ISSN 1553-9768 Summer 2006 Volume 6, Edition 3

Journal of Special Operations Medicine

A Peer Reviewed Journal for SOF Medical Professionals

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Dedicated to the Indomitable Spirit & Sacrifices of the SOF Medic

ISSN 1553-9768 Journal of Special Operations Medicine Volume 6, Edition 3 / Summer 06

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
2006		**00-00-2006 to 00-00-2006**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Journal of Special Operations Medicine, Volume 6, Edition 3	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Joint Special Operations University,357 Tully Street,Alison Building,Hurlburt Field,FL,32544**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**108**	

COVER

ISSN 1553-9768

A medic from the 1st Special Forces Group conducts sick call for Rhade villagers near Ban Me Thout, Vietnam, in March 1962.

From the Editor

The Journal of Special Operations Medicine (JSOM) is an authorized official military quarterly publication of the United States Special Operations Command (USSOCOM), MacDill Air Force Base, Florida. The JSOM is not a publication of the civilian Special Operations Medical Association (SOMA). Our mission is to promote the professional development of Special Operations medical personnel by providing a forum for the examination of the latest advancements in medicine.

Articles, photos, artwork, and letters are invited, as are comments and criticism, and should be addressed to Editor, Journal of Special Operations Medicine, USSOCOM, SOC-SG, 7701 Tampa Point Blvd., MacDill AFB, FL 33621-5323. Telephone: DSN 299-5442, commercial: (813) 828-5442, fax: -2568; e-mail JSOM@socom.mil.

The JSOM is serial indexed (ISSN) with the Library of Congress and all scientific articles are peer-reviewed prior to publication. The Journal of Special Operations Medicine reserves the right to edit all material. No payments can be made for manuscripts submitted for publication.

Official Distribution: This publication is targeted to SOF medical personnel. There are several ways for you to obtain the Journal of Special Operations Medicine (JSOM). 1) USSOCOM-SG distributes the JSOM to all our SOF units and our active editorial consultants. 2) SOMA members receive the JSOM as part of membership. Please note, if you are a SOMA member and are not receiving the subscription, you can contact SOMA through www.somaonline.org or contact MSG Russell Justice at justicer@soc.mil. SOMA provides a very valuable means of obtaining SOF related CME, as well as an annual gathering of SOF medical folks to share current issues. 3) For JSOM readers who do not fall into either of the above mentioned categories, the JSOM is available through paid subscription from the Superintendent of Documents, U.S. Government Printing Office (GPO), for only $30 a year. Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954. GPO order desk-telephone (202) 512-1800; fax (202) 512-2250; or visit http://bookstore.gpo.gov/subscriptions/alphabet.html. You may also use this link to send a email message to the GPO Order Desk—orders@gpo.gov. 4) The JSOM is online through the Joint Special Operations University's new SOF Medical Gateway, it is available to all DoD employees at https://jsou.socom.mil/medical/. On the left you will have several tabs; you must first "log-in" using your SS#, DOB, and name; then go to "publications." Scroll down until you get to the JSOM and click on the picture. From this site, you can link straight to the Government Printing Office to subscribe to the JSOM. We are working with the JSOU to have a SOCOM-SG medical site; we will keep you posted as that progresses. 5) The JSOM can also be emailed in PDF format; if you would like to be added to the PDF list please send your request to JSOM@socom.mil.

Don't forget to do your CMEs!!!! Remember, our continuing education is for all SF medics, PJs, and SEAL corpsmen. In coordination with the Uniformed Services University of Health Sciences (USUHS), we offer CME/CNE to physicians, PAs, and nurses.

The JSOM remains the tool that spans all the SOF services and shares medical information and experiences unique to this community. The JSOM continues to survive because of the generous and time-consuming contributions sent in by physicians and SOF medics, both current and retired, as well as researchers. We need your help! Get published in a peer-review journal NOW! See General Rules of Submission in the back of this journal. We are always looking for SOF-related articles from current and/or former SOF medical veterans. We need you to submit articles that deal with trauma, orthopedic injuries, infectious disease processes, and/or environment and wilderness medicine. More than anything, we need you to write CME articles. Help keep each other current in your re-licensure requirements. Don't forget to send photos to accompany the articles or alone to be included in the photo gallery associated with medical guys and/or training. If you have contributions great or small… send them our way. Our e-mail is: JSOM@socom.mil.

Enjoy this edition of the journal, send us your feedback, and get those article submissions in to us now!

Maj Michelle DuGuay Landers

From the Surgeon

WARNER D. "Rocky" FARR
COLONEL, U.S. ARMY
Command Surgeon
HQ USSOCOM

Arrivals

I arrived at USSOCOM Headquarters in Tampa on 1 June 2006 after forty-five, count them, forty-five days en route. It was a nice break, which I spent mostly ranching in Texas with a short TDY to Hurlburt AFB for a very good counter-terrorism seminar at the Joint Special Operations University–thanks to Lt Col John McAtee. June here at MacDill was a month of transition as I observed CAPT Butler and his office, found a house, wrestled with thousands of boxes of books in my household goods, and basically did not do anything for the good of national defense. As for other arrivals, we have HMCM Mercer in hand. We are still awaiting LTC Bob Vogelsang, incoming veterinary officer who arrives in August.

Farewells

One thing I have learned watching the office is that it takes much appropriate pomp and circumstance to retire a naval person. We had HMCM Gary Welt's retirement ceremony on 16 June and it was great! Bell ringing, piping aboard, piping ashore, side boys, choker whites (not for me!), admirals, cutlasses, every tradition in the books. I seem to have missed the SOF warrior versus biker fistfight at the after party party. I have known Gary quite a while and will miss him much. It appears we are keeping him on the Tactical Combat Care Committee (TCCC), which will benefit us all. His replacement is HMCM Glenn Mercer. Glenn and I went to a performance enhancement conference at the Uniformed Services University of the Health Sciences together earlier in June and he made an impressive presentation of our requirements in this critical area. He can be reached at glenn.mercer@socom.mil.

We stood up and did it all over again two weeks later (30 June) for CAPT Frank Butler retiring from his thirty years of great naval service. Ditto on all the pomp and circumstances, seems like fewer naval persons in choker white and more in white with open collars but other wise similar traditions, and length. The Navy does know how to do this well. Frank is planning to stay involved in the community too.

Tactical Combat Care Committee (TCCC)

Somewhere between these two social activities, extravaganzas and parties, we had a TCCC meeting in downtown Tampa. TCCC is being embraced by all the services, read: the conventional forces. The Navy is funding the TCCC committee, which CAPT (Ret.) Steve Giebner expertly runs. It is a collection of SOF and conventional medical warriors, from corpsman and medics to medical officers, all of which make you proud. This meeting recommended changing from Gatiflox® (gatifloxacin) to Avelox® (moxifloxacin) since Gatiflox® (gatifloxacin) is expiring and is no longer available. It was already the second choice under the last recommendations. The proofs for the sixth edition of the *Prehospital Trauma Life Support* (PHTLS) manual are at the printer (thanks to Dr. McSwain). The book, a separate military version, should be out in the fall. The TCCC also decided to relook haemostatic agents as there are now a number of them out there. Meeting with the TCCC group is both enjoyable and profitable to the community. Their recommendations are great

"top cover" and based in the latest research and clinical practice. The flash to bang time to get a new recommendation to the field is phenomenally short, which saves lives.

Biomedical Initiatives Steering Committee (BISC)

June also saw a BISC meeting that I attended. I plan to start publishing some of the studies that the BISC is funding in the *JSOM* and have my research coordinator write a research and development column in each issue of the journal. The BISC also funded the "TCCC just in time training team" which is doing great deeds. BISC funds are open to any kind of SOF specific research. In the past, we have funded Physician Assistants who needed research funding for the masters degree research efforts. As the Army, Navy and Air Force Component Surgeons are all changing this summer it will be a new crowd at the next BISC when we will vote on full proposals to fund for next year's research effort. The BISC will be 10 and 11 August before the Advanced Technology Applications for Combat Care (ATACC) meeting in St. Petersburg, Florida on 13 to 17 August.

The Joint Special Operations Medical Training Center (JSOMTC) [also known as "Special Warfare Medical Group (Airborne)]. (SWMG [A]).

The JSOTC has passed their accreditation inspection. Quoting from their inspection letter:

CoAEMSP
Committee on Accreditation of Educational Programs for the EMS Professions

1248 Harwood Road
Bedford, TX 76021-4244
817-283-9403
www.coaemsp.org

February 24, 2005

Kevin Keenan, MD, Dean
Uniformed Services-Paramedic Program
USAJFKSWCS
AOJK-M
Fort Bragg, North Carolina
28310-5200

Re: Program Number 600117

Dear Dr. Keenan,

The Committee on Accreditation of Educational Programs for the EMS Professions (CoAEMSP) Board met on February 4-6, 2005 and reviewed your request for Continuing Accreditation for the Paramedic Program sponsored by the Uniformed Services University of Health. After careful consideration, the Committee has forwarded its recommendation of ***Continuing Accreditation*** to the Commission on Accreditation of Allied Health Education Programs (CAAHEP) for accreditation action at its next meeting. The next re-affirmation of the program's Continuing Accreditation with the CoAEMSP/CAAHEP is scheduled for **May 13, 2010**.

Congratulations to the staff, faculty, deans, and commander of JSOMTC and SWMG(A). They have continued to meet the standard while sending maximum graduates to war. The place is busting at the seams and the Marines haven't even asked for seats yet.

The Curriculum Evaluation Board (CEB)

The CEB has delivered their test bank of multiple thousands of professionally vetted questions at the NREMT-P level for use as the external evaluation standard for the Special Operations Forces-Advanced Tactical Provider (SOF-ATP) certification and card. CPT Steve Briggs, Chief, Medical Training, gave the first "β-test" of the examination at the JSOMTC in June. It went well and he will now go to the PJ School at Kirtland to do the same in September. The CEB has a large contingent of civilian physicians who work for free and do not get the credit that they deserve. I met with the current chair, Dr. Rick Hammesfahr at the TCCC

and we discussed future directions. I am trying to get dedicated funding from the command to continue their fine work. Currently they are invaluable in vetting individual questions as issues come up. Their work was critical in showing the last COAEMSP accreditation survey at the JSOMTC that we have a worthy, external examination. Well done and thanks to all the members. Any willing volunteers can contact CPT Briggs: briggss@socom.mil.

USMC/MARSOC

MARSOC has stood up and I have talked by email with their incoming command surgeon who should arrive in August. As we have trained USMC Force Recon Medics before at the JSOMTC, we all know the standard. The new Surgeon's first question coming on board will be, "how do you meet it?" I look forward to helping them come up to speed. The Marine Corps have a long history in SOF and SOF like operations. Read their *Small Wars Manual*, both the old and the new one. It was a Marine Corps General, LTG Samuel B. Griffith II, who translated Mao Tse-tung's "On Guerrilla War" into English. He commanded the 1st Raider Regiment in World War II. Read about the "Boxer Rebellion" and the "China Marines" sometime. Welcome home to our SOF Marine brethren.

The Journal of Special Operations Medicine (JSOM)

I am a strong supporter, and continuing contributor, to the JSOM. You should be also! We will never make it a truly representative, SOF medical journal if the NCOs do not start writing more. Doctors will always fill it up with stuff – I am currently doing that myself. However, that is because the NCOs, including those who present at SOMA, DO NOT WRITE! I promise all, that I will displace a Doctor article for a Medic article every time. Let's get with it. Expect to see more columns from the USSOCOM Surgeon's Office staff also. One of the medical officers at one of the components, now gone, said he wouldn't write for it because it wasn't a "quality journal," he was wrong! Let's all keep proving him wrong! Thanks to Maj DuGuay (now Landers) for continuing to do all the heavy lifting on the journal. For article submission and author details: JSOM@socom.mil.

Medical Website

Lt Col McAtee at the Joint Special Operations University has set up a SOF medical website and it is up and running. Go to https://jsou.socom.mil/medical/default.aspx. It has all the JSOM issues on it. Please let him know what else he should add: john.mcatee@Hurlburt.af.mil. Also, remember the JSOMOC course next spring.

Senior Enlisted Medical Advisor Meetings and Component Surgeons Meetings

HMCM Mercer and I will sit down when we can and attempt to link and synch Senior Enlisted Medical Advisor Meetings and Component Surgeons Meetings to be collocated with a final day together. The senior medical NCOs, under HMCM Welt's leadership have established a great forum to get items surfaced and solved and the medical officers need to do the same. We have not had a component surgeons meeting in quite a while. I want to start them again, perhaps with the officers meeting on the last day together with the NCOs we can get more done. Stay tuned.

The Future

I have not had a sit down with the general yet so my priorities have not had the necessary azimuth check, we'll see what he wants me to work on. Left unguided I plan to fight for more Level 2 capability, more training, and capabilities for medics on the front lines, more research into what's really killing our folks, and getting MARSOF medical started off right. I know there are many folks out there that will want to counsel me personally, so I'm at: office: 813 828-5442; DSN 299-; fax -2568; cell: 813 841-7601 or NIPER: warner.farr@socom.mil. Alternatively, SIPER: warner.farr@hq.socom.smil.mil.

I go over forty years continuous service in the Army next 23 April-come by Tampa, I'm buying.

Senior Enlisted Medical Advisor (SEMA)
HMCM Glenn Mercer

Hello to all our readers and specifically to the enlisted Medics in the Force. I have taken the shop from MC Welt as of July. Gary has retired after 30 years of Fleet and primarily Naval Special Warfare service. We thank him for his achievements and one of the best retirement parties in the history of DOD featuring: Gary, his bird and the house band performing the lead vocals to AC/DC's "Dirty Deeds" with a ten minute stage monologue on the history of Frogmen. For those that had the privilege of working with GW we remember this as just par for the course. Also caught up in this retirement madness was CAPT Butler who was unceremoniously "discovered" by the Bureau of Personnel and told it was time to go home as well. Sir, it was, and has been a pleasure to assist and serve you throughout the years. We look forward to your future contributions from the civilian sector and wish you a rewarding "second" career. Fair winds and following seas to you both.

We recently conducted a JMEAC in June and while it was primarily a turnover event the opportunity to discuss and set the groundwork for future Human Performance issues took place. Currently there is strategic paperwork moving through the staffing process that will prompt significant examination of the what, why, and how much when it comes to the larger topics of performance and optimization. From the senior enlisted perspective this concept document could significantly alter the way we look at preventing injury, raising performance on target, and bridging our operators (warrior athletes) back to capacity. The next JMEAC is tentatively scheduled precedent to the SOMA this year with a combined interest from our Component Surgeons and should be an effective gathering to decide v. discuss.

As for me, I am looking forward to the next 2.5 years here at the HQ. COL Farr is onboard as the new SG and is ready and energized to do good things at the operational level for the medics. In conclusion, I would like to thank SGM Hayes of the Training Company at the JSOMC for his interest and advocacy over the last 18 months while watching over the compound at Fort Bragg. Good luck in your next assignment.

Meet Your JSOM Staff

EXECUTIVE EDITOR
Warner Dahlgren Farr, MD
warner.farr@socom.mil

Colonel "Rocky" Farr was the distinguished honor graduate of his Special Forces 18D class in 1968. He served as a recon team member with the 5th SFG(A) in SOG-Studies and Observations Group. He attended the DLI (German) and joined Detachment A, Berlin Brigade, an early special mission unit. He became the SF instructor at the ROTC Detachment, Northeast LA University and completed his BS. As a SFC, he taught in the 18D course and was selected for MSG. COL Farr was accepted to the Uniformed Services University of the Health Sciences and while a medical student, he was the medical platoon leader for the 11th SFG(A). He received his MD in l983 and has completed residencies in aerospace medicine, and anatomic and clinical pathology. He commanded Company F (ABN), 3rd BN, Academy BDE, Academy of Health Sciences as Course Director of the Special Operations Medical Sergeant's Course; and advisor to the 12th SFG(A). He was Chief, Department of Pathology, Blanchfield Army Community Hospital, and Flight Surgeon, 50th Medical Company (Air Ambulance), 101st ABN Division (Air Assault). COL Farr was the Division Surgeon of the 10th Mountain Division (Light Infantry) until becoming Deputy Commander of the U.S. Army Aeromedical Center. He attended the Air War College before becoming the Deputy Chief of Staff, Surgeon, U.S. Army Special Operations Command; Command Surgeon, U.S. Army Special Forces Command; and Command Surgeon, U.S. Army Civil Affairs and Psychological Operations Command. He became the Command Surgeon of the U.S. Special Operations Command in Tampa, FL in July 2006. He has numerous operational tours to include Bosnia, Kosovo, Kuwait, Vietnam, Cambodia, and Afghanistan.

MANAGING EDITOR
Michelle DuGuay Landers, RN
Duguaym@socom.mil

Maj Landers joined the Army Reserve in 1987 and served as a nurse in a Combat Support Hospital unit for three years before switching services in 1990 to become an Air Force C-130 Flight Nurse. She is currently an IMA reservist attached to the SOCOM/SG office where she is in charge of management, production and publication of the JSOM. Maj Landers has a Bachelors in Nursing and a Masters in Business Administration/Management. Her 20 year nursing career includes being a flight nurse in both the military and private sector, 15 years of clinical experience in emergency and critical care nursing as well as being an EMT and a legal nurse consultant. She also served as the military liaison to her Disaster Medical Assistance Team (DMAT.) Prior to the SG office, Maj Landers' experience at USSOCOM includes an assignment in the Center for Force Structure, Resources, Requirements, and Strategic Assessments.

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USASOC

Joe Caravalho, MD
COL, USA
Command Surgeon

By COL Dalton Diamond, MD, Deputy Surgeon

This is the first and, most likely, the only time I will write this column. Most of you know that COL Rocky Farr has been elevated to the position of USSOCOM Command Surgeon and COL Joe Caravalho, his replacement at USASOC, will not be on the ground until after this issue goes to press. In the interim I am holding the reins of the horse and trying mightily to avoid stepping in the horse manure.

Our office is as busy as ever. We continue to field new and improved Medical Equipment Sets to SF Battalions and other tactical units. Thanks to the genius and dedication of Mr. Joe Marak, our Medical Material and Requirements Specialist, and the herculean efforts of MAJ Hank Sully, Chief of Medical Logistics, and his staff we have fielded over sixty-five million dollars worth of new medical equipment since 2001. As I write this, Mr. Marak has departed for greener pastures and MAJ Sully, who worked his magic from the beginning of the war until the spring of 2006 has returned to Drilling Individual Mobilization Augmentee (DIMA) status and has been replaced by another outstanding USAR Medical Logistics Officer, MAJ Rob Schultz.

Soldiers from the Surgeon's Office are heavily engaged in support to GWOT. LTC Deanna Brown, MAJ Josh Muller, MAJ Tony Littrell, SFC Mike Watson, and SFC Gene Blanding are currently forward deployed in either OIF or OEF; CPT Tracy Michael returned from OIF a few days ago in time to PCS; LTC Rhett Wallace is deployed on a Pre-Deployment Site Survey (PDSS); and MAJ Buck Benson and I are on deck for deployment later this summer.

Heavy items in our rucksack include MC4 fielding, how to manage the post-deployment health reassessment (PDHRA) with our tight deployment cycle, Pandemic Influenza planning, and the SOF Medic Data website. Speaking of the website, it is up and running and access can be requested from the Medical Operational Data System (MODS) homepage on Army Knowledge Online (AKO). LTC Scott Tanner and the training section are shoring up our current training base while pursuing new opportunities; LTC Rocky Rockhill and his operations branch continue to synchronize and drive the overall effort; and Mr. Terry Phelps and I try to stay out of the way while MSG Rodriguez and our stellar NCOs put out all the fires every one else has started.

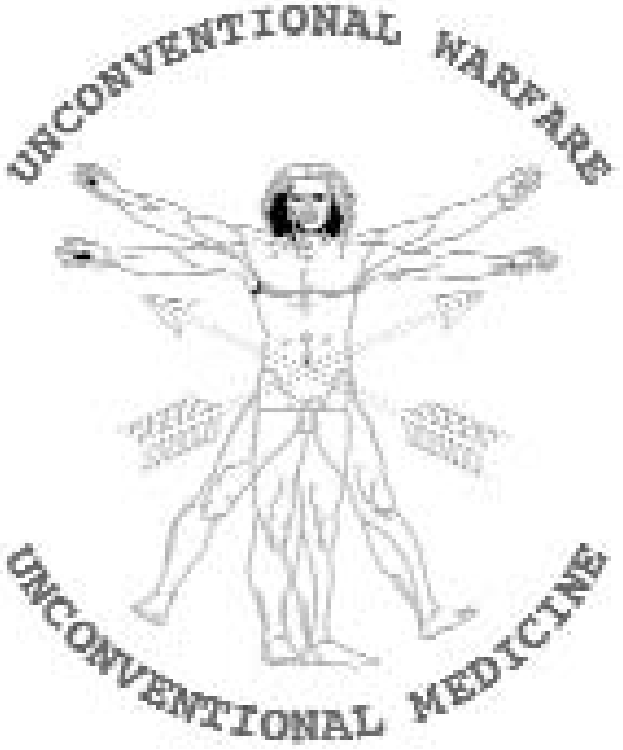
Within USASOC the OPTEMPO never seems to decrease but our AMEDD officers 18Ds, and 91WW1s are resilient and morale remains high. The warrior spirit is alive and well and we continue to recruit and retain the finest medical personnel the Army has to offer! There will be considerable turnover in the SF Group Surgeon's Offices across the board this summer but we are working with HRC to ensure that we get good replacements. Projected growth in SF Battalions over the next few years will increase our need to find more first-rate AMEDD Officers.

The landscape will change as we transition the RC portion of USACAPOC from USASOC to USARC and grow the AC portion. The 95th CA Bde, 97th CA Bn, 98th CA Bn, and 91st CA Bns are being added to the

96th CA Bn in the AC and will report directly to USASOC. This means we will need, at a minimum, eight additional AMEDD officers (4X 60C and 4X 64A) and one hundred and seventeen NCOs over the next three years. We aren't sure how the new AR USACAPOC Surgeon's Office will look but we are fully engaged in recruiting and mobilizing RC assets to keep the momentum going. Stand by for more to follow on CA force structure.

My hat's off to all of you who are practitioners of good medicine in bad places. It is your willingness and ability to take what you learned in the ivory towers of academia and make it work in the dark, in the dirt, in far off places where a certain percentage of the inhabitants want to kill you that sets you apart. It is your stubborn dedication to duty and daily expenditure of sweat on behalf of our sick and wounded that makes it possible to take the fight to our enemies any where, any time, any way. You and your families are my heroes.

As for me, I have been assured by the USASOC Chief of Staff that, come August, my sentence here will be commuted to "time served" and I can return to Afghanistan.



NAVSPECWARCOM

Jay Sourbeer, MD
CAPT, USN
Command Surgeon

By HMCM (SEAL) Mike Beske, Senior Enlisted Medical Advisor

As we all know well, the only constant is change. By the time SOMA 2006 comes around, you will see all new faces and the addition of three new positions within the NAVSPECWARCOM Force Medical Office. We hail and farewell the following personnel:

HAIL

- CAPT Jay Sourbeer, MC, USN, reported in July '06 as the new Force Medical Officer. He came from the White House Medical Unit, White House Physician, and brings with him a broad background of operational and overseas assignments.
- CDR Lanny Boswell, MSC, USN, reported into a new position as Deputy Surgeon/Biomedical Research/Human Performance officer. He came from the position of Director of Strategic Analysis, Naval Service Training Command, Great Lakes, IL.
- LCDR Dave Baptista, MSC, USN, reported as our newest Medical Plans, Ops, Intel officer. He came from Naval Medical Center, San Diego.
- HMCS(SEAL) Rich Moore, reported from Special Boat Team Twelve. Senior Chief Moore will work on medical training and readiness.
- HMC(FMF) Salabao, reported from 3rd MARDIV, Okinawa and will be the Force Medical Administrator.
- HM1(FMF) Arredondo, will report this fall from 1st MARDIV, Camp Pendleton, filling the new position of Force Medical Administrative Assistant.

With the addition of a civilian position starting in FY07, the size of the staff will double in one year. I look forward to the Force Medical Office making significant strides in the upcoming years in all areas of Naval Special Warfare medicine.

FAREWELL

We bid "Fair Winds and Following Seas" to CAPT Andy Woods, who's transferring to Naval Medical Center, San Diego; LCDR Jason Holmes, who's enjoying a one-year tour in the sandbox; and HMCS (FMF) Delgado, who's retiring this fall after 26+ years of service. I thank them all for their significant contributions to NSW medicine and the dedication they have to the SOF operators and their families. HooYa for a job well done!

COMPONENT SURGEON

AFSOC

Timothy Jex, MD
Col, USAF
Command Surgeon

As I write this I haven't officially taken the stick as the AFSOC/SG yet. I make the move across base from my current assignment as the16th Medical Group Commander here at Hurlburt on 20 July, but I appreciate the opportunity to get a few words in early. I'm extremely happy to be able to continue serving within AFSOC. The passion, performance and capabilities of SOF professionals are absolutely unmatched anywhere else and it is truly a privilege and an honor to be part of the team. This is an amazing time to be involved in Special Operations medicine. Not only are we receiving ever increasing recognition for our extraordinary accomplishments and contributions to OEF/OIF and the many other strategic hot spots around the world, but technological advances are opening up whole new realms of possibilities for delivering world-class medical care any time, any place.

As the Command Surgeon, I recognize that my primary responsibility is to make it easier for you to do your job. I'm sure all of you have ideas about how I can do that. I plan to get out and make the rounds early. Talk to me. Tell me what we need to do to get to the next level.

I look forward to serving with each of you and God bless you as you continue to do great things.

HEADQUARTERS USSOCOM

Care Coalition grows for SOF wounded warriors

By Mike Bottoms
USSOCOM Public Affairs

U.S. Special Operations Command sponsored the Care Coalition Conference held at the Davis Conference Center, MacDill Air Force Base, Fla., to further expand the coalition's relationship with non-profit organizations. The two day conference hosted representatives from 16 different benevolent organizations, liaison officers from USSOCOM components and service representatives.

"What the Care Coalition and the non-profit organizations do for our wounded men and women is just so important," said Gen. Doug Brown, commander, U.S. Special Operation Command. "The operator in the field takes great comfort and really focuses on the mission because they know that he and his family will be taken care of if something happens to them."

USSOCOM established the Care Coalition in August 2005 to track, support, and advocate for Special Operations Forces casualties from the Global War on Terrorism for life.

"The Care Coalition mission is to provide wounded special operations warriors and their families an advocacy program in order to enhance their quality of life and strengthen special operations readiness," said Jim Lorraine, director, USSOCOM Care Coalition.

The coalition accomplishes this through advocacy for health benefits, personnel issues, pay and entitlements. The coalition helps keep the wounded warriors and their families aware of benefits and applicable benevolent organizations. Additionally, the organization provides assistance negotiating the medical board process and transition assistance to civilian employment. The coalition also works with government organizations, such as the Department of Defense, services, military health care, and the Department of Veterans Affairs, to ensure the needs of the casualties and their families are supported. Importantly, when a need does not fit into a government program the Care Coalition looks to non-governmental organizations with missions or charters that align with the need of the wounded person or their family.

Staff Sgt. Joseph Kepeczewski, still assigned to A Co. 3/75 Ranger Regiment, sits in his hand-crank bicycle before a "Soldier Ride" race in Key West, Fla. Kepeczewski suffered serious hip and leg injuries from an enemy grenade in Iraq on Oct. 2, 2005. The Care Coalition and the Wounded Warrior Project helped his rehabilitation process. Courtesy photo.

The Special Operations Warrior Foundation is a unique non-profit organization and was represented by Steve McLeary at the conference. "The conference is a key way to expand the network of organizations bringing tangible help to the injured warrior and his family."

"Our organization will provide full funding for a four year college education for kids of SOF who die in training or operations," McLeary said. "We also have started sending a $2,000 check to families of SOF warriors hospitalized due to severe combat wounds for incidental costs that government orders do not cover."

Another distinctive non-profit organization is the Southeastern Guide Dogs or "Paws for Patriots." The organization is the only guide and assist dog non-profit in the U.S. focusing on combat casualties. They provide guide dogs to blinded servicemembers as well as dogs specializing in helping wounded people keep their balance, open doors,

pick up items from the floor, call 911 and provide friendship to amputees, paralyzed or people with traumatic brain injury.

"Southeastern Guide Dogs' mission is to help blind men and women find independence, mobility and dignity through the use of a professionally and humanely trained guide dogs," said Bobby Newman, a founder of the organization. "Since our founding in 1982, Southeastern Guide Dogs has been a proud supporter of American veterans."

According to Lorraine, the Care Coalition has many success stories. One such story is a servicemember who suffered a gunshot wound to his leg resulting in an amputation above the knee. The Soldier remains on active duty and needed a ramp built into his home. Since he remained on active duty he was ineligible for a Veteran's Administration home adaption loan. Upon hearing this story, the Care Coalition contacted The Coalition to Salute America's Heroes and the Armed Forces Foundation and both non-profit organizations combined their efforts in building a ramp and renovating his home.

"We were very happy that Jim Lorraine and the Care Coalition were able to help us when we believed that we were not going to receive any more assistance," said the servicemember.

Another example is a SEAL's daughter who was very ill and needed a referral to the Mayo Clinic in Scottsdale, Ariz. The mother traveled with the daughter from Alaska to Arizona and learned TRICARE had not yet provided the referral and the family would have to wait five days in a hotel for the approval. The Care Coalition worked with TRICARE to authorize the care from Mayo. The Care Coalition also coordinated with the Naval Special Warfare Foundation, and a member of the foundation adopted the family and invited them into their home. The Mayo clinic was able to diagnose and cure the daughter.

Recently, the Jewish Institute for National Security Affairs raised a $120,000 to be donated to SOF wounded warriors. The organization made a $7,000 donation to a 1st Special Forces Group Soldier who suffered a double amputation..

"These are just three examples of hundreds of instances where the USSOCOM Care Coalition ensures the SOF Wounded Warrior and his family needs are met. The Care Coalition is a supporting mechanism for the operator and further allows the operator to fully concentrate on the missions faced in the Global War on Terrorism," Lorraine said.

Jim Lorraine, director, Care Coalition, converses with one of the non-profit representatives during the Coalition Care Conference held at the Davis Conference Center, MacDill Air Force Base, Fla. Photo by Tech. Sgt. Jim Moser.

CARE COALITION

Pillars of the Care Coalition

- *The Special Operations Warrior Foundation*
- *Night Stalker Association*
- *The Armed Forces Foundation*
- *Naval Special Warfare Foundation*
- *The Special Forces Association*
- *The U.S. Army Ranger Association*
- *Wounded Warrior Project*
- *Soldiers' Angels*
- *Yellow Ribbon Fund*
- *The Fisher Houses*
- *The Coalition to Salute America's Heroes*
- *Operation First Response*
- *Helping Our Heroes Foundation*
- *Paralyzed Veterans of America*
- *Comfort for America's Uniformed Services Elite (CAUSE)*
- *Veteran's Benefit Association*
- *Operation Homefront*
- *United States Wounded Soldier Foundation*
- *America Supports You*
- *The Psychological Operations Association*
- *The Air Commando Association*
- *Civil Affairs Association*
- *Enable America*
- *Jewish Institute for National Security Affairs (JINSA)*

USUHS Online Preparedness Education Program

The Uniformed Services University of the Health Sciences (USUHS) and the Center for Disaster and Humanitarian Assistance Medicine (CDHAM) are pleased to announce the availability of the USUHS Online Preparedness Education Program (OPEP).

The requirement for this unique online education project was established through a series of subcommittee hearings and discussions between congressional leaders, the Department of Homeland Security and the Department of Defense.

This no-cost, multi-tiered education program is intended to provide a broad range of interactive training activities that focus on medical response considerations for chemical, biological, radiation and high explosive events by health care providers, planners and emergency response personnel across the nation. The website can also be accessed to review and download a multitude of reference materials relevant to studying WMD threats.

The first OPEP course being released deals with the unique response and medical treatment considerations that involve a domestic radiation event. Visitors to the web-based site will have an opportunity to navigate through a comprehensive set of activities by: 1) objective; 2) lesson topic; or 3) through the study of a unique scenario that guides users to each learning activity via a realistic timeline.

The course is fully accredited, as will be the case for future course offerings. For the domestic radiation event, up to 16 Continuing Medical Education (CME) credits, 19 Continuing Nursing Education (CNE) credits, or Continuing Education Units (CEU) will be awarded to users who register and successfully complete the entire course.

For more information on the CDHAM, OPEP or to find a link to the site, as well as information on how to register, go to www.cdham.org.

Gay D. Thompson, RN, MPH, CHES compiled this list to send out with the author instructions for the Special Operations Forces Medical Handbook 2nd edition. We thought everyone might find it helpful when writing your articles for submission to the JSOM.

Common Spelling Errors: Spelling is particularly important when a computer is utilized to search the text for a certain word. These are the correct spellings of some commonly misspelled medical terms. The "trouble spots" in the words are typed in red.

abscess
accommodation
acetaminophen
albumen
amoxicillin
analgesic
aneurysm
anesthesia
anus
arrhythmia
arthritis
asthma
atresia
axillary
basal
basophil
brachial
breech
callus (noun)
canker
cartilage
catheter
cecum
chancre
cholera
chorea
chlamydia
cocaine
codeine
colon
conjunctiva
conscious
Crohn's disease
decubitus
debridement
diabetes mellitus
diaphragm
diarrhea
dilation
diphtheria
dysentery
ecchymosis
elicit
emphysema
empyema
epiphysis
epistaxis
erythema
exacerbate
fasciitis
fibromyalgia
fibrous
filariasis
foramen
funduscope
giardiasis
gonorrhea
Guinea worm
helminth
hematoma
hemorrhoid
hepatitis
humerus
hymen
hypnic
iliopsoas
ileus
ilium
impetigo
incontinence
inflammation
intussusception
larynx
leukemia
liquefy
Lyme disease
lymph
lymphedema
malaise
malleolus
malleus
maneuver
melanoma
menorrhagia
menstruation
migraine
mnemonic
mucous (adjective)
mucus (noun)
myofascial
neurology
Novocaine
ophthalmoscope
oriented
palate
palliative
parenteral
paroxysmal
pathognomonic
penicillin
perineal
peritoneum
peroneal
persistent
petechia (singular);
petechiae (plural)
phlegm
plantar
pleurisy
pneumococcus
pneumonic
pore
preventive
prostate
prosthesis
pruritic
pruritus
psoas
psoriasis
purulent
regimen
resistant
rhythm
rigor
saggital
saliva
scalene
scarring
sciatica
sclera
sedentary
seizure
somnolence
specimen
sphincter
sphygmomanometer
stethoscope
suppurate
susceptible
symmetrical
syncope
syphilis
tachypnea
temporal
tetanus
thelarche
thoracic
tinnitus
tonsil
tonsillectomy
urticaria
varicose
vesicle
vulva
welt
wheal
X-ray

Research & Development

Mechanical Shock and Injury in Special Warfare Combatant Craft Crewmen (SWCC)

James A. Hodgdon, Ph.D., Warfighter Performance Program, Naval Health Research Center, San Diego, CA 92152

Due to length of the "March 2006 Biomedical Initiatives Steering Committee, Special Operations Command" final report (25 pgs), this is an abbreviated version. For the complete report, please email JSOM@socom.mil.

Introduction

The high prevalence of musculoskeletal injuries among Special Warfare Combatant-craft Crewmen (SWCC) has been a cause for concern for some time. Ensign and coworkers (2000) collected self-report medical histories from SWCC attached to Special Boat Teams (SBT) 12, 20 and 22. They found that 65% of the boat operators they surveyed reported having had one or more injuries. The boat operators attributed 95% of these injuries to boat operations. SWCC had the greatest hospitalization rate for their set of musculoskeletal injuries of any Navy rating. Publication of this report helped to serve as a catalyst to mobilize efforts to study the relationships between mechanical shock and injury, and to implement technology solutions to decrease the exposure to mechanical shock.

One of the research efforts to grow out of this increased level of interest in shock mitigation for SWCC was to understand relationships between mechanical shock exposure and the development of injuries. This research was jointly funded by the Office of Naval Research, under its Warfighter Protection Future Naval Capability, and the Special Operations Command (SOCOM) under its MedTech program.

The objectives of the research were: (1) To determine relationships between shock exposure attendant to Special Warfare Combat Craft (SWCC) operations, and the development of musculoskeletal and other injuries, (2) To determine the biomedical factors which underlie these injuries, (3) To develop exposure standards for SWCC operators to decrease the development of injury based on cumulative exposure, and (4) To develop a biomedical methodology and establishment of baseline measures for evaluation of the efficacy of shock mitigation technologies.

Over a three-year period from FY2003 to FY2005, SOCOM provided $298K to support this research effort. This report provides the results of the completed portions of this study. The emphasis is on the research to which the SOCOM funding was applied.

Methods

The design for this study was to identify a cohort of SWCC to follow during their workup for deployment overseas. Their physical status and aspects of their medical history would be evaluated. Exposure to boat-related impacts would be assessed. Medical reporting for musculoskeletal injuries would be followed during the workup, and their physical status would be evaluated again prior to deployment.

In addition, a set of SWCC trainees would have their physical status evaluated at graduation from SWCC School. School graduates were measured to provide measures of initial status at the time of entry into Special Boat service. Their measurements could then be compared to those already in Boat service to determine whether or not changes had occurred in the current SWCC that might be associated with Boat service.

Subjects

A SBT Squadron consisting of one Mk V patrol boat detachment and five rigid-hull inflatable boat (RHIB) detachments was identified for study recruitment. Members of the Squadron were briefed on the nature of the study; its purposes and the risks associated with participation. Thirty-seven team members gave their consent to participate.

Medical Information

At the beginning of the study period, participants filled out a Medical History Questionnaire that posed questions about the length of time they had served in Special Boats and about any past injuries they had had to their neck, shoulder, back, hips, knees or ankles. These injury questions asked about the occurrence of injury ever in the past, as well as their injury history for the year preceding filling out of the questionnaire. In addition, individual medical records of the SWCC participants were reviewed to determine whether or not

they had reported to the clinic with a musculoskeletal injury during the study period.

Physical Status

Participants were also given a physical status evaluation consisting of a series functional range of motion tests, an isometric leg press, a series of balance tests, and a bone health examination using dual-energy X-ray absorptiometry (DXA). For the SWCC participants, these tests were given at the beginning of the study and again prior to deployment. The graduates were tested one time just prior to graduation.

Functional Range of Motion (FROM) Tests

The FROM tests consisted of moving pegs on pegboard approximately seven feet tall with a back panel approximately four feet wide and wings that protrude forward approximately two feet. (BTE Technologies, Hanover, MD). Three FROM tests were performed. (1) Overhead reach with rotation. The participant moved five rows of pegs from the upper range of panel five to the middle range of panel 6, then to the middle range of panel five, then to the upper range of panel 6, then back to the upper range of panel five. This process was completed two times. (2) Middle reach with horizontal displacement. The participant moved five rows of pegs from the middle range of panel two to the same row in middle range of panel three and back five times. While carrying out this task, the participant was positioned three feet from the base of the pegboard and bent from the waist while performing the task. (3) Movement from crouching to standing and back to crouching. The participant started in a crouched position and moved one row of pegs from the lowest row in the lower range of panel three up one row at a time, until reaching the upper row of the lower range. He then stood and moved the row of pegs, one row at a time from the lowest row of the middle range of panel three to the highest row of the middle range. He then reversed this sequence moving the pegs down one row at a time until they are returned to their starting positions and changing from standing to crouching as the pegs were moved from the middle to lower range. The cycle (crouch to stand to crouch) was repeated 3.5 times and the test was completed with the participant in a standing position.

All of the FROM tests were timed. In addition, Methods-time Measurement scores (MTM) were calculated for each test. MTM is a system of time and motion study developed in 1946 by Maynard, Stegemerten, and Schwab. MTM "Analyzes any manual operation or method into the basic motions required to perform it and assigns to each motion a predetermined time standard which is determined by the nature of the motion and the conditions under which it is made" (Maynard, Stegemerten, and Schwab, 1948, p.12). MTM has become the most widely used and universally recognized such system in the world (Prabhu and Baker, 1986). MTM analysis of the work samples yields time values that represent the work rate standards that well-trained employees in typical industrial contexts would be expected to maintain over the course of the eight-hour workday as they repeatedly performed the exercises. In essence, therefore, an MTM value is a comfortable but efficient work rate performance standard for competent workers. The MTM value is time required to perform the task divided into the standard work time for the task and expressed as a percentage. A score of 100 would be the expected value for the comfortable, but efficient work rate.

Isometric Leg Press -- The isometric leg press was performed in a chair to which an adjustable yoke with foot pedals and a load cell had been added. The participant sat in the chair and pressed against the foot pedals. The distance from the chair edge to the yoke was adjustable. The yoke was moved towards or away from the chair edge to set the knee angle at 100º. A strap was fastened across the participant's hips to keep the buttocks on the chair. After adjusting the knee angle, the participant was required to press on the yoke with his legs as hard as he could for 10 seconds. He was then allowed to rest 10 seconds and then press again for another 10 seconds. This cycle was repeated six times. The integrated force generated during the last four leg contractions was recorded.

Balance Tests -- A series of 30-sec balance tests were carried with the participant standing on a pressure-sensitive mat (MatScan, Tekscan, NY, NY). Center of pressure (COP) values were recorded for each foot while it was in contact with the mat. A variety of indices were calculated to measure the movement of the COP during the tests. Six tests were administered: (1) standing on both feet with eyes open, (2) standing on both feet with eyes closed, (3) standing on the right foot only with eyes open, (4) standing on the left foot only with eyes open, (5) standing on the right foot only with eyes closed, and (6) standing on the left foot only with eyes closed. Three trials each were allowed for tests (5) and (6) to allow the participant to achieve 30 seconds of standing on the mat. Trials were terminated if the participant moved his foot on the mat, or lost his balance. Balance was characterized as (1) the linear distance traveled by the center of pressure during the 30 seconds (or less) of

measurement and (2) the average deviation of the center of pressure from the mean center of pressure location during the 30 seconds of measurement.

DXA examination

Measurements of bone density and body composition were made using DXA (Discovery A, Hologic, Inc., Bedford, MA). Each participant was given a whole body scan (body composition and overall bone density), and had additional scans made of the left hip, and lumbar spine (P/A and lateral). In addition, a single energy image of the lateral aspect of the thoracic and lumbar spine was made to allow vertebral morphometry to be assessed. All dual-energy scans were analyzed using the manufacturer's software and in accordance with the manufacturer's instructions.

The hip scans were also sent to Dr. Thomas Beck at Johns Hopkins University for hip strength analysis. Hip strength analysis is based on determination of three dimensional bone properties such as cortical thickness and bone cross-sectional area from the planar DXA image. From the derived measures, cross-sectional moments of inertia, and section moduli are calculated for the narrow neck of the femur, the intertrochanteric region, and the femoral shaft.

The lateral single-energy scan was used to determine vertebral shapes with an emphasis on the identification of deformities. The procedure is known as vertebral morphometry. The measurement of vertebral morphometry from the single-energy scans was carried out following the methods of Blake, Rea & Fogelman (1999). Points were placed on a computer screen image of the thoracic and lumbar vertebrae identifying the posterior and anterior superior and inferior corners of the vertebral body. Additional points were placed on the superior and inferior margins of the vertebral body midway between the anterior and posterior points. Placement of vertebral measurement points was carried out using the methods suggested by Rea (Appendix to Blake, Rea & Fogelman, 1999). Three vertebral heights were calculated as the difference between the superior and inferior markers of a vertebral body: a posterior height, a mid-body height, and an anterior height. Indicators of deformity were calculated from the calculated heights. Wedge deformity was defined as the ratio of the anterior height to the posterior height. Mid-wedge deformity was defined as the ratio of the mid-body height to the posterior height. Crush1 deformity was defined as the ratio of the posterior height of a vertebra to the posterior height of the vertebra below it, and crush2 deformity was defined as the ratio of the posterior height of a vertebra to that of the vertebra above it.

Vertebral morphometry is commonly carried out using standard radiographs of the spine. Some reference values exist for radiographic vertebral morphometry. However, these reference values do not match those that are obtained from DXA machines. Rea and coworkers (1998) have published a reference set of values obtained from older women. We will determine the appropriateness of these reference values for use with our Special Boat samples.

Mechanical Shock Exposure

Two methods were used to determine the exposure of the study participants to mechanical shock exposure. Firstly, the boats of the squadron were outfitted with data loggers having tri-axial acceleration sensors and tri-axial angular rate sensors to record impacts while the boats were underway. These data loggers were developed and constructed by the Naval Surface Warfare Center, Panama City (NSWC-PC). Each unit measures approximately 3/4-inch by 7-inch by 4-inch, can collect up to 8 channels of data. The signals are sampled at 1250 Hz and anti-aliased at 250 Hz within the data logger. Recorded data is written to a 512 MB Compact Flash memory card that is capable of recording up to eight hours of data.

Study participants were responsible for turning the data logger on as they got underway, and turning it off at the end of the underway period. They also removed the Compact Flash cards and copied them to CD-ROM using a special CD-ROM writer designed to go directly from flash card to CD. The CDs had preprinted labels which were to be filled out to indicate date and time of the underway period, boat hull number and crewmembers aboard the boat for that underway period. The CDs were sent to NSWC-PC for analysis.

Initial data analysis focused on accelerations recorded in the z-axis (vertical). The data files were divided into 15-sec segments. For each segment, the mean, the peak and the root-mean square acceleration were computed. In addition acceleration histograms were created with 1g-magnitude categories (i.e. 0-1g, 1-2g, etc.), each containing a count of the number of impacts received in that acceleration range. Such a histogram summary was developed for each mission.
This impact frequency by acceleration magnitude profile was used to generate and index of relative injury risk. The index was based on the work of Carter and coworkers (1981). These authors conducted uniaxial fatigue tests of devitalized cortical bone specimens at strain ranges of 0.005 to 0.010 applied at physiological loading rates.

The authors indicated in one of their figures that strain ranges up to 0.001 were equivalent to walking, strain ranges of 0.001 to 0.002 were equivalent to running, and strain ranges of 0.002 to 0.004 were equivalent to "rigorous exercise". Walking is known to generate z-axis ground reaction forces of 1 – 1.5gz, and running to generate z-axis ground reaction forces of two to 3gz (Nilsson & Thorstensson, 1989). The assumption was made that for the purposes of this index 0.001 total strain range was approximately equivalent to 1gz, 0.002 to 2 gz, and so on. For each acceleration category, the midpoint g value was entered to estimate a theoretical maximum number of cycles to failure for that category.

The number of recorded impacts in each category was then divided by the theoretical maximum for that category to provide a fatigue fraction for each category. In accordance with the notions of Prendergast and Taylor (1994), these fatigue fractions were then summed to provide a total damage fraction. This value was then multiplied by 100 to indicate a percent damage. If the transformation from De to gz were accurate, then a value of 100 would indicate that the damage was equivalent to that necessary to break a devitalized cortical bone specimen. It is unlikely that the transformation performed is valid, but the index value determined should be related to the relative risk of damage to connective tissue elements during impact.

As a secondary means of monitoring exposure, sailing plans were collected from the detachments participating in the study. The sailing plan contains information about the anticipated time underway, environmental conditions, boat hull number, and the crewmembers planning to be on board.

A Sail Plan Database was written in Microsoft ACCESS to allow storage and manipulation of the exposure information. The Sailing Plan information as well as the information from the CD-ROM labels and index values derived from the acceleration data were entered into the database. When the CD-ROM label information and sailing plan information overlapped a single record was created to hold all the information related to that mission.

Analysis

All statistical analyses were carried out using SPSS for Window v.12 (SPSS, Inc., Chicago, IL). Comparisons between SWCC participant and the class graduates were made using t-tests for independent means. Such comparisons were made between the initial measurements taken on the SWCC and the measurements made just prior to graduation for the students. In this way, comparisons could be made between participants ready to enter active Special Boat service and those who already were engaged in such service. Changes in mean values during the period of study for the SWCC were made using t-tests for correlated means between measurements taken at the initial evaluation and those taken at the final evaluation. Comparisons of measured values with theoretical means were made using the t-test for single samples. When necessary, standardized variables (or Z transforms) were calculated using the DESCRIPTIVES procedure in SPSS. Identification of variables for inclusion in injury models were developed based on t-tests for independent means (where presence or absence of injury was the grouping factor), or serial correlations between variables and presence or absence of injury.

Results and Discussion

Participants were followed from January thru August 2004. Twenty-five SWCC participants took part in the second physical evaluation.

Medical Information

Medical History Questionnaire

From the Medical History Questionnaire, it was determined that 28 of the 37 participants had sustained musculoskeletal injuries prior to entry into the study. Twenty-five participants out of the 37 had experienced musculoskeletal problems within the last year.

Injuries

During the seven-month course of this study, review of the medical records revealed 15 musculoskeletal injuries among 14 of the 37 study participants. The distribution of injuries by location is indicated in Table 3. Other injury sites were foot and ribs. Of those injured, 10 had been previously injured at the same site. The prevalence of injuries was not different among operators of different craft types. Five of 12 Mk V operators (41.7%) reported an injury and 9 of 25 RHIB operators (36.0%) reported an injury.

Physical Evaluation

Functional Range of Motion Tests

Two of the FROM tests were dropped from the Physical Evaluation. The middle reach with horizontal displacement was dropped because several of the participants refused to take the test on its second administration. They complained that the back discomfort was too great.

Initial Wound Management of Improvised Explosive Device or Land Mine Blast Injuries Treated at U.S. Forward Operating Base in Afghanistan

Peter D. Ray, MD; James D. Frizzi, MD; John B. Raff, MD; Robert F. Malsby III, DO, FS, DMO

Abstract

The forward surgical and special operations facilities located at a Forward Operating Base (FOB) in Afghanistan were tasked with providing initial resuscitative and surgical care as well as stabilization of injured U.S. and coalition forces. In addition, definitive surgical care for local nationals who were at risk for life, limb or eyesight (LLE) injuries were brought by MEDEVAC to these facilities. During the initial four months of deployment this joint surgical team received, evaluated, and rendered treatment to 215 trauma patients. Of these, 22 were due to improvised explosive devices (IEDs) or mine blasts. The character of these wounds differed substantially from injuries seen in civilian practice in the United States. The purpose of this paper is to report a method of initial management which proved to be clinically practical and effective, in the hope that it may benefit others who are called upon to treat these injuries.

One aspect of these blast wounds that was particularly challenging was the propensity for bits of rock, mud, and assembly components to be forcibly driven under enormous pressure through dermis and muscle along fascial and intermuscular planes. The blast detritus resulted in grossly contaminated deep tracts along the limb within multiple compartments. The actual level of contamination frequently was far more proximal than the visually evident injury. Depending on the trajectory and distance from point of detonation there is often a surprising loss of skin, subcutaneous tissue, muscle, fascia, and occasionally tendon, bone, and capsular tissue. (Pictures 1 and 2)

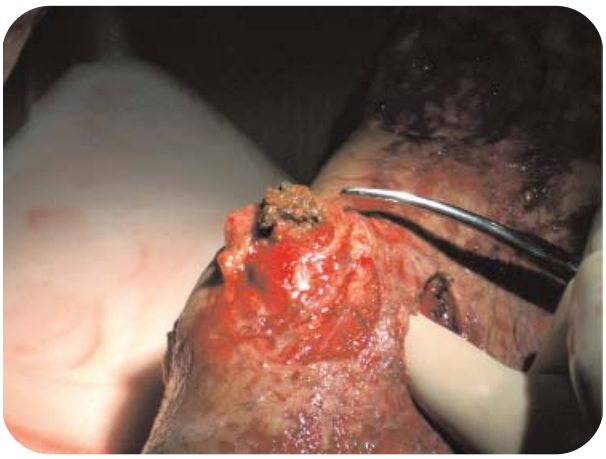
Picture 1
Local national child one hour after stepping on a land mine, brought to the U.S. military surgical facility. Note multiple areas of injected mud and debris.

Externally, the skin and soft tissue can look surprisingly normal. The overall viability of both skin and muscle is often not apparent for up to 48 hours. Initially, multiple repeat visits to the operating room with a single surgeon were met with persistent, widespread draining tracts of pus, the base of which often harbored mud and gravel. (Picture. 3)

Use of the routine pulsatile pressure irrigation system with both saline and antibiotic additives as one would manage a mangled extremity from a vehicular accident in the U.S. did not effectively clear the deeper areas of contamination. There seemed to be a grease or grime component to the injected debris. Tracts often required unroofing remote from the point of the dermal penetration. An analogous injury pattern in the U.S. would be a limb

Picture 2
The same young local national boy but showing the posterior left leg and concomitant soft tissue loss. There is risk of contamination of the hip and knee joint.

injury due to high pressure grease guns or industrial solvent machines; one difference being that IEDs and landmines affect the entire limb or even multiple limbs, in potentially hundreds of individual places.



Picture 3
Deep-seated debris found on second operation embedded between the lower leg muscular planes. These are often times located in multiple places and not radiographically detectable.

Treatment Technique

After managing a number of these patients, it became apparent that the initial Betadine® scrub and prep of the wound bed did not effectively remove the oil, grease, or dirt in the deeper areas. Better methods evolved as our experience with these wounds increased. Adding 5ml of 4% Chlorhexidine scrub soap as a solvent to the first 1000ml of saline irrigation markedly improved the clearance of grime and dirt from the wounds. The tremendous foaming which arose in the suction canisters was neutralized by adding 80mg of crushed simethicone to the suction canister. This prevented the need to change out suction canisters, a rare commodity so far forward on the battlefield.

In multi-extremity cases, the number of operators assigned to the initial debridement was expanded. On one case, three providers were employed at the same time. Each was assigned to one limb and was charged with meticulous unroofing and irrigation of all visible dermal punctures or violated fascial planes. Patients were re-treated the following day with further debridement under general or regional anesthesia. Subsequent debridements were done under conscious sedation and were followed by a "team dressing change" lasting about 15 minutes.

The Forward Surgical Team (FST) was frequently able to apply skin grafts and proceed with definitive or staged closure of the wound at 48 hours after the initial debridement. A forward surgical facility is designed to have a 72 hour holding capability and does not have the staff to operate continuously beyond that time frame. As our experience progressed, the FST surgeons routinely applied skin grafts under sedation outside of the operating room, on an elective basis, for the local nationals.

Early skin grafting, prior to the arrival of granulation tissue in the wound, dramatically reduced the amount of bandages and dressings being consumed. The ability to stabilize the wound within the initial 48 hours aided U.S. Soldiers who were returning to the United States. The local national patients benefitted from this expedient method, as it allowed them to obtain a level of wound stability that could be managed by the local medical community, thereby reducing local reliance on U.S. military facilities. This technique and many others like it should become very valuable as our Special Operations Force venture out to provide not only Level I, but also Level II resuscitative care with ARSOF and AFSOF Surgical assets. Other operational providers who are deployed are encouraged to use or improve upon this method when they are faced with these difficult injuries.

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MAJ Robert Malsby is residency trained and board certified in Family Medicine and received his training at Martin Army Community Hospital, Ft. Benning, Georgia. He is currently Battalion Surgeon for 3rd Battalion, 3rd Special Forces Group (Airborne), Ft. Bragg, North Carolina.

Differentiating Causes of Hypoxemia in Special Operations Trainees

Jaime Rodríguez, MD; Jack Hammes, MD

Abstract

The differential diagnosis of hypoxemia in special operations trainees is different from that of the general population. While diseases contributing to hypoxemia in the elderly and others are manifold, the likely causes in the young healthy male population are relatively limited. They include previously unrecognized reactive airway disease, traumatic or spontaneous pneumothorax, aspiration, pneumonia, and swim induced pulmonary edema (SIPE). Hypoxemia defined as a pulse oxygen saturation less than 97% is a common occurrence at the Basic Underwater Demolition School (BUD/S) and occurs in approximately one in ten students. Of the above mentioned causes, SIPE and pneumonia are almost exclusively seen in this patient population during Hell Week, a five-day period during which trainees are placed under profound physical and emotional stress. Hypoxemia may occur in military personnel in other training and operational environments. The purpose of this review is to illustrate the salient features differentiating these two common conditions and to describe their impact on successful completion of training.

Background

BUD/S is a rigorous six month training program designed to select and prepare trainees for Naval Special Warfare (also known as sea, air, land teams, or SEAL/s.) BUD/S takes place at the Naval Special Warfare Center (NSWC) in San Diego, California. The student population consists of highly motivated males ranging in age from 18 to 34. They are in top physical condition and have no significant underlying medical conditions that can be detected by routine screening methods. The intense training involves extremes of exertion, cold water (temperature ranging between 52 and 72 degrees Farenheit) exposure, sleep deprivation, and close contact with other trainees. Of students who begin BUD/S training, 75% will not finish. The majority of this attrition occurs during the first of three phases. While most attrition consists of voluntary drop from training, medical conditions result in approximately 11% of attritions (personal communication: CDR Chris Christenson, USN, Director of Training, NSWC.)

Students in this high risk training are followed very closely for the development of potentially life threatening illness. Hypoxemia is usually noted by non-medical personnel as difficulty keeping up with the class during physical training evolutions, coughing, bloody sputum, visible shortness of breath at rest, or altered level of consciousness. Physical training evolutions include running, swimming, treading water, calisthenics, obstacle courses, and small boat operations. Trainees do not use SCUBA equipment until after first phase is complete. Students presenting with signs or symptoms of hypoxemia (measured pulse oxygen saturation less than 97%) are referred for evaluation by medical officers, who are immediately available at all times during Hell Week. Signs and symptoms of hypoxemic disorders include decreased exercise tolerance, shortness of breath, chest tightness, cough (dry, productive, or bloody), lightheadedness, mental status changes, abnormal lung sounds (wheezing, rhonchi, and rales,) tachypnea and cyanosis. The two most common etiologies for this presentation in SEAL trainees are pneumonia and SIPE.

The presentation of SIPE (besides hypoxemia) typically includes copious production of frothy sputum (accompanied by blood more often than not.) Chest radiographs may show unilateral or bilateral diffuse airspace opacities which quickly resolve upon rest and administration of oxygen and bronchodilators. SIPE is a condition of stress failure of the pulmonary capillary bed. The mechanisms for this failure are likely related to exertion and the vascular volume changes of immersion (in this case, in cold water). There is an increase in central vascular volume related to peripheral vasoconstriction, increased hydrostatic pressure, and reduction in effect of gravity. The mean increase in cardiac output during head above water immersion is 32% with an associated increase in pulmonary artery pressure. Vital capacity is concomitantly reduced by 700ml

due to a shift of blood from the periphery to the thorax. Investigations into the nature of SIPE have shown this to be a non-infectious, non-inflammatory, potentially life-threatening condition. As noted above, patients respond rapidly to supportive care. Echocardiographic studies have shown normal cardiac function.

Pneumonia occurs in military recruit populations at a significantly greater frequency than the general population. It is defined as an acute infection of the lung accompanied by symptoms of systemic illness. It is similar to SIPE in that cough, fever, shortness of breath, and pulmonary infiltrates on chest x-ray are typical characteristics. The de facto gold standard for diagnosing pneumonia is chest radiography, although this is an imperfect test. Ideally, culture of sputum to obtain a specific pathogen in the right clinical scenario will confirm pneumonia, however this is frequently not done in clinical practice. Proposed risk factors for the development of pneumonia in recruit and similar populations include overcrowding and antecedent viral infections.

Methods

We reviewed available records from August 2000 to May 2006 from training logs for BUD/S classes to search for cases of hypoxemia. Two cases of hypoxemia from the primary causes of hypoxemia are presented. The features differentiating these two cases are described. Numbers of BUD/S trainees lost from training due to the two primary causes are presented and correlated with various factors.

Results

Case 1: A 32 year old white man was brought to medical by instructor staff with persistent cough and shortness of breath on day number three of Hell Week. He denied aspirating water. His oxygen saturation (SaO_2) was determined by portable measurement (Nonin Medical, Plymouth, MN) in the field to be 86%. He appeared tired and in mild respiratory distress. His other vital signs were notable for a pulse of 98, oral temperature of 94.2 degrees Fahrenheit, and a blood pressure of 115/73. His exam was notable for diffuse bilateral rhonchi and basilar rales. He produced blood-tinged non-purulent appearing sputum during his initial evaluation. (Figure 1) His SaO_2 increased to 90% with two treatments of nebulized albuterol.

Figure 1

A chest x-ray was obtained (Figure 2) which revealed bilateral diffuse airspace opacities. He was treated with supplemental oxygen by nasal cannula, gatifloxacin, and rest. His SaO_2 improved over the following 12 hours to 96%. He remained afebrile but was unable to continue training. Within 48 hours he felt completely well and his vital signs and SaO_2 were normal. A follow up chest x-ray (Figure 3) obtained four days later revealed complete resolution of the opacities seen previously.

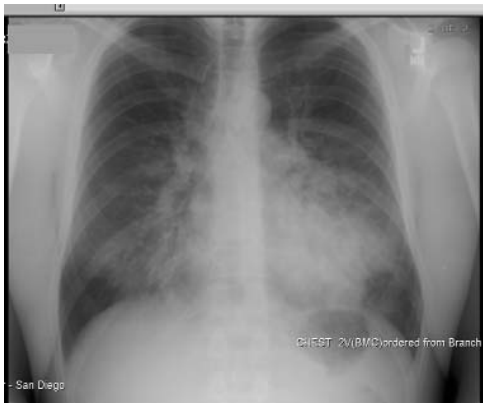

Figure 2

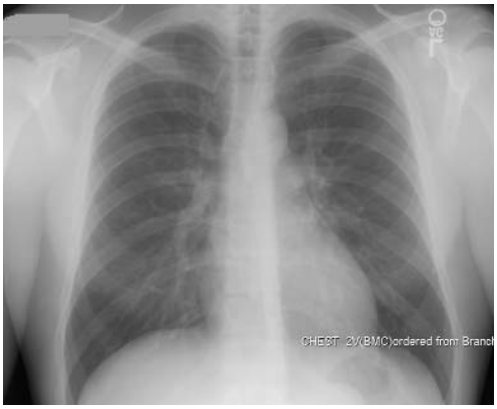

Figure 3

Case 2: A 22-year-old white man experienced sudden onset of shortness of breath and was unable to keep up with his boat crew on day two of Hell Week. The patient denied aspiration of water. The patient was immediately removed from training and found to be tachypneic and hypoxic, with a SaO_2 of 88% in the field as reported by the SEAL corpsmen instructors. He was immediately transported to medical where he continued to complain of shortness of breath and productive cough. He had no significant medical history except for starting Hell week with a "mild head cold." His vital signs were notable for a rectal temperature of 97.2 degrees Fahrenheit, pulse of 72, blood pressure125/78, respiratory rate 16 breaths/min and SaO_2 on room air of 90%. On inspection patient's sputum was also blood tinged. Physical examination was remarkable for rales and rhonchi at the left base. There was no jugular venous distension or tracheal deviation.

Chest radiograph (Figure 4) revealed a patchy air space process in the right middle lobe consistent with pneumonia. The patient was treated with supplemental oxygen via nasal cannula, nebulized albuterol and ipratropium. He was also started empirically on gatifloxacin. On reassessment after treatment, his SaO_2 improved, and he was able to complete sub maximal stress testing and resume training. With continued close observation and supportive care the patient completed Hell Week. Follow-up chest radiograph at 48 hours (Figure 5) showed mild interval improvement but not resolution of infiltrates.

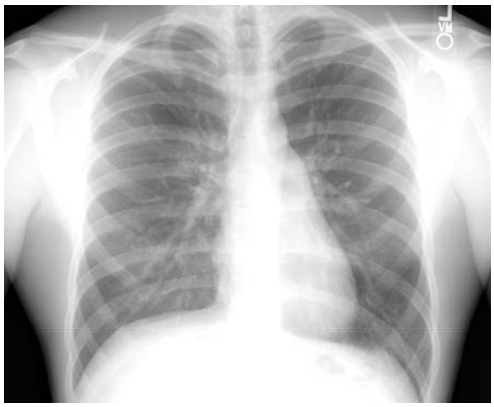

Figure 4

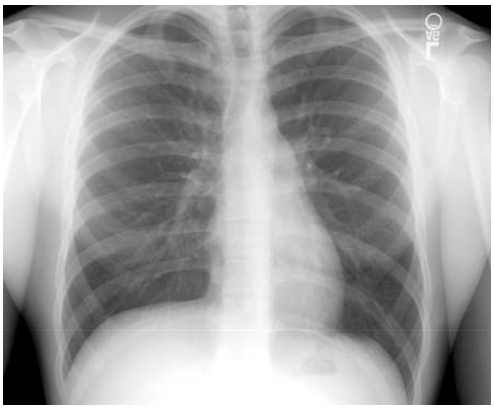

Figure 5

While students at BUD/S have presented with hypoxemia for many years, it was not until the late 1990s that pulmonary edema due to immersion/exertion (SIPE) was formally recognized. Since that time, there have been an average 2.2 cases per training class (there are typically five classes per year.) Table 1 illustrates attrition due to hypoxemic causes over several years of classes at BUD/S. These attritions are almost entirely limited to Hell Week. The numbers provided do not reflect students who are diagnosed with SIPE or pneumonia and manage to stay with their respective classes (as did the patient described in case 2.)

Table 1 (numbers are cases per year)

	Pneumonia	SIPE
2001	9	11
2002	29	15
2003	4	2
2004	8	5
2005	3	21

We and others have theorized that SIPE occurs more frequently during training in colder water. The average ocean temperature in San Diego is 58 degrees Fahrenheit in the winter and 68 degrees Fahrenheit in the summer. Occurrence of both pneumonia and SIPE appear to be correlated with seasonal changes in water temperature (see Figure 6) with the lowest rates of both occurring in the summer and the highest rates occurring in the winter. These findings are consistent with the theory that cold induced vasoconstriction is an important pathogenetic feature of SIPE. The more frequent occurrence of pneumonia during the winter is also consistent with the well known tendency for pneumonia to be more common during this period.

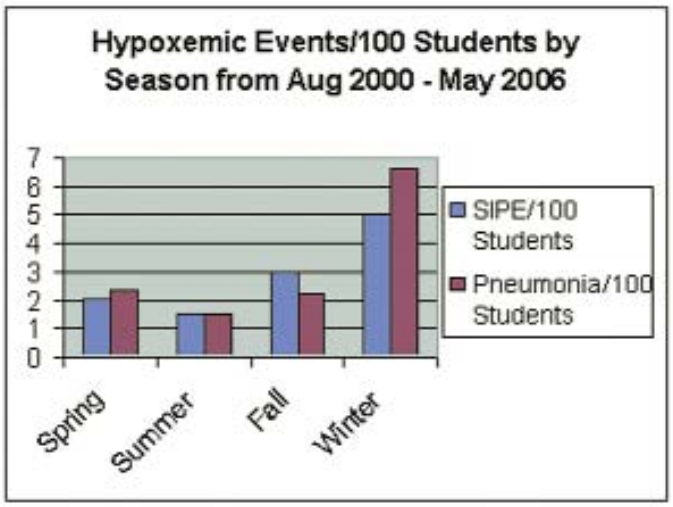

Figure 6

Discussion

Hypoxemia is a common presenting condition for students at BUD/S. Pneumonia and SIPE are by far the most likely causes for this. Bloody and/or frothy sputum and bilateral pulmonary infiltrates help to differentiate SIPE from pneumonia. Patients with SIPE typically have complete resolution of symptoms within 24 to 48 hours of presentation -- this is uncommon among pneumonia victims. The diagnosis is often confirmed retrospectively when the follow-up chest x-ray reveals dramatic improvement in a short period.

Differentiating these conditions may be more important than it would first appear. SIPE is probably seen most commonly at NSWC. It has also been reported at the Naval Diving and Salvage Training Center (personal communication: CDR Tom Robinson, USN) and at other institutions where combat swimmers are trained. It has also been described in other settings (recreational scuba diving, breath-hold divers, and long distance swimmers) and is very likely under-recognized. Supportive care for both conditions may involve oxygen and inhaled bronchodilators such as albuterol and ipratropium. SIPE has also been variably treated with diuretics, vasodilators, and hyperbaric oxygen. However this experience is anecdotal and these cannot be routinely recommended. Differentiating these is important for two reasons. One is that outbreaks of pneumonia may cause significant morbidity in training settings. Surveillance and discovery of sentinel cases may help avert outbreaks. Furthermore, patients who have had SIPE may be at risk to acquire it again. Identifying such patients may result in more adherence to measures designed to prevent it.

Two additional considerations bear emphasis. Pulmonary embolism, myocardial dysfunction, and other causes of hypoxemia are unusual in young, otherwise healthy persons, but may occasionally occur. Providers should consider evaluation for these and other cardio-pulmonary diagnoses if the history, physical, and radiograph do not support SIPE or pneumonia. Furthermore, despite the different characteristics of these conditions (Table 2), making a firm diagnosis may be difficult.

Table 2

	Pneumonia	SIPE
Shortness of Breath	+++	+++
Cough	+++	+++
Blood in sputum	+	++
Bilateral infiltrates	+/-	+++
Fever	++	+/-
Rapid Resolution of Infiltrate(s)	_	+++

The consequence of neglecting to treat pneumonia may be catastrophic. Therefore, we routinely cover patients with appropriate antibiotics for typical and atypical lower respiratory pathogens. While this condition has been described in SCUBA divers, most experience has been with persons breathing ambient air at sea level. The differential diagnosis for divers presenting with shortness of breath or hypoxemia must obviously be expanded to include barotrauma and interruption of or defective gas supply.

In summary, SIPE and pneumonia are common causes of hypoxemia among Naval Special Warfare trainees. They may be differentiated by clinical and radiographic characteristics, but diagnosis may be difficult at initial presentation and may become clearer with time. SIPE should also be considered in the evaluation of shortness of breath for combat swimmers, divers, and other personnel engaged in heavy exertion while immersed in water.

References

1. Goldman L ed.: Cecil Textbook of Medicine, Twenty Second Edition. Philadelphia, PA: W. B. Saunders, 2004: 591.
2. Lundgren CE, Pasche AJ. Physiology of diving: immersion effects. In: Shilling CW, Carlston CB, Mathias RA, eds. The physician's guide to diving medicine. New York, NY: Plenum Press, 1984; 86-98.
3. Arborelius M Jr, Baldin UI, Lilja B, Lundgren, CE. Hemodynamic changes in man during immersion with the head above water. *Aerospace Medicine* 1972;43:592-598.

4. Lund KL, Mahon RT, Tanen DA, Bahkda S. Swimming-Induced Pulmonary Edema. *Annals of Emergency Medicine* 41:2 251-256.
5. Amundson DE, Weis PJ. Pneumonia in Military Recruits. *Military Medicine* 1994; 159(10): 629-631.
6. Metlay JP, Fine MJ. Testing strategies in the initial management of patients with community-acquired pneumonia. *Annals of Internal Medicine* 2003 Jan 21; 138(2):109-118.
7. Crum NF, Russell KL, Kaplan EL, Wallace MR, Wu J, Ashtari P, Morris DJ, Hale BR. Pneumonia outbreatk associated with group a Streptococcus species at a military training facility. *Clinical Infectious Diseases* 2005 Feb 15; 40(4): 511-518.
8. Adir Y, Shupak A, Gil A et al. Swimming-Induced Pulmonary Edema Clinical Presentation and Serial Lung Function. *Chest* 2004; 126:394-399.
9. Koehele MS, Lepawsky M, McKenzie DC. Pulmonary Oedema of Immersion. *Sports Medicine* 2005; 35:183-190.
10. Slade JB, Hattori T, Ray CS, Bove AA, Cianci P. Pulmonary Edema Associated With Scuba Diving. *Chest* 2001; 120:1686-1694.
11. Department of the Navy, Naval Sea Systems Command: *U.S. Navy Dive Manual Revision Five.*

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CME Article

Stand-by Treatment of Malaria: Is It An Option for Special Operations Forces?

Lyndon Bowden, MD, MPH

Accreditation/Designation Statements

CME: This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education (ACCME) through joint sponsorship of USUHS and the Journal of Special Operations Medicine. USUHS is accredited by the ACCME to provide continuing medical education for physicians. The Uniformed Services University of the Health Sciences designates this educational activity for a maximum of **1.0 AMA PRA Category 1 Credit(s)™**. Physicians should only claim credit commensurate with the extent of their participation in the activity.

CNE: This activity, for **1.0 contact hours**, is provided by the Uniformed Services University of the Health Sciences (USUHS), which is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center's Commission on Accreditation.

Expiration Date

This article will be published in the 10 Sep 2006 summer edition and will expire in 10 Sep 2007

Time Requirement

This article requires 60 minutes to complete.

Financial Disclosure

Dr. Bowden has indicated that, within the past year, he has had no significant financial relationship with a commercial entity whose product/services are related to the topic/subject matter.

Executive Editor's Note: Recommending to SOF medics and medical officers that they use a "shotgun therapy" for the treatment of malaria is always a chancy thing. Do remember that there are well established service and geographic theater regulations on anti-malarial drugs and prophylactic chemotherapy as well as service-level aviator-specific rules. This article, which is well done, could be of use to policy setters and planners in future areas of operation.

Objectives

1. Differentiate Stand-by Treatment (SBT) for malaria, from chemoprophylaxis.
2. Recognize why SBT of malaria may be a better option than chemoprophylaxis on certain SOF missions.
3. Describe possible scenarios in which SBT of malaria might be used.
4. Recognize the SBT drug regimen recommended by the CDC including dosing and possible side effects.
5. Recommend appropriate patient education based on WHO guidelines.
6. Recognize the absolute necessity of patient follow-up.
7. Describe potential problems with SBT that have been documented in the medical literature.

Abstract

Stand-by treatment (SBT) of malaria is a life-saving measure that Special Operations Forces (SOF) Soldiers deployed to malarious areas should have available in certain special situations. SBT, or presumptive self-treatment, includes providing SOF Soldiers with appropriate antimalarial medication to carry with them and use in the case of a fever that occurs one week or more after being deployed to a malarious area and medical care is not available for more than 24 hours. SOF healthcare providers must make the call on whether SBT is a good option for a given mission. This decision requires an accurate risk assessment that considers the risk of malaria versus

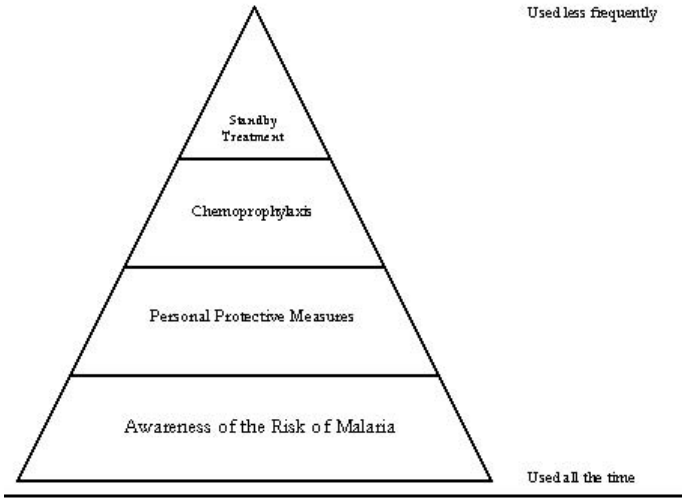
the risk of adverse events from the proposed antimalarial strategy. In order for SBT to be truly life saving, SOF healthcare providers must provide counseling that emphasizes a fever in a malarious area is a true medical emergency and prompt evacuation for definitive diagnosis and treatment is absolutely necessary. Although the World Health Organization (WHO) and the Centers for Disease Control (CDC) endorse this method of managing malaria in certain situations, it has failed to gain acceptance as an option in the U.S. Armed Forces. Instead, the emphasis is placed on using insect personal protective measures (PPM) and chemoprophylaxis (CP). However, there are examples of missions where these measures were ineffective leading to malaria outbreaks. SBT used either as an adjunct or alternative to CP, may be a suitable option especially on some SOF missions. Unfortunately, the evidence supporting SBT is lacking in the medical literature and has not been studied in SOF Soldiers. This article introduces SOF healthcare providers to SBT and reviews the relevant articles found in the medical literature describing its use.

Introduction

Each year, 300 to 500 million clinical malaria infections occur worldwide, and there are about one to three million deaths.[1] There may be up to 30,000 cases in international travelers annually.[2] The disease can devastate non-immune travelers including Soldiers deployed to malarious areas. No doubt, the disease remains a significant threat to SOF personnel and the success of their missions. In 2004, the CDC received reports of 1324 symptomatic malaria cases including four deaths.[3] Most of these cases were cases of imported malaria in travelers. However, according to the Center for Disease Control (CDC), a total of 32 cases of malaria were reported in U.S. military personnel. The U.S. Army conducts its own surveillance through the Army Medical Surveillance Activity (AMSA). AMSA received 40 reports of service members being hospitalized for malaria in 2005.[4] Twenty-three (58%) of these cases were reported as *P. vivax* infections. *P. falciparum* infections, the more deadly form of malaria, accounted for at least two (5%) cases. There were 15 (38%) cases where the *plasmodium* species was "other/unknown". The presumed location of infection was Korea in 18 (45%) cases and Central Asia / Middle East in 16 (40%) cases. Two cases were presumably imported from Central / South America and one case from Africa. In the three remaining cases, the presumed location of infection was reported as "unknown". Unfortunately, this data does not address malaria cases treated as outpatients.

Unknown information about reported cases, possible under-reporting of cases, and lack of a dedicated medical surveillance system for SOF are only a few problems that make it difficult to describe the true threat of malaria to our Soldiers.[5] Moreover, malaria is a threat because it is geographically widespread being endemic in more than 100 countries.[2] Most conventional forces are deployed to areas of chloroquine-resistant vivax malaria. However, members of SOF are deployed globally and it is possible that the risk of acquiring *falciparum* malaria while on a mission is significant. This may lead SOF mission planners to underestimate the risk, fail to implement an appropriate control strategy, and subject Soldiers to undue risk. Indeed, the risk of serious illness due to malaria may not only be present after deployments, as indicated by the data described in the paragraph above, but during deployments as well.

Figure1: A Comprehensive Antimalaria Strategy[6]



Increased awareness of risk is only the foundation to a successful antimalaria strategy.[6] To this we add two more layers that include insect personal protective measures (PPM) and chemoprophylaxis (CP). Despite the best efforts of SOF healthcare providers to emphasize the necessity of PPM and CP, experience shows compliance with these measures to be poor. In an anonymous self-reported survey of members of an Army SOF unit conducted in 2002 only 29% of Soldiers reported using insect repellent, and only 82% reported treating uniforms with permethrin.[7] Even more worri-

some was the 31% compliance rate for both weekly and terminal prophylaxis. Low compliance with preventive measures is a reason for an outbreak of malaria in this unit where there were 38 cases in a 725-man task force. Other reports of outbreaks in Soldiers found similar problems with the lack of PPM use and CP compliance as well as an association between poor compliance and other characteristics of military operations such as hostile actions and location.[8-11]

While it is true that efforts should be made to improve compliance with PPM and CP, are SOF healthcare providers still recommending an antimalarial strategy that is not complete? What about aircrews and other members of SOF whose mission makes it difficult to use CP appropriately? One article specifically addresses the latter question and recommends strict use of causal prophylaxis.[12] However, this recommendation is of little use to a Soldier who falls ill with fever during a mission. Standby Treatment (SBT) – the provision of antimalarial drugs for self-treatment of a possible malaria infection when medical care is not available – plus the aforementioned measures describe a comprehensive antimalaria strategy.[6,9] This antimalaria strategy is depicted in Figure 1. Note that awareness of risk is necessary to consider in all missions while other measures may be used less frequently as risk dictates.

SBT, used commonly by European travelers, is not emphasized in the United States despite endorsements from the World Health Organization (WHO) and the CDC. The *SOF Medical Handbook* and previous articles in *JSOM* describe a common regimen for SBT though they do not describe the regimen explicitly.[13,14] A review of the medical literature reveals that outcomes based evidence with rigorous clinical trials that support the use of SBT are lacking. In fact, studies have demonstrated that SBT has its own technical problems and risks. Such problems include: prescribing the right antimalarials, when to initiate SBT therapy, under or overuse of SBT, and patient follow-up. Risks inherent to SBT include: adverse drug affects and drug failure. Perhaps these are two reasons why SBT is not widely recommended.

Standby Treatment of Malaria

The WHO defines SBT as carriage of antimalarials for *self-administration* when malaria is suspected.[2] The WHO further characterizes SBT as an *emergency* measure used under very specific circumstances. SBT is used when the following apply:

Table 1: Characteristics of Standby Treatment[1]

A life-saving measure
A temporary measure
For Soldiers deployed to remote malarious areas where access to diagnosis/treatment is not available within 24 hours
For Soldiers deployed to malarious areas where healthcare is not acceptable
For Soldiers who cannot take chemoprophylaxis or who will not take it consistently

Table 2: Properties of an Ideal Standby Treatment Strategy[16]

Indications for use are clear
Drug regimen is simple
Drug targets drug resistant parasites
Low side-effect profile
Used with chemoprophylaxis or alone

1. Fever develops only after being in a malarious area for one week or longer.
2. The individual is in a remote location where diagnosis and safe, effective treatment by qualified professionals in an adequate facility are not available within 24 hours.

SOF healthcare providers will recognize that (2) above will require careful assessment during mission planning. For instance, a Soldier may not be in a remote location at all, but will still be denied access to adequate healthcare for more than 24 hours due to mission requirements. SOF missions may occur in locations with substandard healthcare providers, antimalarial drugs, and medical facilities.

The main rationale behind using SBT is that there are some situations where the risk of suffering an adverse drug event (ADE) while using CP is greater than the risk of becoming infected with malaria.[6,15] Nevertheless, any risk of malaria is reason for concern and SBT affords a life saving, emergency measure when a Soldier does become infected. For those who do not tolerate antimalarials, do not use insect PPM, or who will not be compliant with the CP regimen, SBT is a better alternative than using nothing.[6] The key characteristics and ideal properties of a SBT regimen are found in Tables 1 and 2, respectively.[1,16]

Possible Scenarios to Consider Using SBT

The SOF healthcare provider should consider at least three factors while making a reasonable malaria risk assessment and gauge which anti-malaria strategy is best. These factors include: (1) risk of infection versus risk of an ADE, (2) duration of exposure (length of time in the malarious area), and (3) frequency of exposure (number of times deployed to a malarious area).[2,15,16] Depending on these factors SBT may be used alone, along with CP, or not at all. Below are some situations that deployed members of SOF may encounter and where SBT might be a wise choice.

Areas of low risk for malaria where the risk of acquiring malaria is lower than the risk of suffering from an ADE. For example, areas such as Southeast Asia or South America the risk of malaria in persons not taking CP is about 0.1% and 0.05% per month, respectively.[17] However, the risk of suffering an ADE while taking mefloquine CP may be as high as 4%.[12] Clearly, the risk of suffering an ADE is much higher than the risk of malaria. In this situation, the best recommendation may be SBT without CP. SBT could be life saving for the unfortunate Soldier stricken with malaria.

Short, repeated exposure in select occupational groups such as aircrews. The risk to aircrew of acquiring malaria during layovers in high-risk areas like Tropical Africa was found to be as high as 0.8 per 1000 per night.[15,18] The use of CP in SOF and military aircrews including drug selection, safety, efficacy, and cost has been addressed previously.[12] Indeed, causal prophylaxis with primaquine might be safer alternative to long term suppressive prophylaxis with chloroquine due to the potential adverse effects such as retinal pathology seen with long-term chloroquine use.[2] However, this strategy fails to address a symptomatic and possibly deadly malaria infection while deployed. SBT should be considered in this situation.

Based in a malaria free area with missions in a malarious area. Similarly, SBT may be useful in cases where a deployed team is based in a malaria free area, but whose mission requires short stays in malarious areas. For example, most large cities in Asia and South America are free of malaria, but the surrounding rural areas may be high-risk areas.[15] If the area a team is based in is not malaria free, but a low risk area, then CP and SBT may be used together.

Travel to areas of differing drug resistance. CP may be effective in one area of the world but not another due to varying resistance. SBT could be used to cover a person while in the area where the CP regimen would be ineffective. It is conceivable that a mission location could change and the original antimalarials prescribed would no longer be effective. Combinations of CP and SBT are best, especially when there is a high risk of *falciparum* malaria.[15] For example, suppose a mission's location is in a rural area of southern Thailand, an area well-known for cholorquine-resistant *falciparum* malaria. Additionally, suppose that some of the Soldiers must travel to areas along the Thailand-Cambodian border, an area known for mefloquine-resistant *falciparum* malaria. In this example, the best recommendation may be either mefloquine or doxycycline for CP and atovaquone/proguanil for SBT.

Short notice missions. A last minute deployment reduces the possibility that the Soldier receives a thorough briefing on the threat of malaria.[19] Missions requiring very rapid deployment to a malarious area will not allow team members to achieve adequate levels of CP drugs even with accelerated dosing. SBT may be necessary to avoid malaria in the first few weeks of a mission until optimal levels of CP drugs are present.

Table 3: Atovaquone/Proguanil (Malarone) for Chemoprophylaxis and Standby Treatment[1]

Use	Dose	Comments
Chemoprophylaxis	one tablet daily	Start two days before entering malarious area, continue for seven days after return from malarious area
Standby Treatment	four tablets daily for three days	Do not use if taking atovaquone/proguanil for chemoprophylaxis

Centers for Disease Control and World Health Organization Guidelines and Recommendations

Recommendations for malaria SBT are found in the CDC's *Health Information for International Travel.*[1] While the CDC states that CP is the best option for travel to malarious areas; it also realizes that there are problems with this general recommendation. Such problems include situations where persons choose not to take CP, take the wrong CP regimen, or take a suboptimal regimen. Since these are realistic possibilities, the CDC offers an alternative. This alternative includes a three-day regimen of atovaquone/proguanil (Malarone) to be

Table 4: WHO Guidelines for Standby Treatment[2]
Consult a physician immediately if fever occurs one week or more after entering a malarious area
If medical care is not available within 24 hours, start SBT and continue to seek medical care as soon as possible
After finishing SBT, resume chemoprophylaxis one week after the first SBT dose
If fever is present, take a dose of an antipyretic to reduce the chance of vomiting up antimalarials
If vomiting occurs less than 30 minutes after taking SBT, then another full dose should be taken
If vomiting occurs 30 - 60 minutes after taking SBT, then a half dose should be taken
Be aware of drug failure with vomiting and diarrhea
Do not use the same antimalarial drugs for SBT that are used for chemoprophylaxis
ALWAYS follow up with a physician or other professional healthcare provider after SBT use

taken promptly in the case of fever, chills, or influenza-like illness if professional medical care is not available within 24 hours. Note that this is the same regimen recommended in the *SOF Medic Handbook* and a previous *JSOM* article.[13-14] The CDC stresses that this is only a TEMPORARY measure and that a prompt and thorough evaluation is imperative as soon as possible with urgent medical evacuation of the Soldier. It is important to realize that self-treatment may be life saving in those who are taking CP and those that are not. However, travelers or deployed personnel taking atovaquone/proguanil for CP should not use this regimen recommended by the CDC and must use a different self-treatment regimen. WHO recommends an SBT regimen that includes quinine and doxycycline for seven days for persons taking atovaquone/proguanil for CP.[2]

Malarone, like SBT itself, is often overlooked. This antimalarial combines 250mg of atovaquone and 100mg of proguanil in one tablet. It is active against both blood and liver stages of the parasite. Thus, it is a drug that can be used for suppressive prophylaxis, causal prophylaxis, and treatment of malaria.[12] Since it combines two drugs there is a lower chance of developing resistance. Side effects include abdominal pain, nausea, vomiting, and headache.[12, 20] Table 3 displays CP and SBT regimens for Malarone. Note, Malarone should not be used in persons with renal disease causing creatinine clearance of less than 30mL/min.[1]

WHO emphasizes that successful use of SBT depends on individual behavior.[2] It is up to the SOF healthcare provider to educate Soldiers in the use of SBT. These recommendations are found in Table 4. In order to aid Soldiers who are prescribed, the SOF healthcare provider should provide instructions provided both verbally and in writing. The instructions should use clearly understandable language, be individualized to the Soldier, include statements on how to recognize the symptoms of malaria, how and when to start SBT, potential side effects of the antimalarials, the possibility of drug failure, and the absolute necessity to seek medical attention as soon as possible for diagnosis and further treatment.[2]

Previous Experiences with SBT: Review of the Medical Literature and Potential Problems

Unfortunately, there are no published studies on the use of SBT in SOF personnel or other members of the U.S. Armed Forces. In fact, there are no publications describing a rigorous clinical trial that compares SBT to CP or other alternatives. One must look to publications describing the use of SBT in foreign leisure or business travelers to find objective data.

One study provides some insight into which antimalarial strategy travelers prefer.[6] This study is a retrospective case series of Swiss travelers that describes the results of a questionnaire intended to understand the knowledge, attitude, and practices of 514 Swiss business travelers whose destinations included visits to tropical regions in the years 1998 to 2000. Of the 514 questionnaires distributed, 401 were returned. The 401 respondents proved to be knowledgeable about the basics of how and when malaria is transmitted as well as the common symptoms of infection. The antimalarial strategy of a subset of the respondents (n=93) who traveled to African high-risk areas was analyzed. The reliance on CP, SBT, and no antimalarials was compared to the duration of stay. The study found that travelers relied on SBT most frequently when their duration of stay was one to four weeks (40.5% relied on SBT) and used SBT less frequently if the stay was less than one week (28.9% relied on SBT), or longer than one month (8.3% for one to three months, 16.7% for > three months). There was no significant trend in the frequency of SBT use and duration of stay. In all cases, CP was preferred over SBT and SBT was preferred over no antimalarials. The authors do note that using no antimalarials is not an acceptable antimalarial strategy. They comment, "A great number of travelers do not carry any antimalarials in endemic areas, whereas they should know that the correct alter-

native to CP is not 'no antimalarials,' but carriage of [Standby Emergency Treatment]."[6]

In 1995, a prospective study of 3434 German travelers sought to understand the frequency, circumstances, and outcomes of SBT for suspected malaria.[21] 2867 (90.1%) recruited travelers returned questionnaires after their trips. Two hundred thirty-two travelers developed a fever while traveling, of these, 40 (1.4%) took SBT. SBT users in this study were, on average, 28.5 years of age, 60% were male, and the majority of them traveled to Tropical Africa (75%), Latin America (12.5%), and Southeast Asia (10%). Of the 232 travelers with fever, 104 provided a serum sample to confirm the presence of malaria antibodies. Of the 40 who used SBT, 37 provided serum samples. There were 67 samples available from those who did not use SBT. Malaria antibodies were found in four (10.8%) of the 37 samples from SBT users and none of the 67 samples from non-SBT users. As for proper follow-up with a healthcare provider: 23 (57.5%) followed up in accordance with recommendations, while 17 took SBT without follow up. Six (15%) of 40 SBT users reported side effects; however, in only one case were the side effects severe enough to necessitate hospitalization. Side effects were attributed to halofantrine in two of the six cases. Halofantrine is no longer used to treat malaria because of pro-arrhythmic effects, mainly prolongation of the QT-interval.[6,22] Unfortunately, 35 (87.5%) of 40 SBT users made mistakes in the use of the antimalarials. The authors do point out that those without fever followed recommendations correctly and abstained from SBT use. On the other hand, the odds of having malaria were only about 1:8 in SBT users , or for every SBT user who had malaria about eight did not. Fortunately, for those who used SBT the odds of suffering a drug side effect was only 1:40, which is much lower than the odds of having malaria. Thus, even though SBT might have been overused putting people at risk for adverse drug effects, the frequency of these effects were rare. In this study the benefits of SBT outweigh the risks. Nevertheless, poor follow-up and mistakes in SBT use in this study demonstrate two potential pitfalls in SBT. This study emphasizes the importance of patient counseling and the need for follow-up.

A small study of Japanese travelers revealed the same problems with SBT as described above, but also demonstrated that some providers prescribed the wrong antimalarials.[23] This cross-sectional study conducted in December 2003 to January 2004 obtained data from 500 questionnaires that were distributed in Tokyo and Osaka Quarantine Stations. Of the 500 questionnaires, 458 were returned, and 160 of these were from travelers who journeyed to one or more malaria endemic countries. Nine (5.6%) of 160 travelers used SBT, all of whom traveled to Tropical African countries. Eight of the travelers used SBT with the onset of fever and chills (no data was available for one traveler). Two of the nine initiated treatment after less than one week in the malarious area, and eight initiated treatment when definitive care was available within 24 hours. The one traveler who took SBT under the recommended circumstances, but failed to follow-up once SBT was started. Unfortunately, eight used chloroquine as part of their SBT regimen despite the rampant chloroquine resistance in sub-Saharan Africa. In summary, none of the nine travelers used SBT in accordance with WHO guidelines. Thus, it seems that not only was the wrong antimalarials prescribed, there was a miscommunication between the providers that prescribed SBT and their patients about using SBT. They failed to provide clear, correct, and effective counseling as well. SOF healthcare providers should be aware of patterns of antimalarial resistance and follow the CDC recommendations to use atovaquone/proguanil for SBT. Two excellent references on these subjects include the CDC's Health Information for International Travel 2005 – 2006 (available online at http://www.cdc.gov/travel/yb/ and the Control of Communicable Diseases Manual, 18th Edition. 1,30.

Finally, another study showed there might be a problem with a person's reluctance to use SBT.[23] This study found that even though travelers might have fever and great concern for malaria SBT is infrequently used. Out of 1187 travelers surveyed, 123 (10.4%) reported they were ill with fever. Six (4.6%) of the 123 with fever (or 0.5% of the entire group of respondents) reported SBT use and followed up. However, 82 (66.6%) of the 123 did not start SBT or follow-up. Although it is unknown if these 82 persons were within reach of medical care (in which case, they would not need SBT), this finding raises concern that individuals may not be using SBT when they otherwise should, thus allowing their malaria to go untreated. The author remarks, "…while the wrong use of stand-by treatment may lead to serious adverse effects, failure to use it could result in death due to malaria."[23]

Conclusion

While strict use of PPM to avoid insect bites and CP are the two measures that will protect members of SOF from acquiring malaria in most situations, SBT may be an additional valuable life saving measure in some special situations. SBT may be recommended for Soldiers who experience fever after being one week or more in a malarious area and are not able to reach adequate healthcare within 24 hours. SBT is a temporary measure and once taken the individual must follow up with a healthcare provider as soon as possible to confirm the diagnosis of malaria and continue treatment. Recommendations for SBT use is based on the risk of malaria versus the risk of suffering an ADE. Deployments to low risk areas, or even frequently repeated deployments to high-risk areas are two situations where SBT may be recommended. SBT may also be beneficial when missions take SOF Soldiers to areas of varying drug resistance and on short notice missions to malarious areas. SBT and CP are not mutually exclusive and may be taken in combination, but the drug used for SBT should not be the same drug used for CP. The CDC recommends the use of atovaquone/proguanil for SBT due to the lack of resistance with this drug combination. WHO emphasizes that SBT will be effective only with appropriate patient counseling including written instructions.

Previous studies have found problems with SBT such as reluctance to initiate treatment despite having fever in a malarious area, taking the wrong antimalarials given drug resistance patterns, and failure to seek follow up once treatment is initiated. However, most of these studies were case series and lack the epidemiological rigor needed be confident with the findings. Even if the results were fully valid, the findings may not apply to the SOF community since the subjects in these studies were foreign travelers and not military personnel. Indeed, members of SOF community may use SBT more responsibly than the subjects of these studies, or previously unidentified problems could be found in this unique population.

SBT kits have been used previously and may be helpful.[24] A kit that includes atovaquone/proguanil tablets, a thermometer, and written instructions that describe when and how to take the medicine would probably enhance a Soldier's ability to make a presumptive diagnosis of malaria and decrease the number of mistakes made when taking antimalarials. Researchers have studied Rapid Diagnostic Tests (RDTs) to aid in making a self-diagnosis of malaria. While results are encouraging, test parameters such as low sensitivity and a high number of false negative tests remain suboptimal, and there are several technical problems with RDTs.[25-28] On the other had, U.S. military physicians have found RDTs to be useful in malaria outbreaks.[29] Currently, WHO does not recommend RDTs for these reasons. However, these tests may improve in the future and eventually be added to a SBT kit. In the meantime, SOF healthcare providers must rely on a clinical diagnosis of malaria at times and may find SBT to be a good option to offer, in addition to or instead, of CP on certain missions.

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References

1. Centers for Disease Control and Prevention. Health Information for International Travel 2005 – 2006. Atlanta: U.S. Department of Health and Human Services, Public Health Service, 2005. 189-212.
2. World Health Organization. International Travel and Health 2005. Chapter 7. Geneva: World Health Organization, 2005. 132-150.
3. Skarbinski J, Eliades MJ, Causer LM, Barber AM, Mali S, Nguyen-Dinh P, Roberts JM, Parise ME, Slutsker L, Newman, RD. Malaria Surveillance – United States, 2004. *CDC Morbidity and Mortality Weekly Report Surveillance Summaries.* 2006; 55(SS04): 23-37
4. Army Medical Surveillance Activity. Malaria, US Army, 2005. *Medical Surveillance Monthly Report*. 2006; 12(1): 2- 5.
5. Hartman RT. Military Deployment Health Surveillance Policy and Its Application to Special Operations Forces. *Military Medicine.* 2004; 169(1): 1-6.
6. Weber R, Schlagenhauf P, Lorenz A, Steffen R. Knowledge, Attitudes and Practices of Business Travelers Regarding Malaria Risk and Prevention. *Journal of Travel Medicine.* 2003; 10: 219-224.
7. Kotwal RS, Wenzel RB, Sterling, RA, Porter WD, Jordan NN, Petruccelli BP. An Outbreak of Malaria in US Army Rangers Returning From Afghanistan. *Journal of the American Medical Association.* 2005; 293: 212-216.
8. Kitchener S, Nasveld P, Russell B, Elmes N. An outbreak of malaria in a forward battalion on active service in East Timor (Abstract). *Military Medicine.* 2003; 168(6): 457-459.

9. Tuck J, Green A, Roberts K. Falciparum Malaria: An Outbreak in a Military Population on an Operational Deployment. *Military Medicine.* 2003; 168(8): 638-642.
10. Tuck J, Green A, Roberts K. A Malaria Outbreak Following a British Military Deployment to Sierra Leone. *Journal of Infection*. 2003; 47: 225-230.
11. Lessells R, Jones ME, Welsby PD. Letter to the Editor: A Malaria Outbreak Following a British Military Deployment to Sierra Leone. *Journal of Infection*. 2004; 48 209-211.
12. Chambers JA. Military Aviators, Special Operations Forces, and Causal Malaria Prophylaxis. *Military Medicine*. 2003; 168: 1001-1006.
13. Wortmann G. Malaria. Special Operations Forces Medical Handbook. Jackson: Teton NewMedia, 2001. 5-45.
14. U.S. Special Operations Command. Tactical Medical Emergencies Protocols For Special Operations Advanced Tactical Practitioners. *Journal of Special Operations Medicine*. 2005; 5(2): 49.
15. Schlagenhauf P, Steffen R. Stand-by Treatment of Malaria in Travelers: A Review. *Journal of Tropical Medicine and Hygiene*. 1994; 97: 151-160.
16. Bannister B, Hatz C, Toovey S Price R, Zuckerman JN. The Role of Standby Emergency Medication of Falciparum Malaria: Current Opinion. *Travel Medicine and Infectious Disease*. 2004; 2: 119-126.
17. Murry CK, Hospenthal DR, Dooley DP. Guide to Prevention of Infectious Diseases During Military Deployments. *Journal of Special Operations Medicine*. 2005; 5(4): 17-33.
18. Steffen R, Holdener F, Wyss R, Nurminen L. Malaria prophylaxis and self-therapy in airline crew. *Aviation Space and Environmental Medicine*. 1990; 11: 942-945.
19. Zucherman JN. Preventing Malaria in UK Travellers. *British Medical Journal*. 2004; 329: 305-306.
20. Thybo S, Gjorup I, Ronn AM, Meyrowitsch D, Bygberg IC. Atovaquone-Proguanil (Malarone): an Effective Treatment for Uncomplicated *Plasmodium Falciparum* Malaria in Travelers from Denmark. *Journal of Travel Medicine*. 2004; 11: 220-224.
21. Nothdurft HD, Jelinek T, Pechel SM, Hess F, Maiwald H, Marschang A, Sonnenburg FV, Weinke T, Loscher T. Stand-by Treatment of Suspected Malaria in Travelers. *Tropical Medicine and Prasitology*. 1995; 46: 161-163.
22. Traebert M, Dumotier B. Antimalarial drugs: QT prolongation and cardiac arrhythmias (Abstract). *Expert Opinions of Drug Safety.* 2005; 4(3): 421-31.
23. Kimura M, Kawakami K, Hashimoto M, Hamada M. Malaria Prevention and Stand-by Emergency Treatment Among Japanese Travelers. *Travel Medicine and Infectious Disease.* 2006; 4: 81-85.
24. Schlagenhauf P, Steffen R, Tschopp A Van Damme P, Mittelholzer ML, Leuenberger H, Reinke C. Behavioural Aspects of Travellers in Their Use of Malaria Presumptive Treatment. *Bulletin of World Health Organization.* 1995; 73(2): 215-221.
25. Iqbal J, Khalid N, Hira PR. Comparision of Two Commercial Assays with Expert Microscopy for Confirmation of Symptomatically Diagnosed Malaria. *Journal of Clinical Microbiology.* 2002; 40(12): 4675-4678.
26. Playford EG, Walker J. Evaluation of ICT Malaria P.f/P.v and the OptiMal Rapid Diagnostic Tests for Malaria in Febrile Returned Travellers. *Journal of Clinical Microbiology.* 2002; 40(11): 4166-4171.
27. Moody A. Rapid Diagnostic Tests for Malaria Parasites. *Clinical Microbiology Reviews*. 2002; 15(1): 66-78.
28. Rubio JM, Buhigas I, Baquero M, Benito A. Limited Level of Accuracy Provided by Available Rapid Diagnosis Tests for Malaria Enhances the Need for PCR-Based Reference Laboratories. *Journal of Clinical Microbiology.* 2001; 39(7): 2736-2737.
29. Susi B, Whitman T, Blazes DL, Burgess TH, Martin GJ, Freilich D. Rapid Diagnostic Test for *Plasmodium Falciparum* in 32 Marines Medically Evacuated from Liberia with a Febrile Illness. *Annals of Internal Medicine*. 2005; 142(6): 476-477.
30. Heymann, DL ed. Control of Communicable Diseases Manual, 18th Edition. Washington: American Public Health Association, 2004. 324-340.

Hypotensive Resuscitation

Ben Donham, MD; Mel Otten, MD

Abstract

Traditionally, the standard of care for hemorrhagic shock is aggressive fluid resuscitation. Over the last 15 years, emergency care providers have disputed this dogma as data from animal studies and a limited number of clinical trials accumulated. Currently, the Tactical Combat Casualty Care Committee (TCCC) recommends limited fluid resuscitation for hemorrhagic shock.[1] Given the apparent controversy concerning treatment of hemorrhagic shock, the goal of this review is to summarize the medical literature on hypotensive resuscitation in order to clarify the reasoning behind different resuscitation strategies for hemorrhagic shock.

Historical Teaching

The American College of Surgeons' Advanced Trauma Life Support (ATLS) guidelines currently recommend that for each estimated milliliter of blood lost during hemorrhagic shock, three times that amount should be replaced with crystalloid.[2] Medical educators commonly teach this form of large-volume fluid resuscitation and it remains a standard practice of many medical practitioners. The basis of this recommendation comes from the Wiggers model of controlled hemorrhagic shock that was developed in the 1960s.[3] In this animal model, researchers placed a catheter in a dog's vasculature and withdrew blood until they obtained a preset hemoglobin level. At that point, they closed the catheter to stop blood loss and began fluid resuscitation. Multiple studies using this model showed that fluid resuscitation reversed the tissue ischemia caused by hemorrhagic shock and improved survival.[3-4]

The Wiggers model effectively demonstrates how to control hemorrhages by controlling the original vascular injury and stopping the bleeding. During an uncontrolled hemorrhage, the vascular injury remains uncontrolled, active bleeding continues and hemorrhagic shock occurs. In the tactical environment, many patients suffer ongoing bleeding and clinically do not fit a Wiggers model of controlled hemorrhage. Although the data from the Wiggers model of controlled hemorrhage shows that fluid resuscitation indeed decreases mortality by decreasing tissue ischemia, uncontrolled hemorrhage more accurately represents the condition experienced by trauma patients. Prior to the early 1980s, uncontrolled hemorrhage was vastly understudied.

Pathophysiology

The hypothesis of hypotensive resuscitation is that with an actively bleeding injury, increasing the blood pressure by giving intravenous fluids (IVF) will displace a newly formed weak blood clot as the body attempts to stop the bleeding. This hypothesis states that administering IVF during hemorrhagic shock dilutes coagulation factors and exacerbates hypothermia. Furthermore, tissue ischemia and the probability of mortality increase due to the uncontrolled bleeding. Therefore, the overall goal of hypotensive resuscitation is to give just enough IVF to maintain blood flow to the body's vital organs without increasing the blood pressure too much and causing increased bleeding.

Uncontrolled Hemorrhage Models

In the 1990s, researchers published the first papers that challenged the traditional ATLS guidelines of aggressive resuscitation. In 1991, Bickell et al. created an uncontrolled hemorrhage model by utilizing a swine aortotomy.[5] This procedure involved conducting an abdominal laparotomy with insertion of a wire through the swine aorta then closing then closing the abdominal compartment and removing the wire. This procedure results in a small vascular injury and, eventually, uncontrolled hemorrhagic shock occurs. This model revealed that aggressively resuscitating animals according to the ATLS protocol resulted in 100% mortality. The control group, which did not receive any fluid resuscitation, exhibited 0% mortality and had a significant decrease in intraperitoneal bleeding compared to the resuscitated animals. Furthermore, an extraluminal thrombus overlying the

aortotomy site was found post-mortem in the control group, whereas the aggressive resuscitation group only exhibited a weak gelatinous clot at the aortotomy site.

During the same time period, Stern et al. began looking at different fluids to use in fluid resuscitation.[6] Unexpectedly, as with Bickell's uncontrolled hemorrhage model, Stern et al. found that the control animals receiving no fluids actually had a better survival rate than the animals that received aggressive fluid resuscitation.[6] Using a similar swine aortotomy model with a 90% untreated mortality, Stern et al. showed that under-resuscitated animals with a goal mean arterial pressure (MAP) of 40mmHg had decreased mortality when compared with both the control group (no resuscitation) and other groups that received more aggressive resuscitation. The groups receiving aggressive resuscitation had a larger amount of blood loss, lower hematocrit, and higher lactate levels than the under-resuscitated group.

Subsequent animal studies using hypotensive resuscitation consistently reproduced the survival benefit initially noted by Bickell and Stern. Mapstone et al. published a systematic review of animal studies on hypotensive resuscitation and concluded that a significant survival advantage to animals results in studies with hypotensive resuscitation as the goal.[7] Although pre-clinical animal studies on hypotensive resuscitation provide respectable models and intriguing data, the obvious limitation of these studies is that they occurred in animals and not in humans.

Clinical Trials

Unfortunately, because of the difficulties of both study design and informed consent, researchers have performed only a few clinical trials that concentrated on limited resuscitation . Bickell et al published the sentinel paper on hypotensive resuscitation.[8] Their study, performed in Houston, focused on delayed resucitation in penetrating trauma. They enrolled 598 patients who met the study criteria of penetrating injuries to the trunk and torso and a pre-hospital blood pressure of less than 90mmHg. The research team randomized these patients into two study groups (delayed resuscitation patients and the immediate resuscitation patients) using even/odd day randomization. The patients in the delayed resuscitation group had an intravenous (IV) line placed in the field by emergency medical services (EMS), but did not receive IV fluids (IVF) until in the operating room. The patients of the immediate resuscitation group received standard ATLS fluid resuscitation starting with EMS personnel in the field. The overall study population was extremely hypotensive with an average systolic blood pressure of 50mmHg upon presentation. Patient characteristics, initial blood pressure, injury severity, and time to operating room were similar between the two study groups. A statistically significant decrease in mortality (8%) occurred in the delayed resuscitation group compared to the immediate resuscitation group. This study also identified a non-significant trend toward fewer complications in the delayed resuscitation group. The results of this research appear to complement the animal data.

However, some have criticized the methodology and the authors' conclusions.[9-10] Their use of even and odd day randomization may have been a possible source of bias, as were, protocol violations where the delayed resuscitation group received IVF. Because the average amount of total fluid given (375cc vs 2478cc) was small, and the times to operative intervention were short, some believe these factors limit the validity of the conclusions that were drawn. Although this paper does indeed have its limitations, the study is the largest to date, and shows a significant survival benefit when hypotensive resuscitation is used.

In 2002, Dutton et al. performed the only other major human clinical trial focused on hypotensive resuscitation.[11] They treated both blunt and penetrating trauma patients with either normotensive or hypotensive resuscitation. This study enrolled 110 patients almost equally divided between blunt and penetrating trauma. The goal MAP for the hypotensive resuscitation group was 70mmHg, and the goal MAP for the conventional resuscitation group was 100mmHg. Unfortunately, the study goal was not met with the average MAP for the hypotensive group was 100mmHg and the average MAP for the conventional group was 114mmHg. The study found no mortality differences between the two groups. Overall, the results of this study are severely limited, since they did not achieve hypotensive resuscitation. However, these results do not show an improvement in outcome with aggressive resuscitation.

Limitations and Contraindications

Critics of hypotensive resuscitation cite problems with prolonged ischemia and subsequent multiorgan failure as a reason against using this strategy. Although the Wiggers model shows that resuscitation does indeed improve ischemia and survival, this model is not applicable in uncontrolled hemorrhage. The data available on uncontrolled hemorrhage in humans does not show increased ischemia. According to Bickell et al., there was no difference in measured

markers of ischemia (serum pH and bicarbonate levels) occurred between control and experimental groups.[8] In addition, animal studies have shown that 75 minutes of permissive hypotension did not increase mortality, and that after three days no histological evidence of end-organ injury existed.[12]

Ischemia is a real concern when dealing with prolonged periods of hypotensive resuscitation. Medical situations in the Special Operations Forces (SOF) environment are a prime example of prolonged hypotensive resuscitation given the potential for extended evacuation times to occur. From the animal and clinical data presently available, short periods of hypotensive resuscitation on the order of a few hours do not appear to increase ischemia. However, ischemia times reported in the literature are not always consistent with the amount of time it would take for wounded SOF personnel to reach definitive surgical care.

Although the current preclinical and clinical data regarding hypotensive resuscitation in penetrating injury does indeed appear to be promising, certain clinical scenarios exist where the standard of care is to give IVF. For example, hypotensive resuscitation is contraindicated in head trauma, since the main concern is to prevent secondary brain injury by maintaining blood pressure and cerebral perfusion pressure. Currently significant controversy remains among medical care providers regarding the specific type of resuscitation fluid (hetastarch, hypertonic saline dextran, isotonic crystalloid, or heme substitute) that should be used.

The use of hypotensive resuscitation in blunt trauma is controversial because of the limited number of studies on the subject. The few animal studies that tried to replicate injuries seen in blunt trauma showed inconsistent results. An initial study showed a worsened outcome with hypotensive resuscitation, but more recent studies using a different animal model demonstrated a survival benefit.[13-15] However, the only clinical trial that studied the effect of hypotensive resuscitation on blunt trauma showed no difference in mortality when compared with conventional resuscitation.[11] Given the lack of data to support the use of aggressive fluid resuscitation and the logistical limitation of carrying large amounts of IVF, it is reasonable to withhold fluids in the blunt trauma victim.

Hypotensive Resuscitation in the SOF Environment

Why is hypotensive resuscitation important for Special Operations Forces? First and foremost, it appears to be good medicine. From the literature presented above, it is clear that studies and other evidence support hypotensive resuscitation as being beneficial to penetrating trauma victims. Although this is contrary to current ATLS guidelines and conventional teaching, more civilian trauma centers are embracing hypotensive resuscitation. A recent survey in the *Journal of Trauma* showed that the majority of civilian trauma surgeons practice hypotensive resuscitation in penetrating trauma regardless of transport times.[16] As stated above, the logistical difficulty of carrying a large amount of IVF combined with the fact that little evidence supports the use of IVF in uncontrolled hemorrhagic shock argues against giving fluids until there is sufficient evidence of global ischemia.

The SOF community recognizes the above limitations. The current TCCC guidelines state that both blunt and penetrating trauma patients should receive an IV, but no fluid resuscitation should occur until the patient exhibits a mental status change.[1] However, if vascular control can be established, such as with the use of a tourniquet on a hemorrhaging extremity, a small amount of fluid should be given at that point. In this scenario, the tourniquet controls hemorrhage and, based on the Wiggers model of controlled hemorrhage, fluids in this instance would reduce ischemia.

An attempt has been made by the authors in this article to include preliminary data on the use of hypotensive resuscitation from the recent conflicts in Afghanistan and Iraq. Unfortunately, as of the date of this publication we have not received any data from the Army's Institute of Surgical Research or from the Center for Army Lessons Learned.

Conclusions

Extensive animal data and limited human data show decreased mortality with hypotensive resuscitation in penetrating trauma. Although the data on hypotensive resuscitation in blunt trauma are very limited, no studies showed an increase in mortality. Given the difficulty in carrying large amounts of IVF in the SOF environment, hypotensive resuscitation should be used on all patients with hemorrhagic shock regardless of injury mechanism. However, once hemostatic control is obtained, more aggressive fluid resuscitation should begin. Currently there is still significant controversy regarding the specific type of resuscitation fluid (hetastarch, hypertonic saline dextran, isotonic crystalloid, or heme substitute) that should be used. Therefore, more research on specific types of resuscitation fluids is necessary to determine the best type of resuscitation fluid to be used.

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References

1. Butler, F K Jr; Hagmann, J; Butler, E G. Tactical combat casualty care in special operations. *Military medicine*. 1996; 161 Supplement: 3-16.
2. American college of Surgeons Committee on Trauma. *Advanced trauma life support course manual.* Chicago, American College of Surgeons, 1997 pg 97.
3. Wiggers CJ. Experimental hemorrhagic shock. *Physiology of shock*. New York, the Commonwealth Fund, 1950: 121-143.
4. Shires GT, Coln D, Carrico J. Fluid therapy in haemorrhagic shock. *Archives of Surgery*. 1964; 88: 688-693.
5. Bickell WH, Bruttig SP, Millnamow GA, O'Benar J, Wade CE. The detrimental effects of intravenous crystalloid after aortotomy in swine. *Surgery*. 1991; 110P: 529-536.
6. Stern SA, Dronen SC, Birrer P, Wang X. Effect of blood pressure on hemorrhage volume and survival in a near-fatal hemorrhage model incorporating a vascular injury. *Annals of emergency medicine*. 1993; 22: 155-163.
7. Mapstone J, Roberts I, Evans P. Fluid resuscitation strategies: a systematic review of animal trials. *The Journal of trauma*. 2003; 55: 571-589.
8. Bickell WH, Wall MJ, Pepe PE, Martin RR, et al. Immediate versus delayed fluid resuscitation for hypotensive patients with penetrating torso injuries. *The New England journal of medicine*. 1994; 331: 1105-1109.
9. Jacobs LM. Timing of fluid resuscitation in trauma. *The New England journal of medicine*. 1994; 331: 1153-1154.
10. Siegel JH. Immediate versus delayed fluid resuscitation in patients with trauma. *The New England journal of medicine*. 1995; 332: 681-683.
11. Dutton RP, Mackenzie CF, Scalea TM. Hypotensive resuscitation during active hemorrhage: impact on in-hospital mortality. *The Journal of trauma.* 2002; 52: 1141-1146.
12. Stern SA, Wang X, Mertz M, Chowanski ZP, et al. Underresuscitation of near-lethal uncontrolled hemorrhage: effects on mortality and end-organ function at 72 hours. *Shock*. 2001; 15: 16-23.
13. Matsuoka T, Hildreth J, Wisner DH. Uncontrolled hemorrhage from parenchymal injury: is resuscitation helpful? *Journal of Trauma*. 1996; 40 :915-21.
14. Varela JE, Cohn SM, Diaz I, Giannotti GD, Proctor KG. Splanchnic perfusion during delayed, hypotensive, or aggressive fluid resuscitation from uncontrolled hemorrhage. *Shock*. 2003; 20:476-480.
15. Solomonov E, Hirsh M, Yahiya A, Krausz MM. The effect of vigorous fluid resuscitation in uncontrolled hemorrhagic shock after massive splenic injury. *Critical Care Medicine*. 2000; 28:749-754.
16. Salomone JP, Ustin JS, McSwain NE Jr, Feliciano DV. Opinions of trauma practitioners regarding prehospital interventions for critically injured patients. *Journal of trauma*. 2005; 58 (3): 509-515.

Satellite Imagery/GPS Technology: Implications and Applications for Humanitarian and Relief Operations

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Abstract

Despite the world of spectacular growth of technology and applications, a substantial proportion of the world population continues to struggle daily against hunger, poverty, a growing disease burden, and the ravages of disaster and civil strife. As the world community marshals its resources to the help those in need, the roles of the military, especially of special operations forces, continue to expand. This paper looks at some of the implications of satellite and wireless technology in the fields of humanitarian assistance and disaster relief. It also reviews some current applications with a hypothetical scenario in which such applications may expedite delivery of aid while conserving human resources.

Financial Disclosure: Dr Kharod has no financial, research, or academic relationship with any of the satellite, GPS, R&D, or technology application companies discussed in this paper.

Introduction

The fields of science and technology are expanding at an extraordinary rate and application of these advances to the service of those in need is a must. The dichotomy of the current global situation can be seen in the unyielding persistence of hunger, poverty, and burgeoning disease in many regions despite the growth of technology in others. Despite tremendous wealth and convenience for a portion of the world population, others continue to struggle for food, shelter, and clothing. The impact of natural or man-made disasters exacerbates a struggle that can destabilize both solid and tenuous societies alike. The developed countries, which tend to be heavy users of resources, are making increasingly coordinated efforts to provide aid and support when underserved areas are in need. The obvious and necessary forms of aid from developed nations include provision of food, water, clothing, livestock, medical aid, public health/sanitation, and shelter. However, the global community may offer support in other ways.

Some areas of difficulty in post-conflict or post-disaster settings are terrain mapping, hazard identification, and population mapping/location. Mapping of terrain features is essential to rescue and recovery in areas devastated by natural disaster.[1] Similarly, location of internally displaced persons (IDPs) and mapping of refugee clusters is a labor- and time-intensive process. Both terrain and population mapping require personnel on the ground to risk exposure to unstable situations in order to provide adequate assessments. Several technologies, initially developed for scientific and military applications, can augment current field techniques.[1] In particular, though the technology has been available for several decades, satellite imagery is coming to the fore in the areas of humanitarian assistance and relief operations. When combined with satellite use in global positioning systems (GPS), the resulting geographic information systems (GIS) are powerful weapons in the global arsenal of humanitarian assistance.

Satellite Imagery and Reconnaissance Photography

According to the United Nations High Commission for Refugees (UNHCR), applying existing satellite technology can meet multiple needs in the setting of disasters or contingencies. First, satellite imagery can provide current data in rapid fashion. It can also supply large scale survey information in various levels of detail. Furthermore, the universal access of the satellite's orbit can provide imagery for areas where limited on-the-ground access and little

available related information exist.[2] Finally, the remote satellite provides substantial information without directly exposing human resources to environmental or man-made hazards. Of course, the realistic application of such technologies must take into account additional factors which may affect deployment of advanced technology.

The most obvious constraint may be access. Not every country or group has a satellite or a reconnaissance aircraft at its disposal. An associated obstacle is the financial cost of obtaining the images. The general consensus among non-governmental organizations (NGOs) seems to be that obtaining data from and conducting analysis of satellite imagery is cost-prohibitive.[3]

Naturally, the cost of the service is directly related to the size of area surveyed, the types of imagery obtained, whether analysis of the images is required, and how rapidly analysis and images are required. For example, RadarSat International has a website whereby orders can be placed on-line. Older data are available at a discounted rate. The prices above do not include the timeframe for analysis or the number of scenes ordered. Like with any other business purchase, larger volume sales merit discounted rates.

Beyond the financial constraints are the human resource issues. Trained personnel must process and analyze incoming data. Such expertise must be applied early in the process to optimize the usefulness of the data to the rescue and recovery efforts. Another issue which prohibits open exchange of data and imagery, but one that is not discussed in the scant available literature, is that of the strategic implications of widespread sharing of satellite imagery and aerial photography. Humanitarian assistance, from the individual level to the national level, may stem from more than humanistic origin or political motivation. While altruism is one obvious point of reference, public image or personal (or national) gain may also motivate benefactors. In the strategic sense, any help rendered may contribute to a nation's international reputation. On the other hand, distribution of imagery would almost certainly disclose one's reconnaissance capacity, which undoubtedly is of strategic significance. It is the global equivalent of a poker player "tipping his hand," as it were. Though this may seem a small price to pay in the truest sense of humanitarianism and altruism, the current geopolitical climate, especially in the spheres of military and diplomatic influence, is not one of completely open exchange and access.

Global Positioning Systems (GPS)

This technology makes use of the existing network of satellites already in orbit around the earth. It allows, via communication between the GPS device and satellites, the precise location of personnel, prominent terrain features, man-made features, and when combined with existing databases, precise mapping of routes to and from specified locations.

Rev. Date: 12/18/03

RADARSAT-1 SAR Imagery: Digital Products $US

Beam Mode/ Resolution	Nominal Coverage Area	Path Image	Path Image Plus	Map Image	Precision Map Image	Signal Data	Single Look Complex
Fine / 8 m *	50 x 50 km	$3,000	$3,000	$3,000	$3,750	$3,000	$3,000
Standard / 25 m	100 x 100 km	$2,750	$2,750	$2,750	$3,500	$2,750	$2,750
Wide / 30 m *	150 x 150 km	$3,000	3,000	3,000	$3,750	$3,000	$3,000
ScanSAR Narrow / 50 m*	300 x 300 km	$3,000	N/A	N/A	N/A	$3,000	N/A
ScanSAR Wide / 100 m *	500 x 500 km	$3,000	N/A	N/A	N/A	$3,000	N/A
Extended High / 25 m	75 x 75 km	$3,000	$3,000	$3,000	$3,750	$3,000	$3,000
Extended Low / 35 m	170 x 170 km	$3,000	$3,000	$3,000	$3,750	$3,000	$3,000

www.radarsatInternational-Products,SatelliteImagery,RADARSAT-1PriceList$US.htm

The advantages of such a technology are as obvious as the applications are numerous. First, it would allow unprecedented precision in the location of identified hazards and displaced population groups. Then, as performed by Global Relief Technologies, if combined with satellite information exchange capacity and the internet, it can provide real-time up-linking with up-to-the-minute updating of central databases using information garnered from on-site survey teams.[4] The final section of this paper will discuss examples of such emerging applications.

As expected, technology-dependent innovations such as these may be associated with characteristic disadvantages as well. For example, they are exceedingly resource-intensive. The related resources and training include, but are not limited to, 1) development and maintenance of hardware/software, 2) training and retention of personnel trained in system use, and 3) personnel trained in system maintenance and repair. In addition, such technology-dependent systems may undergo periods of decreased effectiveness when the uplink connections are altered or when the virtual access is slow. Finally, equipment accountability, maintenance, and repair, which can be routine in the course of a day in the continental United States, can be an area of substantial complexity for the team in the field. Even so, despite technical, economic, and human resource constraints, the application of satellite technology in GIS is an exciting development in emerging technologies for use in the rising tide of humanitarian and relief efforts. Some collaborative work is already underway and other field applications are being developed.

Implications and Potential Applications

The concept of using satellite imagery in the support of humanitarian operations is not a new one. At least six years ago, the humanitarian community was positing the use of commercial satellites to monitor civilian casualties in war-torn areas.[5] Even then, it was understood that the possibility of monitoring situations at the personal level was not technically feasible. However, the technical community was aware that it could use the "big picture" to monitor refugee and IDP situations by observing large objects including camps, roads, and shelters.[6]

As mentioned earlier, access to imagery and analysis can be an imposing obstacle for many NGOs or for developing countries. The UNHCR and UN Office for the Coordination for Humanitarian Affairs have a combined program to resolve that issue. This joint endeavor proposes to make non-copyrighted imagery from the LandSat 7 satellite available free-of-charge via the internet to humanitarian groups. The program is hosted at the Information Technology Outreach Services of the University of Georgia by the GIS technology division.[6] The program is a work in progress and is currently stalled for lack of funding. The applications of such a free imagery network are innumerable in each of the areas identified previously (terrain/population mapping, hazard identification).[3] The UNHCR collaborated with local authorities in several situations to optimize delivery of improved services. Examples of such work include efforts with the Ethiopian Mapping Authority to determine environmental impacts, land use around refugee camps, and evaluation changes in vegetation.[3] The UNHCR employed GPS and satellite services in the mapping and maintenance of the Kakuma Refugee Camp Water Sector Planning effort by UNHCR in conjunction with local and multinational organizations.[3]

Global Relief Technologies (GRT) of Rockville, Maryland created a collaborative project with Telenor Satellite Services (TSS).[7] Together, they initiated a service to support the International Medical Corps (IMC) in the coordination of recovery operations. As the IMC conducts mobile clinics and support operations in conjunction with local agencies, the workers would use the combined technologies to review and update maps, data tables, detailed coordinates for all locations, and imagery from GIS. Data experts can adapt GIS imagery via the software applications of GRT/TSS to combine all the data for a location digitally with its satellite image to provide in-depth information. Such information may be of critical value in emergency situations such as failing security at a site.[8]

Similarly, the space agencies of several nations developed an international disaster charter in November 2000 to create a combined process for acquisition and delivery of space imagery/data to humanitarian agencies serving those affected by disaster.[9] Non-governmental agencies are also involved in the advancing efforts. Reuters, long known for providing news around the world, created AlertNet, an internet-based service. One of AlertNet's novel services is an online map viewer that the humanitarian community or the lay public can access at the AlertNet website.[10] For example, the map viewer service on AlertNet provides a view of the entire world which the user can then customize to show the

preferred data including infrastructure (airports, railways, roadways), bodies of water (rivers, lakes), as well as population areas and country data.[11] Additionally, the European Space Agency (ESA) funded a global telemedicine project named I-DISCARE. NGOs employed this project's capabilities after the December 2004 tsunami in the Indian Ocean basin to help connect ground-based rescue teams with distant hospitals using satellite up-link to enhance on-site medical interventions.[12]

These examples demonstrate that concerned organizations and governments can apply the latest technologies in the service of those in need. However, the copyright laws and the expense of obtaining imagery/analysis may prevent optimal application of available technologies. The LandSat 7 program discussed earlier heralds the beginning of improving access to imagery. The cost factor, though, remains a significant obstacle to widespread use. Space Aid is an ongoing United Nations program designed to enhance access and utility of satellite imagery by the UN humanitarian sections.[13]

The need, then, is clear, and the applications are virtually limitless. An example of optimal application could be to provide assistance teams with the most current satellite imagery before they deploy to familiarize them with terrain features, hazards, and population distribution in war-affected and heavily-mined areas of central Afghanistan. These teams, equipped with satellite up-link capability and real-time access to all such data via a virtual network, would proceed with their ground survey operations. They could then update and monitor ongoing processes via the wireless up-link so that each team member (or each team, if multiple teams are working in geographically separated areas) can send and receive real-time data. Using this information stream, governments and NGOs could direct resources to areas most in need, obviating the need for massive resource offloading in one area and delayed transport of relief personnel and supplies until after all data is centralized and analyzed, thereby reducing unnecessary resources devoted to transportation, gathering and transmission of data, distribution of latest data, etc. The relief workers would no longer be limited to working from fixed facilities tethered by landlines for telephones, fax, or internet access.

The above brief example is just one hypothetical way in which technologies such as those developed by GRT, Reuters AlertNet, Space Aid, and others could be applied. The idealism inherent in humanitarian work could inspire the widespread sharing and free-sourcing of all available information and technology. The real-world application of such idealism, though, must consist of more than good intentions. It requires attention to strategic implications; provision of equipment; cost of satellite development, launch, and maintenance; cost of analysis; and dissemination of data. Perhaps most importantly, it necessitates the training of personnel to make best use of such technically advanced data in the tangible, relevant service of IDPs, refugees, and disaster-stricken populations in need.

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References

1. Key role for satellites on humanitarian front, Press Release, Date Released: Monday, July 14, 2003, Retrieved 27 July 2006 from Source: European Commission, www.spaceref.com/news/viewpr.html?pid=12075 (accessed 12 April 2005.
2. Use of space technology for refugee operations in Africa, United Nations High Commissioner for Refugees (UNHCR), Geographic Information and Mapping Unit (GIMU), Regional Spatial Analysis Lab (RSAL): Nairobi, Kenya.
3. Grunewald, F., From Airborne Images to Ground-Truthing in Turbulent Times; From Military Purposes to Citizen Control: Potentials, Myths, and Dangers of New Satellite Technologies from the NGO Perspective, A contribution to the conference, *The Use of Satellites and Integrated Technologies for Humanitarian Purposes*, 19-20 September 2000, Varese, Italy.
4. Retrieved 24 April, 2005 and 27 July 2006 from http://www.globalrelieftech.com.

5. Willum, B., "From Kosovo to Chechnya, Selling Images from Above," Christian Science Monitor (USA) November 30, 1999.
6. Retrieved 13 April, 2005 and 27 July 2006 from https://gist.itos.uga.edu.
7. Retrieved 23 April, 2005 and 27 July 2006 from www.telenor.com.
8. Retrieved 3 April, 2005 https://www.telenorsatellite.com/index.cfm?obj=document&act=displayDoc&doc=1068.
9. Charter On Cooperation To Achieve The Coordinated Use Of Space Facilities In The Event Of Natural Or Technological Disasters. Retrieved 3 April, 2005 and 27 July 2006 from http://www.disasterscharter.org.
10. Retrieved 12 April, 2005 and 27 July 2006 from http://www.alertnet.org/thefacts/satelliteimages/index. htm.
11. Retrieved 12 April, 2005 and 27 July 2006 from http://www.alertnet.org/thefacts/satelliteimages/471307.htm.
12. Esys, Inc, Tsunami Victims Receive Treatment via Satellite, Retrieved 10 April, 2005 and 27 July 2006from ESA Press Release http://www.esa.int/esaCP/SEM5RZ71Y3E_Improving_0.html.
13. Space Aid - Current and Potential Uses of Satellite Imagery in UN Humanitarian Organisations (E. Bjorgo, UNHCR) Retrieved 10 April, 2005 and 27 July 2006 from http://www.unhcr.org/cgi-bin/texis/vtx/home and http://www.usip.org/virtualdiplomacy/publications/reports/12.html.

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Stand-by Treatment of Malaria: Is It An Option for Special Operations Forces?

1. According to the Army Medical Surveillance Activity (AMSA), there were 40 US Army personnel hospitalized due to malaria in 2005. Most of these cases were _____ malaria, and the presumed location of infection was _____.

   a. P. vivax, Korea
   b. P. falciparum, Africa
   c. P. vivax, Afghanistan
   d. P. falciparum, Iraq

2. Which of the following choices best describes a comprehensive antimalaria strategy:

   a. Insect Personal Protective Measures (PPM) and Chemoprophylaxis (CP)
   b. Awareness of malaria risk and PPM
   c. CP and Stand-by Treatment (SBT)
   d. Awareness of malaria risk, PPM, CP and SBT

3. According to the World Health Organization, all are true statements about SBT EXCEPT:

   a. SBT is carriage of antimalarial drugs for self-administration when malaria is suspected.
   b. SBT is an emergency measure.
   c. Follow up with a healthcare provider is optional after initiating SBT.
   d. SBT may be used when one develops a fever after being in a malarious area for a week or longer.

4. The rationale behind recommending SBT in certain situations is:

   a. CP is often ineffective, even when used properly.
   b. SBT will kill parasites hibernating in liver cells while causal prophylaxis will not.
   c. Soldiers are more compliant with SBT than with CP.
   d. In some situations, the risk of suffering from and adverse drug event when using CP is higher than the risk of malaria itself.

5. In order to make a recommendation as to whether or not to include SBT in an overall antimalaria strategy for a given mission, one must consider:

   a. Risk of malaria infection versus risk of an adverse drug event.
   b. Duration of time spent in malarious areas.
   c. Frequency of repeated trips to malarious areas.
   d. All of the above should be considered in making a recommendation for SBT.

6. SBT may be most suitable in which of the following scenarios:

    a. Members of a SOF aircrew, who conduct short, repeated flights to sub-Saharan Africa.
    b. Members of SOF who are based in an urban area where no malaria is present, but conduct operations in rural areas of high risk for falciparum malaria. Adequate healthcare is available within 24 hours.
    c. Members of SOF who develop a fever of 102o F on the fifth day of a mission in an area of high risk for malaria.
    d. Members of SOF on a 12 month deployment to a mature theater of operations where the risk of malaria is due to P.vivax only.

7. The Centers for Disease Control recommend the following drug(s) for SBT:

    a. Doxycycline
    b. Mefloquine
    c. Chloroquine-proguanil
    d. Atovaquone-proguanil

8. Which of the following is FALSE regarding Malarone:

    a. Malarone is taken daily, starting two days before entering a malarious area, and continued for seven days after returning from a malarious area when used to prevent malaria.
    b. Malarone should not be used for SBT when a soldier is already taking Malarone for CP.
    c. Under no circumstances should children take Malarone.
    d. Malarone should not be used in persons with renal disease causing creatinine clearance of less than 30 mL/min.

9. As a SOF healthcare provider, you have recommended using Malarone for SBT to a deploying Soldier. Which of the following should be mentioned when counseling the Soldier:

    a. Consult a physician immediately if fever occurs 1 week or more after entering a malarious area; if one is not available in 24 hours, then start SBT and follow up as soon as possible.
    b. If fever is present, take a dose of an antipyretic to reduce the chance of vomiting up antimalarials. If vomiting occurs less than 30 minutes after taking SBT, then another full dose should be taken. If vomiting occurs 30 - 60 minutes after taking SBT, then a half dose should be taken.
    c. That you will provide written instructions as a reminder to take 4 tablets daily for 3 days if SBT is necessary.
    d. All of the above should be mentioned.

10. Regarding previous studies on SBT use, which of the following is TRUE:

    a. Studies have conclusively shown SBT to be preferable to CP.
    b. Members of SOF use SBT appropriately when properly counseled.
    c. Studies have demonstrated problems with SBT such a knowing when to start treatment, using the appropriate antimalarials given the pattern of drug resistance, and patient follow-up.
    d. Rapid Diagnostic Tests for malaria are essentially problem free and are the most valuable tool in making the diagnosis of malaria.

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Page 27

	Strongly Agree				Strongly Disagree
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I learned something new that is important.	_	_	_	_	_
I verified some important information.	_	_	_	_	_
I plan to discuss this information with colleagues.	_	_	_	_	_
I plan to seek more information on this topic.	_	_	_	_	_
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I plan to seek more information on this topic.	_ _ _	_ _ _
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Abstracts from Current Literature

Hextend Attenuates Hypercoagulability After Severe Liver Injury in Swine.

Journal of Trauma-Injury Infection & Critical Care. 59(3):589-594, September 2005.

Todd, S Rob MD; Malinoski, Darren MD; Muller, Patrick J. BS; Schreiber, Martin A. MD

Abstract

Background: Hypercoagulability is a major source of morbidity and mortality after injury. A resuscitation regimen that modulates this coagulopathy may prove beneficial. We sought to evaluate the effects of lactated Ringer's (LR) solution and Hextend on the resuscitation of uncontrolled hemorrhagic shock. **Methods:** Twenty swine underwent invasive line placement, midline celiotomy, and splenectomy. After a 15-minute stabilization period, we recorded a baseline mean arterial pressure and created a grade V liver injury. The animals bled freely for 30 minutes, after which we measured the initial blood loss (that after injury). We blindly randomized the swine to receive LR solution or Hextend to achieve and maintain the baseline mean arterial pressure for 90 minutes postinjury. Laboratory values were obtained at baseline and on completion of the 2-hour study period. **Results:** The initial blood loss (before resuscitation) was 22mL/kg in both treatment groups ($p = 0.97$). Animals required 119 +/- 78mL/kg of fluid in the LR group and 40 +/- 21mL/kg in the Hextend group ($p = 0.01$). After resuscitation, the secondary blood loss was 3.7 +/- 1.7mL/kg in the LR group and 4.7 +/- 1.1mL/kg in the Hextend group ($p = 0.1$). Thrombelastography revealed a hypercoagulable state in all animals after injury. This was less pronounced in those animals resuscitated with Hextend. Routine tests of coagulation did not reveal a hypercoagulable state. **Conclusion:** Modulation and restoration of normal coagulation is critical in the management of trauma patients. The patient's coagulation profile might determine the type of fluid to be used at various times during their course. Thrombelastography is superior to routine coagulation assays for the detection of a hypercoagulable state. Resuscitation with Hextend results in a decreased fluid requirement and attenuation of hypercoagulability after injury without increased blood loss.

Influence of Personal Armor on Distribution of Entry Wounds: Lessons Learned from Urban-Setting Warfare Fatalities.

Journal of Trauma-Injury Infection & Critical Care. 58(6):1236-1240, June 2005.

Kosashvili, Yona MD; Hiss, Jehuda MD; Davidovic, Nadav MD; Lin, Guy MD; Kalmovic, Boaz MD; Melamed, Eitan MD; Levy, Yehezkel MD; Blumenfeld, Amir MD

Abstract

Background: This study was undertaken to examine the distribution of entry wounds resulting from firearms and shrapnel in soldiers wearing military personal armor systems (MPASs) in low-intensity urban combat conditions. **Methods:** Data were collected for a retrospective analysis of all combat fatalities sustained by the Israeli Defense Force (IDF) between March 30, 2002, and April 22, 2002, during Defensive Shield Operation in the West Bank. Twenty-six of the 30 fatalities were evaluated in the Israeli National Center of Forensic Medicine. **Results:** A total of 149 entrance wounds were categorized as shrapnel and bullet groups. The face-neck region had the highest density rate in comparison with other body regions in both the shrapnel and bullet groups (2.97 and 2.41, respectively; $p < 0.0001$). In both groups, the overall prevalence of anterior injuries was significantly higher than that of posterior ones (78.9% vs. 21.1% in the shrapnel group and 68.5% vs. 31.5% in the bullet group, $p < 0.001$). However, anterior and posterior chest injuries had a reverse yet more even distribution (43.8% and 56.2% in the bullet group and 40% and 60% in the shrapnel group, respectively; $p < 0.001$). The difference in the average diameters of entry wounds in the covered versus uncovered regions (0.79 +/- 0.42 cm vs. 0.73 +/- 0.29 cm, respectively) was not statistically significant ($p = 0.11$). **Conclusion:** The use of MPASs turned the face-neck region into the most vulnerable body part, as shown by its prominent density rate, especially in the shrapnel group. MPASs designed for urban-setting warfare should provide maximal shielding to both the anterior and posterior chest regions. The diameter of entrance wounds in the covered versus uncovered areas was not statistically significant, suggesting that only a minor deformation of the bullet takes place as it traverses a protective vest.

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Supplemental Perioperative Oxygen and the Risk of Surgical Wound Infection: A Randomized Controlled Trial.

Journal of the American Medical Association. 294(16):2035-2042, October 26, 2005.
Belda, F. Javier MD, PhD; Aguilera, Luciano MD, PhD; Garcia de la Asuncion, Jose MD, PhD; Alberti, Javier MD; Vicente, Rosario MD; Ferrandiz, Lucia MD; Rodriguez, Rafael MD; Company, Roque MD, PhD; Sessler, Daniel I. MD; Aguilar, Gerardo MD, PhD; Botello, Stephanie Garcia MD; Orti, Rafael MD, PhD; for the Spanish Reduccion de la Tasa de Infeccion Quirurgica Group

Abstract

Context: Supplemental perioperative oxygen has been variously reported to halve or double the risk of surgical wound infection. **Objective:** To test the hypothesis that supplemental oxygen reduces infection risk in patients following colorectal surgery. **Design, Setting, and Patients:** A double-blind, randomized controlled trial of 300 patients aged 18 to 80 years who underwent elective colorectal surgery in 14 Spanish hospitals from March 1, 2003, to October 31, 2004. Wound infections were diagnosed by blinded investigators using Centers for Disease Control and Prevention criteria. Baseline patient characteristics, anesthetic treatment, and potential confounding factors were recorded. **Interventions:** Patients were randomly assigned to either 30% or 80% fraction of inspired oxygen (FIO2) intraoperatively and for six hours after surgery. Anesthetic treatment and antibiotic administration were standardized. **Main Outcome Measures:** Any surgical site infection (SSI); secondary outcomes included return of bowel function and ability to tolerate solid food, ambulation, suture removal, and duration of hospitalization. **Results:** A total of 143 patients received 30% perioperative oxygen and 148 received 80% perioperative oxygen. Surgical site infection occurred in 35 patients (24.4%) administered 30% FIO_2 and in 22 patients (14.9%) administered 80% FIO2 ($P = .04$). The risk of SSI was 39% lower in the 80% FIO_2 group (relative risk [RR], 0.61; 95% confidence interval [CI], 0.38-0.98) vs. the 30% FIO_2 group. After adjustment for important covariates, the RR of infection in patients administered supplemental oxygen was 0.46 (95% CI, 0.22-0.95; $P = .04$). None of the secondary outcomes varied significantly between the two treatment groups. **Conclusions:** Patients receiving supplemental inspired oxygen had a significant reduction in the risk of wound infection. Supplemental oxygen appears to be an effective intervention to reduce SSI in patients undergoing colon or rectal surgery.

The Impact of Hypoxia and Hyperventilation on Outcome after Paramedic Rapid Sequence Intubation of Severely Head-Injured Patients.

Journal of Trauma-Injury Infection & Critical Care. 57(1):1-10, July 2004.

Davis, Daniel P. MD; Dunford, James V. MD; Poste, Jennifer C.; Ochs, Mel MD; Holbrook, Troy PhD; Fortlage, Dale BA; Size, Michael J. MD; Kennedy, Frank MD; Hoyt, David B. MD

Abstract

Background: An increase in mortality has been documented in association with paramedic rapid sequence intubation (RSI) of severely head-injured patients. This analysis explores the impact of hypoxia and hyperventilation on outcome. **Methods:** Adult severely head-injured patients (Glasgow Coma Scale score of 3 to 8) unable to be intubated without neuromuscular blockade underwent paramedic RSI using midazolam and succinylcholine; rocuronium was administered after confirmation of tube position. Standard ventilation parameters were used for most patients; however, one agency instituted use of digital end-tidal carbon dioxide ($ETCO_2$) and oxygen saturation (Spo_2) monitoring during the trial. Each patient undergoing digital $ETCO_2/Spo_2$ monitoring was matched to three historical nonintubated controls on the basis of age, gender, mechanism, and Abbreviated Injury Scale scores for each of six body regions. Logistic regression was used to explore the impact of oxygen desaturation during laryngoscopy and postintubation hypocapnia and hypoxia on outcome. The relationship between hypocapnia and ventilatory rate was explored using linear regression and univariate analysis. In addition, trial patients and controls were compared with regard to mortality and the incidence of "good outcomes" using an odds ratio analysis. **Results:** Of the 426 trial patients, a total of 59 had complete $ETCO_2/Spo_2$ monitoring data; these were matched to 177 controls. Logistic regression revealed an association between the lowest $ETCO_2$ value and final $ETCO_2$ value and mortality. Matched-controls analysis confirmed an association between hypocapnia and mortality. A statistically significant association between ventilatory rate and $ETCO_2$ value was observed ($r = -0.13$, $p < 0.0001$); the median ventilatory rate associated with the lowest recorded $ETCO_2$ value was significantly higher than for all other $ETCO_2$ values (27mmHg vs. 19mmHg, $p < 0.0001$). In addition, profound desaturations during RSI and hypoxia after intubation were associated with higher mortality than matched controls. Overall mortality was 41% for trial patients versus 22% for matched controls (odds ratio, 2.51; 95% confidence interval, 1.33-4.72; $p = 0.004$). **Conclusions:** Hyperventilation and severe hypoxia during paramedic RSI are associated with an increase in mortality.

Tranexamic Acid Does Not Prevent Rebleeding in an Uncontrolled Hemorrhage Porcine Model.

Journal of Trauma-Injury Infection & Critical Care. 59(4):976-983, October 2005.

Drobin, Dan MD, PhD; Sjostrand, Fredrik MD; Piros, David MD; Hedin, Annika MD; Heinius, Goran MD; Hahn, Robert G. MD, PhD

Abstract

Background: Fluid resuscitation after uncontrolled hemorrhage might promote rebleeding and irreversible shock. Tranexamic acid is a procoagulant drug that limits blood loss after surgery of the hip, knee, and heart. We hypothesized that pretreatment with tranexamic acid reduces the rebleeding in uncontrolled hemorrhage and thereby allows safe administration of crystalloid fluid resuscitation. **Methods:** A 120-minute intravenous infusion of 100mL/kg of Ringer's solution was given to 24 pigs (mean weight, 20 kg) 10 minutes after lacerating the infrarenal aorta. The animals were randomized to receive an intravenous injection of 15mg/kg of tranexamic acid or placebo just before starting the resuscitation. Rebleeding events were monitored by two ultrasonic probes positioned proximal and distal to the laceration. **Results:** Tranexamic acid had no effect on the number of rebleeding events, bled volume, or mortality. The initial bleeding stopped within four minutes after the injury. The five animals that died suffered from 4.4 rebleeding events on average, which tripled the total blood loss, whereas the survivors had only 1.3 such events during fluid resuscitation ($p < 0.02$). At autopsy, death was associated with a larger total hemorrhage; the blood recovered from the abdomen weighed 1.4 kg (median) in nonsurvivors and 0.6 kg in survivors ($p < 0.001$), with the difference being attributable to rebleeding. **Conclusion:** Rebleeding events increased the amount of blood lost and the mortality in uncontrolled aortic hemorrhage. Tranexamic acid offered no benefit.

Apologies To COL Rocky Farr regarding his article, "American Guerrilla Warfare Medical Doctrine – The First Manuals: Lessons Learned" on page 33 of the Spring Ed Vol 6 Ed 2. The reference page was accidentally cut off in the middle of reference 28. Below are the remainder of the articles references

28. For the Ukrainian see: http://www.infoukes.com/upa/; http://www.infoukes.com/upa/series01/vol23.html., (Retrieved 21 November 2005). Ripeckyi M. UPA Medical Services. Toronto: Litopys UPA; 1992. For the Yugoslavian: Dragiæ D.
29. FM 31-21, 1951, 25.
30. Joint Publication 3-05. Doctrine for Joint Special Operations. Washington, DC: GPO; 17 April 1998. V-6. Joint Publication 4-02. Doctrine for Health Service Support in Joint Operations. Washington, DC: GPO; 30 July 2001.
31. Bank, 51-52.
32. FM 31-21.1951. 137.
33. Ibid. 138.
34. Grenkevich L. The Soviet Partisan Movement 1941-1944. London: Frank Cass; 1999, 197-8. Dragić D. 81-3.
35. FM 31-21.1951. 138.
36. Papo I. The organization of surgical care in the partisan war in Yugoslavia and aspects relevant to training of surgeons for modern warfare. The Journal of Trauma, January 1988; 28(1): S170-4. Ripeckyi M., 271-96. Dragic D., 80-101.
37. FM 31-21.1951. 138-140.
38. Dragić D., 65-80.
39. Street B. 88-91.
40. Rogers L. Guerilla Surgeon. A New Zealand Surgeon's Wartime Experiences with the Yugoslav Partisans. London: Collins. 1957.
41. FM 31-21. 1951. 143
42. FM 31-21. 1951. 143-4.
43. Dragić D., 81-3.
44. FM 31-21. 1951. 144-145.
45. Department of the Army. Field Manual 31-20. Operations Against Guerilla Forces. Washington, DC: GPO; 1 February 1951. iii.
46. Hirst J. Street, 250-1.

Disclaimer: The opinions or assertions contained herein are the private views of the author and are not to be construed as official or reflecting the views of the Department of the Army, the Department of Defense, or the U.S. Government.

Correspondence I am a new member of SOMA and have recently received the current issue of JSOM. Thank you, it's well done! Being a big fan of book references... I looked through the compiled lists, briefly. I noted that it asked for input from the readership and if I may….(Unless I missed them and I might have), there are three titles I like a lot, but two of them are pretty large to be field luggable.
Oxford Handbook of Tropical Medicine ISBN: 0198525095
Wilderness Medicine: Management of Wilderness and Environmental Emergencies. Paul Auerbach, MD; ISBN: 0323032281
Medicine: For Mountaineering & Other Wilderness Activities 5th Edition, James A. Wilkerson (Editor); ISBN: 0898867991
If I might be able to contribute further to JSOM, please let me know, I would be happy to help.

Wayne Thompson, MS, MPA

Foreign Bodies in the External Ear Canal: An Odd but Possible Injury Downange

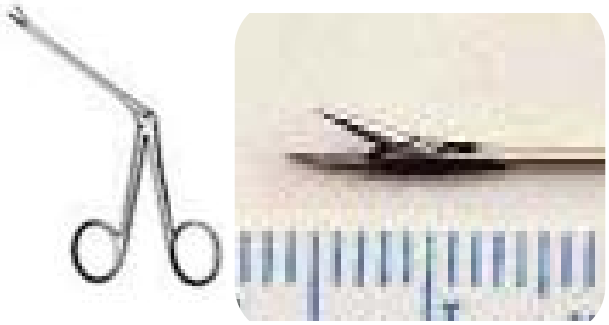
John W. Paul, PA-C

While hospital emergency departments commonly see foreign bodies in ear canals, such injuries also occur to Soldiers while deployed downrange. On three occasions while deployed, the author had to remove a foreign body in the ear canal, which prompted the writing of this article. Usually, the cause of the foreign body is an insect that crawled into the ear canal. While this can be comical to the observer, an insect buzzing or moving around in the ear canal can cause great distress to the patient. If it is an insect, the patient most often states that they felt something crawl into the ear while lying on their cot. A good preventitive measure for this problem is to use a mosquito net whenever possible. Like Soldiers, insects are designed to move forward; however, this feature prevents them from throwing it in reverse and backing out of the canal. Occasionally, the patient will have a piece of a Q-tip or its cotton end break off inside the ear canal. Either way, it is a quick removal at the aid station or by the Special Operations Medic while in the field. Whatever the foreign body is, most often the history will reveal what the object is.

The evaluation of the patient with a foreign body in the ear should begin with calming the patient and placing him or her in the supine position. Direct visualization of the object is of the utmost importance. It should be noted that hemotympanium might look like ladybug - don't try to remove it unless you are positive that it is an actual ladybug. If there is an insect, the ear canal should be filled with 1 to 2% lidocaine without epinephrine. Viscous lidocaine can also be used. This solution should paralyze the insect as well as provide some amount of analgesia. While some patients may need to be sedated, it is a rare occurrence and usually only necessary in small children or a very uncooperative patient. In these cases, do not attempt removal until the patient is calm. After the insect stops moving, remove the liquid using a small 3 to 5cc syringe and an 18-gauge catheter tip being careful not to insert it too deeply into the canal. The best tool to use for insect removal is a pair of alligator forceps. These special forceps (NSN: 6515011398287) do not open fully like hemostats do. Since only the tip opens, it allows easy grasping of the insect or soft foreign body such as the Q-tip cotton mentioned above. Remove the insect as soon as possible after applying the lidocaine because the insect may swell and break into several tiny insect pieces. If this happens, removal becomes a prolonged process while trying to remove legs and feelers one at a time.

Vegetable matter also swells with liquid; however the author has not encountered this downrange. Fortunately, MRE's do not have the dehydrated fruit (NSN: 8970-00-926-9222) any longer because I shudder to think of that being lodged in the canal. If the object is light and moves easily (e.g., a piece of Styrofoam,) apply light suction if a suction unit is available. If the object is dry and rigid, a drop of superglue may be applied to the wooden portion of a cotton tip applicator and very carefully touched to the foreign body. After 10 seconds, remove the cotton tip applicator with the foreign body (hopefully) attached to it. Be careful not to touch the ear canal-with the glue -- especially in patients who still have their weapon! If that occurs however, the cerumen should protect the ear canal and the patient will have no lasting damage.

After irrigating the ear canal with room temperature water, completely inspect the ear canal for any remaining foreign body or insect parts. Finally, inspect the tympanic membrane for any sign of perforation. Small abrasions of the ear canal usually heal spontaneously, but in the field I would recommend the topical antibiotic Floxin Otic (ofloxacin), which is safe even with perforations. This small precaution can possibly prevent a Soldier from having to be evacuated due to a preventable infection.



Alligator Forceps: Recommended for medical set

Floxin Otic: Recommended for medical set

What not to do:

- Do not use a rigid instrument to remove an object from an uncooperative patient's ear. An unexpected movement might lead to a serious injury of the middle ear.

- Do not attempt to remove a large bug or insect without killing it first. They tend to be wily, evasive little creatures well equipped for fighting in tunnels. In the heat of battle (with the insect), the patient can become terrorized by the noise, insect movement, and pain. Furthermore, the instrument that you are using is likely to damage the ear canal. I have had an insect all out of the ear only to jump onto the tent flap and run up the wall. This can be very disturbing and cause some minor mayhem for everyone involved.

- Do not attempt to irrigate a tightly wedged bean or seed from an ear canal. The water may cause the bean to swell.

- Do not attempt to remove a large or hard object with bayonet (not the knife) or similar forceps. The bony canal will slowly close the forceps as they are advanced and the foreign object will be pushed farther into the canal. While alligator forceps are designed for the canal, even they will push a large, hard foreign body farther into the ear if not handled correctly..

Complications of foreign body removal include trauma to the skin of the canal, canal hematoma, otitis externa, tympanic membrane perforations, ossicular dislocations, and facial nerve palsy. By using the least invasive technique and being careful, the risks of these complications are very low. The patient will forever be grateful for the removal of the offending object and you will gain the admiration and love of the entire unit (unless you mess up with the superglue). Be sure to consult an ENT surgeon, if available.

REFERENCES:

Farr, Warner D., USSOCOM Surgeon

COMMON SIMPLE EMERGENCIES ©, Longwood Information LLC 4822 Quebec St NW Washington DC 20016-3229, retrieved from: http://www.ncemi.org/cse/cse0305.htm on 31 May 2006.

Tintinalli Judith E., *Emergency Medicine,* Fifth edition, p.1522-1525.

Captain Johnny Wayne Paul is a physician assistant assigned to USSOCOM.

Simple Respiratory Mask

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Retrieved from http://www.cdc.gov/ncidod/EID/vol12no06/05-1468.htm. Dato VM, Hostler D, Hahn ME. Simple respiratory mask [letter]. *Emerg Infect Dis* [serial on the Internet]. 2006 Jun [date cited].

Letter to the Editor: The U.S. Department of Labor recommends air-purifying respirators (e.g., N95, N99, or N100) as part of a comprehensive respiratory protection program for workers directly involved with avian influenza–infected birds or patients.[1] N95 respirators have two advantages over simple cloth or surgical masks; they are ≥95% efficient at filtering 0.3-μm particles (smaller than the 5μm size of large droplets—created during talking, coughing, and sneezing—which usually transmit influenza) and are fit tested to ensure that infectious droplets and particles do not leak around the mask.[2–4] Even if N95 filtration is unnecessary for avian influenza, N95 fit offers advantages over a loose-fitting surgical mask by eliminating leakage around the mask.

The World Health Organization recommends protective equipment including masks (if they not available, a cloth to cover the mouth is recommended) for persons who must handle dead or ill chickens in regions affected by H5N1.[5] Quality commercial masks are not always accessible, but anecdotal evidence has showed that handmade masks of cotton gauze were protective in military barracks and in healthcare workers during the Manchurian epidemic.[6,7] A simple, locally made, washable mask may be a solution if commercial masks are not available. We describe the test results of one handmade, reusable, cotton mask.

For material, we choose heavyweight T-shirts similar to the 2-ply battle dress uniform T-shirts used for protective masks against ricin and saxitoxin in mouse experiments.[8] Designs and T-shirts were initially screened with a short version of a qualitative Bitrex fit test.[9] The best were tested by using a standard quantitative fit test, the Portacount Plus Respirator Fit Tester with N95-Companion.[10] Poor results from the initial quantitative fit testing on early prototypes resulted in the addition of four layers of material to the simplest mask design. This mask is referred to as the prototype mask (see Figure on page 58).

A Hanes Heavyweight 100% preshrunk cotton T-shirt (made in Honduras) (http://www.hanesprintables.com/Globals/Faq.aspx) was boiled for 10 minutes and air-dried to maximize shrinkage and sterilize the material in a manner available in developing countries. A scissor, marker, and ruler were used to cut out one outer layer (=37 × 72 cm) and eight inner layers ($\leq$18 cm^2). The mask was assembled and fitted as shown in the Figure.

A fit factor is the number generated during quantitative fit testing by simulating workplace activities (a series of exercises, each one minute in duration.) The Portacount Plus Respirator Fit Tester with N95-Companion used for the test is an ambient aerosol instrument that measures aerosol concentration outside and inside the prototype mask. The challenge agent used is the ambient microscopic dust and other aerosols that are present in the air.

A commercially available N95 respirator requires a fit factor of 100 to be considered adequate in the workplace. The prototype mask achieved a fit factor of 67 for one author with a Los Alamos National Laboratory (LANL) panel face size of four, a common size. Although insufficient for the workplace, this mask offered substantial protection from the challenge aerosol and showed good fit with minimal leakage. The other two authors with LANL panel face size 10, the largest size, achieved fit factors of 13 and 17 by making the prototype mask inner layers slightly larger (22 cm^2).

We do not advocate use of this respirator in place of a properly fitted commercial respirator. Although subjectively we did not find the work of breathing required with the prototype mask to be different from that required with a standard N95 filtering facepiece, persons with respiratory compromise of any type should not use this mask. While testers wore the mask for an hour without difficulty, we cannot comment on its utility during strenuous work or adverse environmental conditions.

We showed that a hand-fashioned mask can provide a good fit and a measurable level of protection from a challenge aerosol. Problems remain. When made by naive users, this mask may be less effective because of variations in material, assembly, facial structure, cultural practices, and handling. No easy, definitive, and affordable test can demonstrate effectiveness before each use. Wearers may find the mask uncomfortable.

We encourage innovation to improve respiratory protection options. Future studies must be conducted to determine levels of protection achieved when naive users, following instructions, produce a similar mask from identical or similar raw materials.

Research is needed to determine the minimal level of protection needed when resources are not available for N95 air-purifying respirators since the pandemic threat from H5N1 and other possible influenza strains will exist for the foreseeable future.

References

1. Occupational Safety and Health Administration. Guidance for protecting workers against avian flu. [cited 2005 Oct 23]. Retrieved from http://www.osha.gov/dsg/guidance/avian-flu.html
2. National Institute for Occupational Safety and Health. 42 CFR Part 84 Respiratory protective devices. 1995 [cited 2005 Oct 23]. Retrieved from http://www.cdc.gov/niosh/pt84abs2.html
3. Garner, JS. Guideline for isolation precautions in hospitals. The Hospital Infection Control Practices Advisory Committee. *Infect Control Hosp Epidemiol.* 1996;17:53–80.
4. Centers for Disease Control and Prevention. Laboratory per formance evaluation of N95 filtering facepiece respirators, 1996. *MMWR Morb Mortal Wkly Rep.* 1998.47:1045–9.
5. World Health Organization Regional Office for the Western Pacific. Advice for people living in areas affected by bird flu or avian influenza. 2004 Nov 8 [cited 2005 Oct 22]. Retrieved from http://www.wpro.who.int/NR/rdonlyres/04FA6993-8CD1-4B72-ACB9B0EBD3D0CB1/0/Advice10022004rev08112004.pdf
6. Capps JA. Measures for the prevention and control of respiratory infections in military camps. *JAMA.* 1918;71:448–50.
7. Kool, JL. Risk of person-to-person transmission of pneu monic plague. *Clin Infect Dis*. 2005;40:1166–72.
8. Darling RG. Biological warfare and bioterrorism. Slides 47 and 48. [cited 2006 Mar 19]. Retrieved from http://www.regionsem.org/~trjoing/papers/123456/clr/Slides%20with%20Notes/Biological%20Warfare%20&%20Bioterrorism.pdf
9. Occupational Safety and Health Administration. Fit testing procedures (mandatory)–1910.134 App A. [cited 2006 Jan 21]. Retrieved from http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9780&ptext_version=FALSE#Appendix%20A
10. TSI incorporated. How to quantitatively fit test filtering-face piece respirators using a TSI Portacount Plus and N95-Companion (ITI-054) c2006. [cited 2006 Jan 21]. Retrieved from http://www.tsi.com/AppNotes/appnotes.aspx?Pid=33&lid=445&file=iti_054

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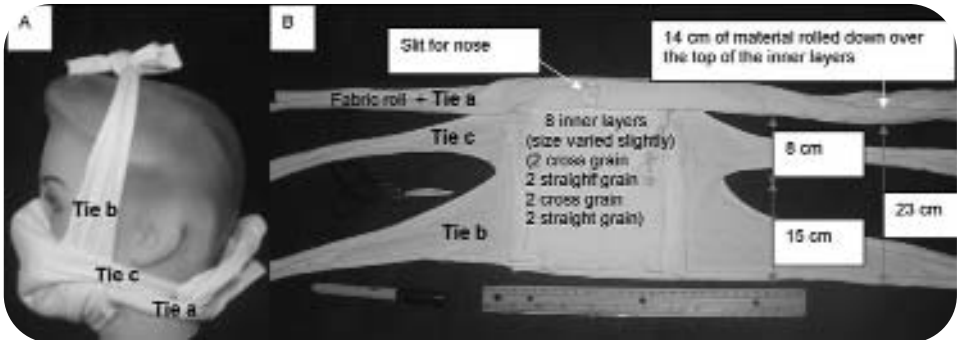

Figure. Prototype mask. A) Side view, B) Face side. This mask consisted of one outer layer (approximately 37 cm × 72 cm) rolled and cut as in panel B with 8 inner layers ($\leq$18 cm^2) placed inside (against the face). The nose slit was first placed over the bridge of the nose, and the roll was tied below the back of the neck. The area around the nose was adjusted to eliminate any leakage. If the seal was not tight, it was adjusted by adding extra material under the roll between the cheek and nose or by pushing the rolled fabric above or below the cheekbone. Tie b was tied over the head. A cloth extension was added if tie b was too short. Finally, tie c was tied behind the head. The mask was then fit tested.

In reference to "Simple Respiratory Mask"

Warner Anderson, MD

Dust is a fact of life, and is a complicating factor in every effort. Fortunately, non-smokers have good pulmonary toilet and can pump dust out of their respiratory tract about as quickly as it deposits there. This is a good thing, because otherwise your lungs pretty quickly would turn into sandstone. Unfortunately, lots of Iraqi soldiers do smoke.

In order to protect against the irritating effects of dust, soldiers have learned to adopt a cloth scarf called, in the "Action Guy" catalogs, a *shemagh*, but in Iraqi a *yashemagh*. A more general name is *keffiyah*, possibly derived from the name of the city Kufa. These are available in several combinations, most commonly in the military as a sand-and–black reticular (network) pattern, with an olive-and-black also available. This is referred to as "military chic."

Some other combinations are showing up on Coalition uniforms as well, including the rare Gulf States' (Arabic, not Louisiana) plain white, the black-on-white netted pattern made popular by Yasser Arafat, the Palestinian Liberation Organization and Fatah; the green-on-white net pattern associated with Islamists and now with International Jihadists; and the red-on-white net pattern popular among both pan-Arab socialists and Hamas.

Other non-reticular red-and-white patterns are associated with Jordan, while black-and white is popular throughout the Levant (Lebanon and surrounding territory) and elsewhere. All of these, according to *Wikipedia*, are now adopted as fashionable by Western "hipsters," and I have personally seen many of these adorning the otherwise *de riguer* black clothing of the anti-war protestors on the District of Columbia mall.

But what is overlooked in all this symbolism is the material. Desert people wear a cloth made of combination wool and cotton, because as field Soldiers know, wool dries better than cotton when soaked with perspiration, and in the cold night will still insulate. And here is an entrepreneurial tip to anyone looking for retirement income: make a *keffiya* in some tactical pattern out of silk. The fine weave will trap sand better, it is lighter, it will evaporate water faster, and it will insulate when wet. Plus, it will not melt in IED explosions nor in vehicle or aircraft fires (it will char, but this poses less danger).

This brings me by a roundabout way to the accompanying item that first appeared in the CDC journal *Emerging Infectious Diseases*.

The authors have developed a field expedient respiratory mask for use when high-efficiency (HEPA) masks are not available. Special operations Medics may find themselves wondering how much good that shemagh will do when faced with a patient whose cough sounds like tuberculosis, SARS, H5N1 or some other contagious droplet-transmitted disease.

And the answer is, not much. However, this item points out that a particular brand-name high-quality closely-woven cotton T-shirt fabric can be shrunk and multi-layered as a substitute HEPA mask, a true field expedient measure. It can be laundered and re-used too, meaning that these could be mass-produced as the need arises (say an 18D deployed where there is an unexpected outbreak of human-to-human H5N1 influenza), and cycled through use, disinfection and re-use several times.

Quality control during manufacture seems to be the most important issue, but the technology is within the grasp of any peasant household.

Will this eliminate the need for real HEPA masks? No, of course not. But a HEPA mask, or an M-40 mask, is unlikely to be in your SOF rucksack just when you need it most. So pay close attention to the boiling and the sewing and the fitting of the old T-shirts, or your hipster military-chic shemagh, because you may want to McGyver up a good filter in a hurry.

Executive Editor's Note: Some medical articles are noteworthy when they appear and then fade while others stand the test of time. This is such an article. We all are in the business of saving lives *"... IN ADVANCE OF THE AID STATION ... "* as the title indicates and need to be familiar with the thoughts of those who went before us in trying to lessen mortality on the battlefield. This article, presented in 1954, looks at the differences and improvements in far forward care after World War II and the Korean War. Many of its lessons are still valid. The author's "four major phenomena threaten life following wounding," includes blood loss, tissue damage, infection, and mechanical defects (airway, hemothorax, pneumothorax, cardiac tamponade and increased intracranial pressure). Not a bad list for today. Also, read the 1954 opinion of the aideman's required bag contents.

Retrieved from http://history.amedd.army.mil/default_index2.html. Permission to publish granted by OTSG.

CARE OF THE BATTLE CASUALTY IN ADVANCE OF THE AID STATION*

Russell Scott, Jr., MD

A review of the statistics dealing with the battle casualty in past wars has thrown increasing attention upon the extreme importance of the medical care given the wounded soldier during the first few hours after wounding. The mortality rate of the battle casualty after admission to a fixed hospital has fallen from 17 percent in World War I to 5 percent in World War II to 1.7 percent in the Korean War. In spite of these encouraging statistics, one out of every four wounded soldiers dies. The ratio of Killed in Action to Wounded in Action has changed very little since the First World War. The mortality rate at division and particularly battalion level has not paralleled the fall in the hospital mortality. For this reason, improvement of all facilities that speed the casualty to resuscitation and that bring resuscitation as far forward to the casualty as possible should be continued. In particular, intensive effort should be directed to the casualty in the most forward area.

To realize these aims it is of the utmost importance to appreciate what the optimal care of a battle casualty can and should consist of, under what conditions optimal care has been demonstrated to be possible, and what policies in training and supply must be adopted to insure the best care under any set of circumstances. It is necessary also to appreciate that variations in weather, terrain, tactical situation, efficiency of supply, etc., sometimes render optimal care difficult, but not impossible. We must therefore strive to modify our care as circumstances permit in order to give the best care possible at all times. As simple as this might appear, there is usually a significant delay in improving our care as circumstances allow. In order to have optimal care it is necessary for us to have a clear idea of what the optimal care of a battle casualty should be.

Before we go into the specific first aid procedures, let us formulate the broad aims and objectives of the early phase of resuscitation.

The broad aims and objectives of resuscitation are first to save life, then save limb and, at the same time, do the most good for the greatest

*Presented 19 April 1954, to the Course on Recent Advances in Medicine and Surgery, Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D. C.

Number of casualties

To achieve these objectives we must understand the pathology of trauma so that from this knowledge we may emphasize the measures of resuscitation that are of real importance in saving life and limb.

Briefly, four major phenomena threaten life following wounding.

1. First, and most important, blood is lost and continues to be lost, not only to the exterior but into the

damaged tissue at the wound or fracture. With blood loss there is progressive decrease in blood volume, fall in cardiac output, fall in blood pressure, decrease in renal blood flow and decrease in oxygenation of tissue.
2. Tissue is damaged. With tissue damage specific organs and systems are damaged, the media for bacterial growth are produced, and the latest laboratory work indicates that toxic products may be released from the damaged tissue and have a general systemic effect which in itself may cause death.
3. The defense against bacteria is broken; wounds become contaminated and bacterial evasion of the tissues and of the blood stream may occur.
4. Mechanical defects may develop, such as blockage of the airway, hemothorax, pneumothorax, cardiac tamponade or increase in intracranial pressure.

It must be understood that all of these four processes are progressive, synergistic, and will continue until measures are instituted to slow them down (first aid) and finally correct them (definitive surgery). As long as these processes are in motion, the casualty continues to deteriorate. In general, the intensity of early therapy and the time lag before the processes are finally brought to a halt determines the outcome of each casualty.

Aims of Resuscitation

It is important to appreciate that "resuscitation" includes the whole process of slowing down and stopping the pathological processes set in motion by wounding; first by simple local means, secondly by plasma or blood replacement therapy, and finally by operative intervention at the surgical hospital. In its complete sense, first aid in the field and surgery at the surgical hospital should be considered integral parts of resuscitation.

The specific aims, then, of resuscitation include:
1. Prevention of continued blood loss.
2. Prevention of additional tissue damage.
3. Prevention of additional bacterial contamination and suppression of bacterial growth.
4. Replacement of blood volume deficit.
5. Prevention or correction of mechanical defects in the cardiorespiratory and central nervous system physiology.
6. Relief of pain.
7. The removal of damaged tissue and repair of specific organs.

Again, the level or echelon at which each of the above measures may be carried out will depend upon many variables: the weather, tactical situation, terrain, efficiency of supply, and the ability and attitude of the medical personnel involved.

It should be obvious from this discussion that neither "first aid" on the battlefield nor surgery at the surgical hospital can be separated from resuscitation. The whole process of resuscitation should be considered to be an integrated program, beginning with first aid in the field and ending with surgery at the surgical hospital. We all know that military surgery is not just civilian surgery carried out in a tent; likewise, we must appreciate that combat first aid is not Boy Scout first aid carried out on the field of battle. If we are to lower the present battle mortality of 25 percent, every effort must be made to make the initial phase of resuscitation prompt, intensive, exact and thorough. One oversight or break in technique may well cost a life because of the long time lag involved in evacuation.

It would be impossible with the time and space allotted even to outline a complete course in first aid. The following section deals with the first aid measures believed to be the most important.

Optimal resuscitation begins with the aidmen in the field who attempt to slow down or stop the basic pathological processes that have been set in motion by wounding. This is done by initiating the aims of resuscitation.

1. **Prevention of continued blood loss**

a. *Pressure dressings and pressure points.* The vast majority of bleeding wounds can be controlled by the application of a pressure dressing. In addition to the pressure dressing, the patient may be instructed to add additional pressure. In most instances bleeding can be controlled by such measures.

b. *Tourniquets.* When a pressure dressing has proven to be unsatisfactory for the control of hemorrhage, a tourniquet should be resorted to. I use the word "resorted" advisedly, for the necessity of a tourniquet should occur only infrequently. It is of the utmost importance that all aidmen be well grounded in the use of the tourniquet. Often the tourniquet will not be applied correctly so that hemorrhage is not completely controlled, or the tourniquet may slip and bleeding recur so that a casualty will bleed to death while on the way to the aid station.

During cold weather an extremity with a tourniquet applied is unusually susceptible to freezing and gangrene formation. During the freezing months the aidmen and surgeon should be unusually careful not to apply a tourniquet unless it is absolutely necessary and should do so only when repeated efforts to control hemorrhage have failed.

Once a tourniquet has been applied, any member of the medical team removing that tourniquet should exercise extremely good judgment, as bleeding may recur after the patient has passed through that period of observation. The removal of a tourniquet in cases where follow-up observation is impossible, such as during the period of evacuation, is extremely hazardous and should be avoided. The untimely removal of a tourniquet with recurrent hemorrhage, even when recognized and immediately stopped, has been shown to be serious. On occasion this error has thrown a casualty back into shock from which he could not be revived. However, when safe, the removal of a tourniquet reduces the chances of the casualty's losing an extremity. In casualties with extensive tissue damage where the need for amputation is obvious, the tourniquet can and should be left in place to avoid any chance of additional hemorrhage. This decision, however, should be made only by a medical officer.

c. *Immobilization.* Splinting of a fracture is of real assistance in preventing further vascular damage near the fracture site, and thereby preventing additional blood loss, both to the exterior and into the damaged muscle. Immobilization of any portion of the body which has been wounded is a sound principle to observe in order to decrease the chances of recurrent hemorrhage. Should an arm or leg be wounded, it is advisable to instruct the patient not to use that extremity until a location has been reached where complete resuscitation is possible should bleeding recur.

2. **Prevention of Additional Tissue Damage**

a. *Splinting of fractures.* The proper application of a splint is the single most important factor in preventing additional tissue damage. Inadequate splinting, rough evacuation, or inadequate instructions to the patient as to how to manage himself during the period of evacuation, may result in additional tissue damage at the fracture site. The importance of prompt and adequate splinting cannot be overstressed. We should continue the motto of "when in doubt, splint them where they lie."

b. *Immobilization of any wounded part.* Regardless of location, with or without fracture, it is also important to impede further tissue damage. If a missile should be lodged in a leg and a casualty is allowed to walk, the metallic fragment may well produce additional tissue damage or hemorrhage. Every wounded casualty should be instructed not to move the injured part for fear of producing additional tissue damage. If the casualty is disoriented, measures should be taken to restrict movement of the wounded part. Should a leg have extensive muscle damage, a splint will do no harm.

3. **Prevention of Additional Contamination and Bacterial Growth**

a. An adequate dressing should be placed on the wound as soon as possible. By adequate is meant a dressing that is large enough and thick enough to protect the wound in its entire extent. Often more than one of the conventional dressings will be needed.

b. Antibiotic therapy in the field is also desirable under certain circumstances. In outpost positions, during assaults, or in any tactical situation where the casualty cannot reach the aid station until four or five hours or longer after wounding, antibiotic therapy by the aidman in the field is most desirable. This practice can be carried out with minimal effort by the use of penicillin syrettes. Antibiotic therapy at this early time is not only important in suppressing bacterial growth at the site of wounding, but also may be of particular value to casualties with abdominal wounds where the peritoneal cavity has become contaminated with fecal matter. Recent work indicates that in such cases bacteria may enter the blood stream and be deleterious to the patient's condition. Dressings, once applied, should not be removed so that wounds are exposed by the "look-see procedure" to satisfy the curiosity of the aidman or battalion surgeon. In the absence of continued bleeding or severe pain, removing the dressing to look at the wound accomplishes nothing and increases the chances of further contamination or hemorrhage. The unofficial policy or habit of looking at the wound at each level should be abandoned.

c. Burns should be covered with dry sterile dressings at the earliest possible time. In many instances, because of the extent of injury, this cannot be accomplished before the casualty reaches the aid station. All personnel should be warned not to use Vaseline dressings at this early time. Adequate cleansing of the wound in advance of the surgical hospital is impossible, and the application of Vaseline dressings in the field usually contributed to bacterial contamination. A Vaseline dressing, however, is preferable to no dressing at all, and should be used rather than leaving the burn completely exposed during evacuation. The application of a dry sterile dressing in the field does not obligate the casualty to continued treatment by the closed method. At the surgical hospital the first aid dressing applied in the field may be removed and the patient treated by the open method if the surgeon in charge so desires.

4. **Replacement of Blood Volume Deficit**

The replacement of a deficit in blood volume is second only to the control of hemorrhage in saving life. With the new plasma expanders, found to be efficient in combating shock, the aidman has a relatively harmless and inexpensive agent with which to resuscitate more completely the battle casualty at an earlier time. Prior to the advent of the plasma expanders, when pooled plasma was used, many surgeons felt the risk of hepatitis was probably too great to allow many aidmen to use their own discretion in administering plasma therapy on their own. With the new expanders the danger of hepatitis has been eliminated.

During the winter months it was found difficult and sometimes impossible to reconstitute the dried plasma. The loss of this expensive agent through breakage of the glass containers sometimes accounted for half of the plasma allotted to a given battalion. In addition, the glass containers were bulky for use on patrol, and the process of reconstituting the dried plasma required valuable time. Plasma expanders are now available in a light plastic container which can be easily carried by the aidmen. Plasma expanders so prepared are light, nonbreakable, and can be kept warm under the clothing of an aidman prior to administration. Their contents can be given under pressure by manipulation of the bag or by placing the casualty on the bag to create pressure.

Also important is the more vigorous replacement of the blood volume deficit in the field of battle prior to evacuation. This is important for three reasons:

a. First, the patient will be brought out of shock earlier and what deleterious effects shock has on the casualty will not operate as long.

b. Second, the condition of the seriously wounded patient is improved for his journey to the rear, he is in a less critical condition, and his chances of surviving the litter carry are better. All of the casualties with multiple penetrating wounds of the extremities, peripheral vascular wounds and traumatic amputations in whom hemostasis has been established will be greatly benefited by vigorous replacement therapy shortly before and during the period of evacuation to the aid station.

The casualty with internal bleeding is another problem. Vigorous replacement therapy and delay to any extent should be reserved for an echelon where immediate surgical intervention is possible should abdominal bleeding continue or recur as the blood pressure rises to normal; in most instances this will be the surgical hospital. In the hands of a skilled, well oriented, mature aidman, certain types of casualties would be definitely benefited, however, by more vigorous resuscitation in the forward area before evacuation is begun. By vigorous resuscitation is meant the administration of 500 to 1,000ml. of a plasma expander over a 10-minute period. A "delay" of more than 10 minutes by the aidman is, probably not justified. I avoid the use of the word holding. Any delay in evacuation, however, should be reserved for those patients in whom complete hemostasis has been established. If any degree of hemorrhage continues, it would be unwise to expect an aidman to have the clinical judgment required to make a decision as to whether a patient's evacuation should be delayed for more vigorous resuscitation. If there is any question about continued hemorrhage, intravenous therapy should be started and a speedy evacuation to the aid station begun.

Whole blood therapy, which was shown to be practical in the aid stations under certain circumstances, is probably not practical in advance of the aid station, at least in the hands of the aidman. As a rule, it is usually impractical to give more than 1,000cc. of an intravenous solution to a patient before he reaches the aid station and plasma expanders can be used without reservation in this amount.

c. Finally, it is important to recognize that certain types of wounds will eventually be accompanied by clinical shock unless intravenous therapy is instituted early. Such injuries as traumatic amputations and large evulsing wounds will eventually require intravenous therapy. Early intravenous therapy in such patients may well prevent clinical shock. This is the third reason that casualties will be benefited by intravenous therapy before and throughout the period of evacuation to the aid station.

5. **The prevention or correction of defects in cardio-respiratory physiology.**

At the time the battle casualty is initially examined, an effort should be made to determine whether the patient has signs of respiratory difficulty. If the patient has a sucking chest wound, this should be immediately closed with a Vaseline dressing. Many battalion surgeons instructed their aidmen to have the casualty exhale completely an instant before the Vaseline dressing is applied. This will force the major portion of free air out of the thoracic cavity thereby reducing the "dead space" caused by the free air within the thorax and will result in a larger vital capacity following closure of the chest wound.

The patient should be examined about the face and neck for wounds. If there is partial occlusion of the airway, this may be relieved by manipulating a shattered larynx or positioning the head in a particular manner. Instructions to the patient concerning how to hold his head or how to lie on the litter may be life-

saving during the period of evacuation. With bleeding about the nose and mouth, the patient should be instructed to lie in a manner that will allow the blood to drain to the exterior and not pass into the throat and cause aspiration and suffocation. The treatment of a hemothorax or cardiac tamponade is beyond the ability of the aidman and should be reserved for a medical officer.

6. **Relief of Pain**

a. Immobilization of the wound is one of the greatest factors in relieving or preventing pain. This may be accomplished by splinting in the case of suspected or known fractures and by instructions to the patient as to how he should prevent movement of a wounded part during evacuation.

b. Reassurance and explanation to the patient is often beneficial. Many casualties expect pain, or in the excitement of battle, a fear of death or deformity actually magnifies in their own minds the amount of pain they are experiencing. A simple explanation that their wounds do not threaten life or limb and that a small amount of pain can and should be tolerated will quite often give gratifying relief to the casualty.

c. Morphine Therapy. Several known facts should be taken into consideration by the aidmen before administering morphine. These facts are:

(1) A very small percentage of battle casualties actually have pain severe enough to warrant morphine therapy. This is particularly true of casualties in shock. Patients in shock may be restless, hyperactive, and appear disoriented. The untrained will interpret this as a response to pain when the reaction is actually on the basis of cerebral anoxia. As stated, a large portion of the patients who claim to have pain are merely anxious and can be relieved of this anxiety by adequate psychotherapy founded on mature judgment of a sincere and well trained aidman or surgeon.

(2) Morphine may be deleterious in certain types of casualties.

(a) Casualties with head wounds should not receive morphine because morphine can alter the neurologic response of the casualty and make physical examination and evaluation before operation difficult.

(b) Patients with chest wounds and impaired respiratory physiology may have slowing of respiration and additional difficulty with adequate oxygenation of their blood.

(c) Patients in shock with poor peripheral blood flow may accumulate morphine in the peripheral tissues and receive an overdose once shock has been combated and adequate tissue profusion is restored.

(3) It has been clearly shown that a dose of one-sixth to one-fourth grain is as effective in relieving pain as a one-half grain dose and has fewer side effects.

(4) Morphine may cause nausea and vomiting, which can be deleterious to the patient.

(5) Morphine may increase the hazard of anesthesia.

In view of these facts, a real consideration should be made before morphine is given and any aidman administering morphine should have a thorough understanding of the indications and hazards as well as contraindications to morphine therapy. Many capable medical officers and civilian consultants feel strongly that the Medical Service should recall the one-half grain morphine syrettes and replace them with one-fourth grain syrettes.

7. **Transportation and Protection from the Elements**

It is important for all personnel dealing with the battle casualty to appreciate that exposure to the elements is deleterious to the casualty. It is important that adequate numbers of blankets (four to five) be available when a casualty is to be transported outside of a heated vehicle during the winter months. This can be made possible by instructing all members of a litter team to carry one blanket in addition to their normal load while on patrol or during an assault.

It is also important for all members of the medical team to appreciate that movement of the casualty is often deleterious, particularly while a patient is in shock. We should abandon the motto that "the shortest litter time is the best litter time" and put in its place "the smoothest litter carrier is the best litter carrier." This is particularly true after bleeding is controlled and intravenous therapy has been started when the need for speed is not urgent. It was observed at the Mobile Army Surgical Hospital that the movement of casualties from the preoperative ward to the x-ray table, not 50 feet away, can cause some patients to go back into severe shock. In two cases this resulted in death. The concept of preparing a patient for evacuation and then carrying out a smooth litter evacuation must be well understood by all members of the Medical Service.

The evacuation of casualties with head injuries is an individual problem. The ease of movement is more important following head injury than in any other injury. It was the feeling of some neurosurgeons attached to the Mobile Army Surgical Hospitals that a patient with an open head wound, received during the hours of darkness when helicopter evacuation was impossible, had a better chance to survive if he were held at the aid station until dawn to be evacuated by helicopter, rather than have a traumatic evacuation, via ambulance. Once evacuation is started, the patient with a head injury should be positioned on his stomach to prevent aspiration should he vomit.

A smooth period of evacuation is not only important for the "general condition" of the patient in shock or with a head injury but, as stated, prevents additional tissue damage in extremities that have fractures. In dealing with problems of evacuation, it is the duty of the battalion surgeon to be ever alert for means of improving the speed and ease of evacuation from the fields of battle or in taking resuscitation to the casualty. This may be done in a number of ways.

a. By securing additional litter teams from labor pools of indigenous personnel.

b. By requesting additional vehicles, such as tanks and armored cars, to be used to pick up casualties under enemy fire.

c. By requesting that the battalion commander have litter trails or tramways constructed where indicated.

The construction of a "forward aid station" on the main line of resistance has enabled a medical officer, without unnecessary risk, to advance and set up an aid station on the main line of resistance in bunker positions. The bunkers are constructed to accommodate six to eight litters of patients and are usually within easy access of any portion of the battalion sector. In addition to this forward aid station, some battalions developed the concept of a "mobile aid station." The mobile aid station group usually consisted of the battalion surgeon or assistant battalion surgeon and two to three aidmen from the aid station. It was their function to move forward of the main line of resistance and meet incoming patrols with casualties or to move laterally to concentrations of casualties who did not have easy access to the forward aid station. In one sector a 3/4-ton truck was converted into a heated, lightproof compartment and could be dispatched to any area night or day for the reception and treatment of wounded under adverse weather conditions. This was of great value on winter nights when a message was received that a number of wounded would arrive at a specific location distant from and inaccessible to the forward aid station.

Within the aid station more aggressive resuscitation by the medical officer should he carried out. To mention but a few examples: An intravenous cutdown may be instituted to insure that intravenous therapy will not be interrupted in a critically injured casualty; thoracentesis can be carried out to relieve a mediastinal shift; closure of sucking chest wounds, tracheotomy and intensive blood replacement therapy may be carried out at this level. These procedures will be discussed under the section on resuscitation within the aid station and details will not be given at this time.

A brief consideration of the supplies and equipment required to carry out effectively the aims of resuscitation is in order. Only the equipment of the aidman and aid station pertinent to the care of the battle casualty will be considered.

An aidman should have available the following equipment:

1. Aid bag.
2. Tourniquets-either rubber or strap, probably two to three in number.
3. Carlyle pressure dressings with supplemental ace bandage, roller gauze and adhesive tape.
4. Arm sling.
5. Morphine syrettes (gr. 1/4).
6. Penicillin syrettes.
7. Scissors.
8. Plasma expanders in plastic containers.

Such items as bandaids, merthiolate, hydrogen peroxide, cough syrup, APCs and swabs were found useful but not essential.

Within the aid station certain items are essential for adequate care at this level:

1. Adequate light-flashlights or Coleman lanterns.
2. Tourniquets, hemostats, Carlyle dressings and ace bandages for the control of hemorrhage.
3. Thomas lantern and wood splints with roller bandage for proper immobilization.
4. Scalpel, hemostats, suture material for performing a venous cutdown or closing a sucking chest wound.
5. Tracheotomy set.
6. Several 100 ml. syringes with No. 15 and No. 18 gauge needles to perform thoracentesis.
7. Procaine in sterile ampules for immediate injection.

8. Morphine in syrettes.
9. Penicillin in syrettes.
10. Tetanus toxoid.
11. Plasma expanders in plastic containers for administration under pressure if needed.
12. Sphygmomanometer and stethoscope.
13. Oral airway for unconscious patients.

The physical setup of the aid station will vary greatly depending upon the tactical situation, time available to construct the aid station, casualty flow and weather conditions.

In general, one should select a site for constructing an aid station which will give the surgeon adequate room to move as freely as possible from patient to patient. When the casualty load is heavy, it is advantageous to have the aid station divided into areas: a receiving area for sorting, a shock area, a splinting area and an area for patients waiting evacution.

Another important consideration of the aid station is protection from the elements. This is essential for the wounded casualty. When the tactical situation is fluid, a house or tent will suffice; when the line becomes stable, a tent which has been "dug in" or a large bunker is satisfactory. As stated, on occasion a closed, heated, 3/4-ton truck may be used as a mobile aid station.

Conclusion

In conclusion, we may say that any significant reduction in battle mortality will be made by saving lives now lost within the battalion.

Most of the improvements and improvisions which increase the excellence of early care will be made possible through an understanding by the battalion surgeon and his aidmen of the ultimate goal of resuscitation and the role they play in achieving this goal. For a team to succeed, each member must have a clear understanding of the final objective.

Our training must stress the broad scope of resuscitation so that each member, both officer and enlisted, will realize that his actions play a vital role in the outcome of each casualty. It is of the utmost importance that all members of the Medical Service and all members of the tactical units recognize and appreciate the great challenge placed on the aidmen and the battalion surgeon and be willing to support these individuals. No other members of the Medical Service are called upon to render unsupervised medical care to such a critically injured group of patients as are the battalion surgeons and aidmen. We must all recognize the need for the best trained men in the most forward area where the greatest test of ability is made and orient our policy and training to achieve this end.

This is a new section of the journal that will include articles both "old and new" that have already been published elsewhere. However, we feel they are very pertinent to SOF medicine so with permission, they are being reprinted in the JSOM.

Special Operations Forces

COMBAT MEDICINE

J.R. Wilson

This article was previously published in " The Year in Special Operations 2006 Edition" by Faircount's.
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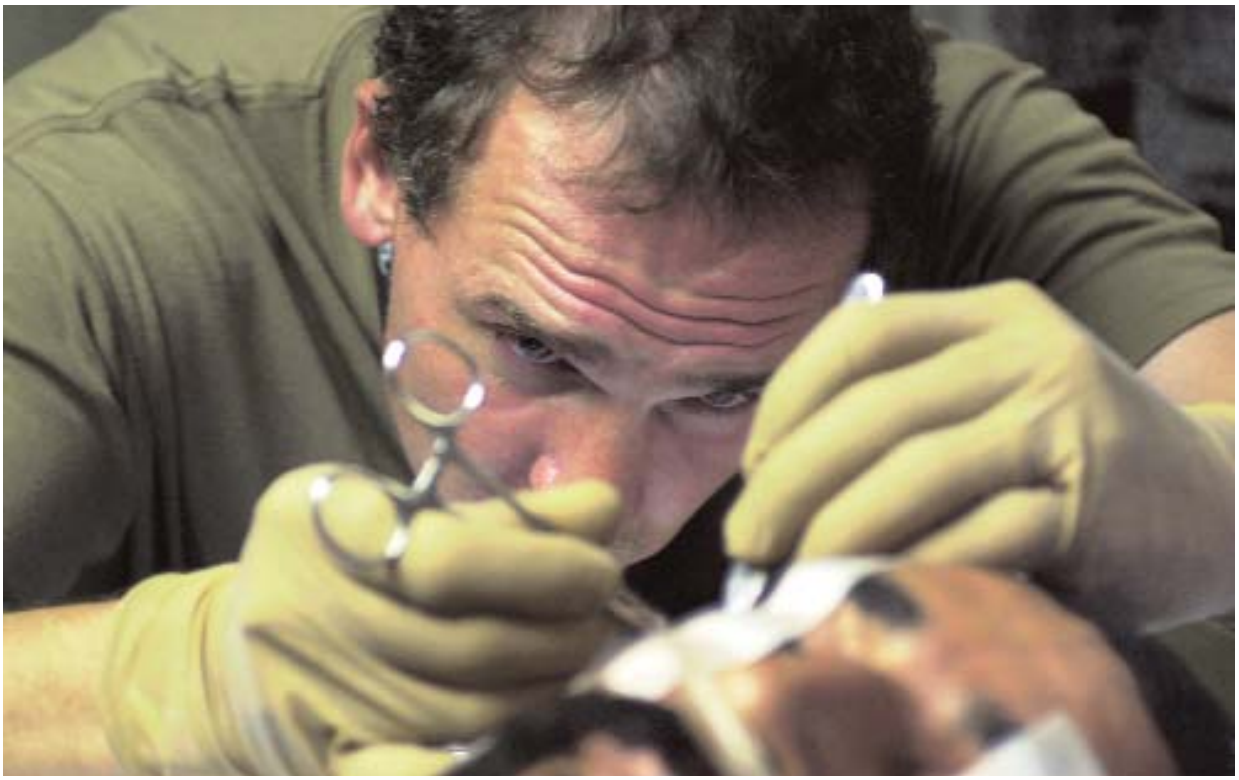
Special Operations Forces, typically working in isolation in far forward positions that require stealth, must be largely self-reliant when it comes to combat medicine. Their unique requirementshave led to the creation of Special Operations Command (SOCOM) joint standards for both medics and individual warfighters that far exceed those of traditional forces, such as the Army 91W Health Care Specialist (medic).

"The 91 Whiskey course provides emergency medical technician training at the basic level," SOCOM Command Surgeon CAPT. Frank Butler, a Navy SEAL, explains. "Our training provides that at the paramedic level, so our guys get cardiac life sup-



A Special Forces medic tends to the wounds of a local Afghan near Kandahar, Afghanistan. Because SF soldiers provide humanitarian aid to the people in their areas of operation, Special Forces medics are trained to care for children and families as well as in emergency medicine.

DoD photo

port, pediatric cardiac emergencies, civilian trauma, and, in addition, get the same TCCC (Tactical Casualty Combat Care) principles the 91's get. So there is significant overlap, but our course is a bit longer – six months – and gives them a bit more depth.

"There are many things about our combat medics regulated at the component level. For example, the 18-Deltas (Army Special Operations Medical Sergeants) have skills that go above and beyond the standard we expect everybody to have. And the SEALs go above and beyond as well, but in a somewhat different direction, working more with diving medicine than Green Beret medicine. So we build the standard and the components build on that to fit their own particular needs."

COL Warner "Rocky" Farr, who serves as both Army deputy chief of staff-surgeon and command surgeon - Army Special Forces Command (USASOC), says a lot has changed since he was a medic in Vietnam, not only in the training SOF medics and team members receive, but especially in the equipment they carry into battle

In addition to training, SOCOM has sought to standardize equipment and medicines – all of which must fit into the medic's pack, with few or no opportunities for resupply in the field.

"In all wars up until the current, the killed in action rate – those who die before getting to a medic – has been about 20 percent," Farr says. "We have fielded enough new equipment, such as dressings – not just to medics, but to individual soldiers, as well – that those numbers have dropped substantially. A lot of that is due to technology, from tourniquets to dressings."

USASOC fields two kinds of SOF medic, the 18Ds, who are cross-trained members of the Special Forces (Green Beret) A-Teams, and the Special Operations Combat Medics (SOCMs), who are assigned to the 160th Special Operations Aviation Regiment (Airborne) and Special Operations Support Command (Airborne). About 80 percent of USASOC medics are 18Ds.

"That SOCM has had a 24-week medical course, where the 18Ds get 46 weeks. We front-load trauma medicine into the first part, so the SOCMs have the same trauma training as the 18Ds," Farr says. "The 18-Deltas also are trained for unconventional warfare, where they go into a country to train a local indigenous force, which might include dependents or the local population. So the second part of the course they get has veterinarian, pediatric, and so on. The SOCMs go primarily to the Ranger regiment, where trauma training is the priority.

"We also have about 50 physicians. Each unit, down to the battalion level, has a physician and physician's assistant. There are Special Forces Group surgeons and Ranger regimental surgeons – usually a lieutenant colonel – a battalion surgeon, who is a major, or a captain. Because Special Forces train indigenous forces, they have a lot more medics than they need for themselves. That also is true at the Ranger level."

Soldiers from the U.S. Army John F. Kennedy Special Warfare Center and School practice evacuating a casualty during a training exercise at Fort Bragg's Joint Special Operations Medical Training Center. The JSOMTC conducts the intensive medical portion of Special Forces Medical Sergeant training.

U.S. Army photo by Gillian M. Albro, USASOC PAO

A significant change in how SOF doctors move through their careers took place in 1999. Prior to then, doctors coming out of medical school would complete their internships, then join SOF units as general medical officers. After serving two years with a combat unit, they would enter a hospital residency program in their area of specialization and only rarely return to combat medicine.

The Defense Department Office of Health Affairs decided to reverse that path, requiring physicians to go directly into a residency program from their internships, then to the combat units as board-certified physicians. That transition occurred from 1999-2002, so today every SOF doctor has completed an additional three-to-five years of training and certification than was true prior to 1999. About half of those specialized in emergency medicine and the majority of the rest in family medicine, although a few other specialties also are represented.

Capt Jessica Maverick, simulating a victim, is carried on a stretcher by Air Force pararescuemen toward a Marine CH-53 Super Stallion helicopter during a search and rescue exercise. Whatever service SOF medical personnel come from, all medics are trained to the same standard.
U.S. Air Force photo by SSgt Ricky A. Bloom

During Operation Iraqi Freedom, regular Army and Navy doctors were placed in new forward teams, moving that level of medical care farther forward than had ever been the case for traditional combat units. SOF doctors, however, have always faced assignment much closer to the front lines – if not beyond them – even working alongside frontline SOCMs.

"It is very mission dependent how far forward the doctor goes; it has always been that way," Farr notes. "Clearly, if a physician with more training can have the medics see patients first and select who comes back to him, that's a good use of his expertise. But he will go as far forward as needed and wherever he thinks his skills are best used.

"We sometimes are supported by an FST (Forward Surgical Team) because our docs are doing the life-saving care and want to turn those patients over to a surgeon at an FST or Level 3. But where we operate, it may be a very long way to that FST, so we may have to save the casualty's life and then have a long way to get to that next level."

In the military medical chain, Level 1 is the combat medic, Level 2 a casualty collecting point, and Level 3 a combat support hospital. The FSTs essentially are a piece of the CSH transplanted into Level 2, but the FSTs are still farther back than SOF doctors, who function exclusively as Level 1 and 2.

"We have a small Level 2 in our sustainment brigade – not an FST, but a holding hospital piece. We then get an FST to fall in on top of that to provide our surgical care. We use that to support ourselves and any other SOFs assigned to our task force," Farr explains.

While the structure may differ from one service SOF component to another, under the relatively new SOCOM directives, there is close coordination among all Special Operations medical teams.

"There is complete cross-over in Special Ops," Farr says. "All our medics are trained to the same standards. Within the command in Tampa, we have not only SOCMs and 18-Deltas, but Navy SEAL medics, PJs (Air Force Special Ops ParaJumpers), and 4N AFSOC medics, all trained to the same level. If you are fighting a SOF war and a PJ gets off the helicopter, you want to know he has the same training as an 18-Delta."

Whatever a SOF medic can fit into his backpack may be the extent of his field supplies for days at a stretch, placing pressure on the services to find the best possible components – small, light, multifunctional, and, aside from mission-specific items, standardized and interoperable.

"For the most part, when we send medics forward, whether Special Ops Forces medical elements or PJs, they have to have the capability to be self-sufficient, with a small footprint, and operate for prolonged periods of time in austere environments without outside support," notes Lt Col Michael Curriston, Air Force Special Operations Command (AFSOC) chief of operational medicine. "We train all AFSOC operators

to be first responders, to provide triage capability."

While the PJs are inserted, usually by helicopter, to provide medical care far forward, they are considered ground operators; every effort is made to limit their involvement in casualty evacuation (CASEVAC) to no more than one hour's transport before they can return to the combat site.

"If there is a prolonged transport time, that's when mission planning looks at establishing a transload site within an hour's distance, where they would go to a Special Ops medical element for handoff. That is generally a flight surgeon, PA [physician's assistant] and IDMT [independent duty medical technician] for prolonged flight transport as well as advanced monitoring and medical capabilities," Curriston says.

"We also have a Special Operations Surgical Team (SOST) and Special Operations Critical Care Evacuation Team (SOCCET), which are similar to the conventional mobile field surgical team or critical care air transport team. The primary difference is additional training to work far forward for prolonged periods with a smaller footprint. SOST is a couple of surgeons, a nurse anesthetist, EMS (Emergency Medical Services) for initial resuscitation after surgery; SOCCET is an emergency medicine physician and nurse as well as a respiratory therapy technician for ventilatory support in-flight."

Butler says a lot of time and effort has gone into reducing the SOF medical pack and protocols to the fewest instruments and medications providing the greatest versatility of use. For example, while a hospital can store dozens of different antibiotics to fight infectious diseases, SOCOM has narrowed that to a few broad-spectrum antibiotics that do not require refrigeration.

The SOF combat operations environment also affects those choices as well as training, including how best to deal with both trauma and non-trauma medical emergencies in a tactical setting.

"We expect our combat medics, if confronted in an austere environment with pneumonia or an allergic reaction, to have both the training and equipment to treat those. That is a capability that, at this point in time, is unique to SOF medics," Butler says.

"Other things unique to SOF medicine include distribution of assets and a number of physiological aspects. If you are deploying to Afghanistan and operating at 9,000 feet, are you safe going straight from your flight to the field to your operating locale? Another is CASEVAC (casualty evacuation) – how do we do that, who flies the aircraft, what are the onboard care teams like – 18-Delta, SOAR medic, PJ, or 4-November – and what can all those different flavors of medic do on the aircraft?"

CASEVAC also is unique to SOF, which is about the only combat element for which immediate medical evacuation (MEDEVAC) – often within 30 minutes of being wounded – is unlikely due to their more remote (and often clandestine) operations. As a result, all SOCMs are trained to hold a patient for up to 72 hours before transport to a higher level of care.

Pararescuemen from the 304th Rescue Squadron, Portland, Ore., prepare a patient to be hoisted into a HH-60 helicopter with a stokes litter off of Mount Hood, Ore., during a training exercise.
Photo by TSgt. Ruby Zarzyczny

Those completing the 12-month training course also are taught to use platforms of convenience for CASEVAC, as well as how to develop a plan to turn civilian casualties over to the care of host nationals if they have to leave before evacuation is available.

The primary training center for all SOF medics is the Joint Special Operations Medical Training Center (JSOMTC), part of the Army JFK Special Warfare Center and School at Fort Bragg, NC COL Kevin N. Keenan serves as both JSOTC dean and commander of the Special Warfare Medical Group (Airborne).

"We teach MEDEVAC in the first six months, CASEVAC in the second – and how to deal with both human and animal patients if no evacuation is possible," he says. "We also teach how to carry patients on horses and mules – but not on camels or llamas – not only treating and diagnosing those animals but also loading patients on [horseback] (as opposed to camelback). We teach diagnosis and treatment of camels, but only PowerPoints on using them for CASEVAC as platforms of convenience, not choice."

Keenan says the overall standards of proficiency and practice for SOF medical personnel has always been exceptionally high, but while 20th century

SSG Thomas Brennan, Multi-National Corps - Iraq Surgeon Cell, applies the Special Operations Forces Tactical Tourniquet to the arm of SGT Sherrie Knight, MNC-I Surgeon Cell, during a recent class at Camp Victory. While training and the standard of care have seen major improvement in SOF medicine, new technologies have also been saving lives.

Photo by SPC Jeremy D. Crisp/MNC-I PAO

medics were highly skilled and well-trained, today's six-month graduates leave the school with a much improved knowledge base and skills proficiency.

"What we have changed in terms of training and the product – the SOCM – is tremendous improvements in the basic medic, SEAL corpsman, and aviation regiment medic. That six-month course is a tremendous improvement, reflecting improvements in civilian medicine for paramedics and in conventional force medicine, who have much greater trauma skills than those of prior wars," he adds.

"The 12-month grad is not tremendously better because they were always great. What has changed is some of the equipment, which is lighter, more reliable, and provides more useful information. So the equipment is much more efficient, but the warrior is equally as superb in terms of Green Beret, independent duty SEAL, and independent duty Force Recon Corpsman."

In some respects, it is not lessons learned from the ongoing war on terrorism and field operations in Southwest Asia that form the core of SOF medic training, but lessons learned from World War II operations by the Office of Strategic Services (forerunner to the CIA) that have evolved with changing technologies and improving medical knowledge.

While the civilian standard for conventional force medics is EMT-Basic, the equivalent for SOF tri-service medics is the more advanced EMT-Paramedic, plus additional trauma and primary care screening skills.

"That is driven by isolation, protracted evacuation time, and dispersal on the battlefield [distance from higher level care]. So we have additional training, especially in trauma," Keenan says. "That tri-service standard is exceeded by Army Special Forces and some of the Navy SEAL IDCs and in the Marine Corps Force Recon community. Those three come back here for an additional six months of training beyond the six months SOCMs get.

"In that second period, we talk about families, children – more medical practice in an austere environment, because we think these warriors will work with populations – local villagers – who will never be evacuated. World War II also taught us that guerrilla or irregular fighters fought better, harder, and longer if they knew good medical support was available."

As of March 2005, all SOF combatants – not just medics – are trained in TCCC, something conven-

tional warriors do not get.

"The standard we aspire to is to have each combatant provide life-saving care for his teammate, so if three operators are on a mission and the medic goes down, the other two can care for him," Butler explains. "That was mandated in response to a growing awareness, based on individual reports coming back from theater, that training medics in TCCC was a good and correct step, but an incomplete solution. There were multiple reports of individuals who had to have life-saving care rendered by a teammate when no medic was available."

Neither JSOMTC nor the service SOCs provide special training for physicians, nurses, or PAs assigned to SOF units, but they are encouraged to become familiar with field medic operations.

"From a SOCOM standpoint, we have not tried to impose a standardized training package for physicians beyond the Joint Special Operations Medical Officer orientation course, which is taught at the Joint Special Ops University twice a year," Butler says. "The new training instruction strongly encourages commanders to send their nurses, physicians, and PAs to this course, because most have no background in Special Ops and won't get that in hospitals or medical school. So it is important to get a look at Special Ops force structure and some of the peculiar characteristics of SOF medicine."

Among those unique aspects is who provides what level of care in the field. SOF non-commissioned officers are trained to use equipment and techniques only employed by medical professionals in conventional forces.

"They use ultrasound to look for blood in the belly; shoot, develop, and interpret their own X-rays," Keenan says. "That equipment – similar to what you would find in a field hospital and used by physicians, nurses, or physicians assistants – is packaged in parachute-droppable containers to be deployed in theater for use by SOF NCOs. They also carry broad-spectrum antibiotics, narcotics, and interosseous fluid administration kits, which not all conventional medics carry.

"These are high-school graduates doing physician-level work. That's the uniqueness, not special equipment. The equipment is standard, the Soldier is the special part of the system."

In addition to caring for local human and animal populations, SOF medics also are trained to repair a wide range of medical equipment – including older systems rarely found in U.S. hospitals or clinics. The end goal is not to use such host nation resources, which often are scarce, but to return them to use by local doctors and nurses. When their own supplies begin to be depleted, SOF medics will call back to their support chain and request parachute drops of "push-packs" – supply pallets they created prior to deployment.

As to the future, Butler says it will be a continuing evolution, combining lessons learned from every combat theater of the past with new techniques and technologies, creating an ever-more capable medical care system for Special Operators in remote, austere environments.

"If you look at what has happened since Vietnam and the original TCCC paper, there has been a recognition of the need to combine good tactics and good medicine. That led to the concept of three phases of care – under fire, tactical field, and CASEVAC," he says. "Each phase has a gradual reduction of the threat from the enemy and an increase in the capability to do more advanced things for the casualty. You can do more while flying back on a helicopter than on a battlefield under fire, but in the past those differences were not defined in terms of what specifically could be done in each phase.

"The original combat casualty care paper also made a point of saying combat medics might need to return fire instead of render care, at least initially," Butler continued. "There were those who said medics should be observant of the Geneva Convention and not carry automatic weapons. We researched that with Convention lawyers and found SOF combat medics are not afforded any special protections because they do carry weapons and do not wear a Red Cross. So they are considered combatants who know how to treat injuries."

The distinction is not a mere technicality. Even as all SOF combatants are now being trained in combat casualty care to a level equivalent to Vietnam medics, so have all SOF medics become full-time warriors.

Medical History

The Medical Support of Guerrilla Forces

Dwight R. Wade, Jr., MD* MAJ John F. Erskine, MSC, USA**

Reprinted from Military Medicine, Vol. 134, No.3, March, 1969

Executive Editor's Note: Few articles exist in the published medical literature on special operations forces or, in particular, guerrilla hospitals. This article, from the long vanished, 6th Special Forces Group (Airborne) was written by their surgeon (Wade) and their medical operations officer (Erskine) in 1969 and describes a field training exercise with guerrilla war medical play. Colonel John Erskine was a professor at USUHS when I knew him in 1979 and had had considerable time in 1st SFG(A). We are trying to bring many of the scarce, older, SOF medical articles to you in future issues.

Insurgencies and guerrilla warfare were relatively common phenomena prior to the dawn of recorded history. The unconventional warfare approach (guerrilla warfare) continues to be as successfully utilized in insurgencies today as it was in World War II. Since the mission to conduct the unconventional warfare within the U.S. Army is the responsibility of the U.S. Army Special Forces, it naturally follows that Army Medical Service personnel assigned to Special Forces units must be conversant with and proficient in the medical support of this special mode of combat.

The Past

Since World War II, there have been six major insurgencies involving the Western Allies. These have included the countries of Algeria, Malaya, Indo-China, Laos, Cuba, and, more recently, the Republic of South Vietnam. A witness to the effectiveness of guerrilla warfare is the fact that in only one of the above insurgencies, Malaya, has counter-action been completely successful. In Malaya the majority of the population was unfriendly to the insurgents, who were predominantly Chinese and, therefore, ethnically distinguishable. Insurgent action favorable to the Allies in World War II was also successful, to some degree, throughout all theaters of war.

In all successful insurgencies of any magnitude, a guerrilla medical service has been established (or evolved) in support of the guerrilla forces. The level of sophistication has varied, depending upon the medical resources of the countries involved. Two notable examples of such medical services are the one which supported the National Liberation Army of Yugoslavia (NLAJ) of Marshall Josip Broz Tito, and the one which now supports the National Liberation Front (Viet Cong) in South Vietnam. The unqualified success of the former insurgency cannot be denied, although that of the latter has certainly been limited. Some accounts are still available regarding the medical effort of the Yugoslav Partisans and the Allies in Yugoslavia during World War II. The medical service consisted of a relative handful of trained medical personnel operating with only the bare essentials of medical equipment and supplies; the bulk of the medical equipment was improvised. Drugs available were drastically limited and included for the most part anesthetics, analgesics, and sulfanilamide. There were so few doctors that there was only one at the brigade aid post and only four or five at the division hospital level.[1] In addition, many of these doctors were not surgically trained, and thus were limited in technical surgical ability, especially in orthopaedics.

Figure 1. A guerrilla scrubs for "surgery" using makeshift equipment.

Against the tremendous odds of drastic lack of personnel and equipment, extremely large patient load, chronic under-nutrition, and omni-present danger of attack, the medical service of the NLAJ played a vital role in the insurgency effort. Its personnel conscientiously adapted themselves and became expert at tactical planning, camouflage, improvision, security, and flexibility. Factors contributing to the success of the clandestine medical service included the following: a favorable population base (loyalty of the civilian population to the Partisans); ideal terrain; extremely close cooperation between the medical service and combat command staff; mobility of medical personnel and equipment; careful tactical and strategic location of medical support facilities; and employment of rigid discipline and security measures within the hospital system. The principles which governed the care of the sick and wounded under conditions of unconventional warfare in Yugoslavia were graphically summarized by Dragic:[2]

a. "Care of the sick and wounded is one of the most difficult problems and is often decisive in the development of military operations.

b. As distinct from the tendency of regular armies to concentrate the sick and the wounded to a certain degree, for the purpose of ensuring the maximum efficiency of medical service, under conditions of partisan warfare it is necessary to disperse the sick and wounded in order to protect their lives from the enemy, who often embark on special operations aiming at their destruction. Moreover, it is extremely difficult to provide food and accommodations for a large number of casualties in burnt-down and devastated towns and villages, or in regions laid waste by war.

c. Depending on the situation, most casualties were tended either on the move or in stationary partisan medical institutions or institutions of the regular Army, while a smaller number were entrusted to the care of local population, and even in hospitals under enemy control.

d. A comparatively small number of the sick and wounded were successfully cared for in secret hospitals with a system of contact points, where, in addition to receiving adequate treatment, their security was guaranteed to the highest degree. Apart from other measures for preserving the absolute security of the hospital, which had to be carried out fully and with the greatest possible care, the separation of the lighter cases into special departments guaranteed greater security for the hospital for the most seriously wounded.

e. The temporary concealment of the sick and wounded in carefully camouflaged underground shelters (bunkers) proved an extremely suitable expedient when security was in question, particularly if they were previously treated in non-secure hospitals."

The Viet Cong medical organization operating in the Republic of South Vietnam has also enjoyed relative success against great odds. They, like the Yugoslav Partisans, are experts at camouflage, discipline, improvisation, and tactical medical planning. This has been graphically demonstrated in their highly successful evacuation of casualties sustained in combat, thus preventing capture and sustaining morale. The sophistication of their medical facilities continues to amaze the American commanders, who overrun Viet Cong base camps and find complex medical support facilities in bunkers, caves, and tunnels.[3]

A Concept is Tested

The medical organization within the U.S. Army Special Forces today is not designed primarily for the provision of hospital support for unconventional warfare. Even so, it has been tacitly understood that, if necessary to do so, the medical personnel, equipment, and technical knowhow exists within the Special Forces Group Medical Detachment for the establishment of such hospital support. Because of this contingency, the Medical Detachment of the 6th Special Forces Group (Airborne), 1st Special Forces, conducted an experiment in this operation in the summer of 1967 on a seven-week long field exercise. In the exercise, several small troop units were deployed in an operational area of several hundred square miles. Subsequently, medical detachment personnel were infiltrated tactically by parachute during the hours of darkness. These personnel linked up on the ground with "friendly" forces, and hiked more than 20 miles to a hospital site, deep in the forest, in the central portion of the operational area. All medical equipment was received tactically by parachute drop during the hours of darkness. Communication with the support base was solely via continuous wave radio. Medical personnel consisted of one Medical Corps officer, one medical NCO, and one laboratory technician. The medical section was augmented by one half of a Special Forces Operational Detachment A, consisting of an operations sergeant, an intelligence sergeant, a combat engineer, a weapons sergeant, and a communications sergeant. The mission of this medical unit was to establish a 20-bed clan-

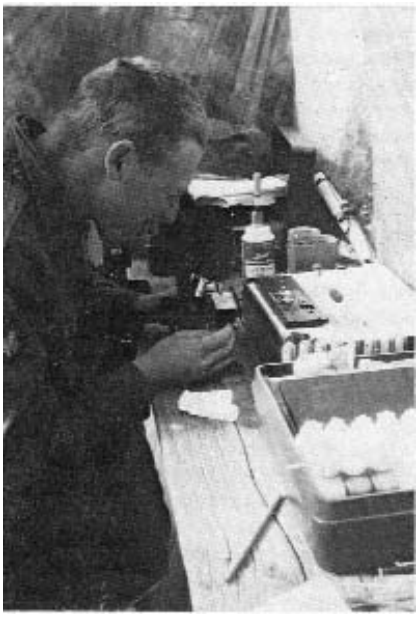


Figure 2. Special Forces medic uses lab. kit in Improvised laboratory.

destine hospital, and train indigenous personnel to help operate it in support of the operational detachments and guerrilla forces within a 100-mile radius. A bare minimum of medical equipment was brought in, due to the requirements for mobility in event the need arose for rapid relocation. A small, improvised hospital was established, and then camouflaged to avoid detection from both ground and air surveillance (Figures 1 and 2). Medical evacuation routes and clandestine patient pick-up points were established with surrounding friendly units. All simulated patients were blindfolded, and either led or carried the last few miles to and from the hospital site, in order to keep the location secret. Medical and surgical treatment was simulated as realistically as possible in order to judge the adequacy of medical supplies and equipment actually present on the ground (roughly only 1,000 lb total). Shelters were improvised (Figure 3), except for one hexagonal tent which was used as a "lightproof" operating room. In this fashion, the hospital remained operational and undetected by the counterinsurgency forces for a period of two weeks, at which time it was exfiltrated at the termination of the exercise.

The efforts resulted in many valuable lessons learned. The most significant ones included the following: For a 20 bed hospital, at least 50 indigenous support personnel will be required if it is to have adequate security and staffing. The size of the American medical team win vary with the expected patient load and the amount of actual training required for indigenous helpers. Physical security posed the most difficult problem faced by the hospital unit: the ability to function and remain undetected from the air and on the ground is essential, and a great deal of effort was expended on light and noise discipline. Movement was only by night and then only when absolutely necessary. Other measures included the extensive use of a 24-hour guard in strategic locations around the camp perimeter, and the use of secret drop-off points where patients were placed to await pick-up by hospital personnel. The surrounding friendly units knew only the exact location of the patient drop points. They did not know the exact hospital location, even though they had to be told the general area.

Only a bare minimum of equipment and supplies was parachuted in initially. Where possible, all equipment was pre-packed in 50-lb man-portable bundles, so that rapid movement off the drop zone could be made. Even so, the small number of personnel required several hours to carryall the equipment to the hospital site. It is inconceivable that too much emphasis can be placed upon the admonition to "travel light" in medical operations of this nature. Depending upon the nature of the hospital mission, augmentation of both personnel and equipment from outside the Special Forces TO&E will clearly be necessary to some extent. At least one well trained general surgeon will be required. A limited number of drugs and items of equipment will be necessary, in order to give the hospital the capability to handle the normal variety of combat casualties.

Much discretion, however, must be used in choosing additional personnel and equipment, keeping in mind that only the basic necessities (anesthetics, antibiotics, analgesics, bandages, and a minimum of equipment) should be considered. The temptation to take sophisticated equipment and extra personnel is always a great one. However, as Dragic points out, in order to be effective the hospital must maintain its mobility for a quick evacuation and for movement along with guerrilla forces.[2]

The support requirement placed by the hospital upon the operational base in friendly territory is larger than most commanders and staff officers realize. Trained medical supply personnel must be located at the support base, in order to insure that the medical logistics chain remains unbroken. Non-medical supply personnel should not be expected to carry the medical logistics burden.

The Future

The need for medical support for clandestine, guerrilla-type combat operations will exist as long as

there are requirements for such operations, and, if guerrilla operations are to be successful, adequate and timely medical support will also be necessary. The medical elements of the U.S. Army Special Forces must remain aware of this need, and be prepared to fill it. It is also incumbent upon unconventional warfare unit commanders to realize the additional significance of medical problems in unconventional warfare. It is in this situation that the sick and wounded become tactical problems, not merely logistical ones. The task is a complex and unfamiliar one for most. Unfortunately, there currently is little well documented previous experience within the U.S. Army Medical Service in the establishment of a clandestine medical service in support of unconventional warfare. In securing guidance for medical support of this type of combat action, the experience of others must be relied upon for guidelines, and training exercises such as the one mentioned above must be fully utilized to work out doctrine and to maintain proficiency.

Conclusion

The importance of the medical service in maintaining morale and conserving the fighting strength of unconventional forces is all too often not appreciated by the medical service or combat commanders. To be prepared to fight unconventionally is to be prepared for the future. The fight will be won if the medical service is prepared for its vital role, and unconventional warfare force commanders are ready and willing to utilize the medical service to its fullest capability.

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Figure 3. One of the to-man wards made from scrap tarpaulin and a salvaged plastic weather balloon.

Acknowledgments

The authors wish to express their gratitude to COL Samuel Wilson, Commanding Officer, 6th Special Forces Group (Airborne) and to LTC L. V. D. Harris, Surgeon, USAJFK Center for Special Warfare for encouragement and proof reading. A special thanks goes to LTC Lance Kruger, Commanding Officer, Company B, 6th Special Forces Group (Airborne) for his support, and for giving us the opportunity to conduct the guerrilla hospital experiment.

References

1. Hirst, J. W.: An Account of the Medical Services of the National Liberation Army of Yugoslavia and of the R.A.M.C. Assistance Given to It. Royal Army Medical Corps, No.3, March, 1945.
2. Dragic, D.: Sanitetska Sluzba U Partizanskim Ratovania. Vojno Delo (Military Affairs), Belgrade, 1965.
3. Ahearn, A. M.: Viet Cong Medicine. *Military Medicine,* 131: 219-221, 1966.

The USSOCOM Surgeon's Office does not endorse any of the below listed private contractors who provide medical training nor does the USSOCOM Surgeon's Office vouch for the competence of the instructors providing the training. This listing of education opportunities is simply to help our readers in the event some would like to further their continuing medical education.

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Web Site: http://www.insightstraining.com

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Fax: (702) 920-7635
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Fax: (336) 945-2289
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Fax: (540) 752-8192
Web Site: www.teamonenetwork.com

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Web Site: www.tactical-specialties.com

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SOF and SOF Medicine Book List

New Revised List as of this edition. Three new books added.

Those of you who know COL Farr's history of joining the Army at age 18 may realize that he has evidently conned the Army into sending him off for long term civilian schooling for his bachelor's degree, two master's degrees, and his doctor of medicine. Each time, he bought books. So below is his book list of military medical history and Special Operations Forces history books currently in his library. For a detailed list with the publishers and date of publication, please contact the JSOM at JSOM@socom.mil.

If anyone has other books they would like to add to the list, let us know. The intent is to present a concise list of the vast array of reading material available that pertains to the mission of Special Operations - both past and present. We also strongly encourage readers to write a short review for the books they have read and/or have personal first hand knowledge concerning a specific selection. This will help maintain a high degree of content validity.

TITLE	AUTHOR	ISBN
15 Months In SOG: A Warrior's Tour	TL Nicholson, TP Nichols	0804118728
90 Minutes at Entebbe	W Stevenson, U Dan	0553104829
200 Years of Military Medicine	RC Engelman	
A Bugle Calls: The Story of the Witwatersr and Rifles	S Monick	620139846
A Concise History of U.S. Army Special Operations Forces	GT Barker	0922004099
A Concise History of the U.S. Army Airborne Infantry	GT Barker	0922004021
A Concise History of U.S. Army Airborne Infantry	GT Barker	0922004013
A Concise History of U.S. Army Special Operations Forces	GT Barker	
A Confederate Nurse: The Diary of Ada W. Bacot	AW Bacot, JV Berlin	0872499707
A Confederate Surgeon's View of Ft. Donaldson…	J Stanbery	
A Historical Perspective of SOF as Instruments of Strategy	GD Jones	CGSC 1991
A History of Medicine in South Carolina: 1825-1900	JI Waring, RH Shryock	SCMA
A History of Military Medicine	RA Gabriel, KS Metz	031327746X
A History of Special Forces in Somalia 1992-5	JD Celeski	
A Man Called Intrepid	W Stevenson	0345310233
A Medical Tour Through the Whole Island of Great Britain	L Appleby	05711739X
A Prototype of a Confederate Hospital Center…	PW Houck	B0006ELBYY
A Saw, Pocket Instruments, and Two Ounces of Whiskey: Frontier Military Medicine in the Great Basin	AP Sohn	0870622722
A Soldier with the Arabs	JB Glubb	0006DI81O
A Soldier's Story: The Double Life of a Confederate Spy	DL Phillips	567994253
A Special Breed of Man	E Edell	0934588082
A Surgeon's Civil War: The Letters of Daniel M. Holt	JM Greiner, et. al.	0873384946
A Study of the Medical Support to the Union & Confederate Armies During the Battle of Chickamauga: Lessons & Implications for Today's U.S. Army Medical Department Leaders	DA Rubenstein	CGSC, 1990
A Swift, Elusive Sword: What if Sun Tzu and John Boyd Did a National Defense Review?	CW Richards	1932019014
A Systematic Review of "Commando" (Special) Operations 1939-1980	E Lutwak, et. al.	
A Texas Surgeon in the C. S. A.	JQ Anderson	0007E4AEG
A Vast Sea of Misery: A History and Guide to the Union and Confederate Field Hospitals at Gettysburg, July 1 to November 20, 1863	GA Coco	0939631091

Title	Author	ISBN
A Woman Doctor's Civil War: The Diary of Esther Hawks	G Schwartz, EH Hawks	0872494357
A Woman of Valor: Clara Barton and the Civil War	SB Oates	0028740122
About Face: Odyssey of an American Warrior	DH Hackworth, J Sherman	0671526928
African Guerrillas	CS Clapham	25321243X
AFSOF: A Unique Application of Aerospace Power	JA Hill	AU Press, 1993
Airborne: A Guided Tour of an Airborne Task Force	T Clancy	0425157709
Air Commando! 1950-1975, AFSOC	ME Haas	0006PF6DA
America and Guerrilla Warfare	AJ Joes	0813121817
An Historical Survey: The U.S. Army Vietnam Individual Training Group (UITG) Program, 1971-73	KR Bowra	AWC 1991
An Intimate History of Killing: Face-To-Face Killing in Twentieth-Century Warfare	J Bourke	0465007376
Angels of Mercy	MP Oakes, I Sumner	1885938128
Any Place, Any Time, Any Where: The 1st Air Commandos in WWII	RD Van Wagner	076430447X
Apollo's Warriors: USAF Special Ops during the Cold War	ME Haas, et. al.	1585660353
April '65: Confederate Covert Action in the American Civil War	WA Tidwell	0873385152
Army Badges and Insignia Since 1945	G Rosignoli	0713706481
Army Medical Department 1775-1818	MC Gillett	1410202380
Army Medical Department, 1818-1865	MC Gillett	0160019540
Army Medical Department, 1865-1917	MC Gillett	9994162853
Army of Mississippi's Medical Department Apr-Jul 1862	PA Ussery	U MS Press, 1981
Armed Progressive: A Study of the Military and Public Career of Leonard Wood	JC Lane	0891410090
Art of the Warrior	RD Sawyer, Sun Pin	1570621632
Assault at Mogadishu	K Hermann, P Koch	0552107743
Asymmetrical Warfare on the Great Plains, A Review of the American Indian Wars - 1865-1891	LS Yarbrough	AWC 2002
At the Hurricane's Eye	G Walker	0804109559
Badges and Insignia of the Elite Forces	L Thompson	1854095110
Battle Exhaustion: Soldiers and Psychiatrists in the Canadian Army, 1939-1945	TT Copp, B McAndrew	0773507744
Behind Fascist Lines	AK Starinov	0345444574
Behind Japanese Lines: An American Guerrilla in the Philippines	RC Hunt, B Norling	0813109868
Belle Boyd: Siren of the South	R Scarborough	0865545553
Beret Insignia of the U.S. Army	WA Hudspeath, RW Smith	B000714ZSK
Black Hawk Down: A Story of Modern War	M Bowden	0871137380
Blank Check	T Weiner	0446514527
Bravo Two Zero	A McNab	059303421X
Cambodia: Analysis of U.S. Military Assistance	KR Bowra	ACGSC 1983
Casebook on Insurgency and Revolutionary Warfare	PA Jureidini, et al.	SORO, 1962
Casualties & Consensus: The Historical Role of Casualties in Domestic Support for U.S. Military Operations	EV Larson	0833023705
Central Burma: The United States Army Campaigns of World War 2	GL Macgarrigle	0160481376
Champ Ferguson. Confederate Guerilla	T Sensing	0826512127
Chimborazo: The Confederacy's Largest Hospital	CC Green	1572333162
Civil War Medicine	SM Brooks	B0007DN1N8
Civil War Medicine 1861-1865	CK Wilbur	0791052079
Civil War Medicine: Care & Comfort of the Wounded	RE Denney	0806908793
Civil War Medicine: Challenges and Triumphs	AJ Bollet	1883620082
Civil War Nurse: The Diary and Letters of Hannah Ropes	HA Ropes, JR Brumgardt	0870492802
Civil War Pharmacy: A History of Drugs, Drug Supply and		

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Provision, and Therapeutics for the Union and Confederacy	MA Flannery	0789015021
Civil War Schemes and Plots	WB Garrison	0517162873
Classics of Strategy and Counsel, Volume 1	TF Cleary	1570627274
Code-Name Bright Light: The Untold Story of U.S. POW Rescue Efforts During the Vietnam War	GJ Veith	0440226503
Code Name Copperhead	JR Garner, AM Fine	671864351
Cohesion, the Key to Special Operations Teamwork	RE McDonald	B00010X2WC
Cold Injury, Ground Type	TF Whayne	00071O36E
Combat Surgeons	J Laffin	0750921730
Combined Operations	L Mountbatten, H Saunders	417987413
Command and Control	JD Mitchell	0425117774
Commando Raids: 1946-1983	B Hoffman	B0006EQN60
Commandoes	DC Waller	0671787179
Commandos and Rangers of World War II	JD Ladd	0312151675
Commandos from the Sea: Soviet Naval Spetsnaz in World War II	YF Strekhnin, JF Gebhardt	1557508321
Come Retribution: The Confederate Secret Service and the Assassination of Lincoln	WA Tidwell, et. al.	0878053484
Complete Art of War	Sun Pin, et. al.	0813330858
Conduct of the Partisan War in the Revolutionary War South	KE Jacobsen	CGSC 2003
Confederate Agent, a Discovery in History	JD Horan	B0007EW656
Confederate Commando and Fleet Surgeon	JW Lynn, DB Conrad	1572492201
Confederate Courage on Other Fields: Four Lesser Known Accounts of the War Between the States	MJ Crawford	786407204
Confederate Hospitals on the Move: Samuel H. Stout and the Army of Tennessee	GR Schroeder-Lein	0872499642
Confederate Spy	LA Sigaud, B Boyd	B0007EDK7E
Confederate States Medical and Surgical Journal	SP Moore, WD Sharpe	0810809729
Confederate Surgeon: Aristides Monteiro	S Dannett, RH Burkart	0396058965
Confederate Surgeon: The Personal Recollections of E.A. Craighill	EA Craighill, PW Houck	0930919912
Confederate Operations in Canada and New York	JW Headley	0809442841
Countering the New Terrorism	IO Lesser, et. al.	0833026674
Counterinsurgency Lessons from Malaya and Vietnam: Learning to Eat Soup with a Knife	JA Nagl	0275976955
Coup d'Etat	E Luttwak	0674175476
Crippled Eagle: A Historical Perspective	R Lenahan	1886391238
Cushing: Civil War SEAL	RJ Schneller	1574886967
Dark Lanterns: Secret Political Societies, Conspiracies and Treason Trials in the Civil War	FL Klement	0807115673
Darkmoon: Eighth Army Special Operations in the Korean War	E Evanhoe	1557502463
Debris of Battle	GA Patterson	081170498X
Delta: America's Elite Counterterrorist Force	T Griswold, DM Giangreco	0879386150
Delta Force	CA Beckwith, D Knox	0151246572
Desperate Deception: British Covert Operations in the United States, 1939-44	TE Mahl, R Godson	1574880802
Deterrence and Influence in Counterterrorism: A Component in the War on Al Qaeda	PK Davis, BM Jenkins	0833032860
Diary of Dr. J. F. Shaffner, Sr: Commencing September 13, 1863, ending February 5, 1865	JF Shaffner	B00086U8U8
Disease and History	FF Cartwright	0880296909
Doctor to the Front: The Recollections of Confederate Surgeon Thomas Fanning Wood, 1861-1865	TF Wood, DB Koonce	1572330821
Doctors in Blue	GW Adams, H Schuman	0890290865

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Doctors in Gray	HH Cunningham	0844605662
Dr. J. G. M. Ramsey: Autobiography and Letters	JG Ramsey, et. al.	1572331739
Dr. Mudd and the Lincoln Assassination: The Case Reopened	JP Jones	0938289500
Ducimus. The Regiments of the Canadian Infantry	M Mitchell	CA War Mus., 1992
Early Texas Physicians 1830-1915	RM Hood, TR Fehrenbach	1880510634
Edward Lansdale: The Unquiet American	CB Currey	1574881760
Elite Warriors: 300 Years of America's Best Fighting Troops	LQ Zedric, MF Dilley	0934793603
Elusive Victory: The Arab-Israeli Wars, 1947-1974	TN Dupuy	0840378629
Encyclopedia of Guerrilla Warfare	IFW Beckett	0874369290
Eyes of the Hammer	B Mayer	0312928629
Euphemia Mary Goldsborough, 1836-1896, Exile to Sweet Dixie: The Story of Euphemia Goldsborough, Confederate Nurse and Smuggler	EF Conklin, EM Goldsborough	1577470443
Faded Coat of Blue	O Parry	0380797399
Farmcarts to Fords: A History of the Military Ambulance	JS Haller	0809318172
Field Medical Services at the Battles of Manassas	HH Cunningham	0935523170
Field Surgeon at Gettysburg	CB Kernek	1878208322
Fighting Elite	I Padden	0553253581
Fighting for Life	AE Cowdrey	0029068355
Fighting in the Streets: A Manual of Urban Guerilla Warfare	Urbano	094263747X
Foreign Internal Defense Does Air Force Special Operations Have What it Takes?	MC Koster	B00010X5QU
Foundation for Victory: Operations and Intelligence Harmoniously Combine in Jackson's Shenandoah Valley Campaign (1862)	SB Smith	NPS, 1993
Fourth Dimension of Warfare. Vol. 1 Intelligence / Subversion / Resistance	M Elliott-Bateman	0719004373
From a Dark Sky	O Kelly	0671009176
From OSS to Green Berets: The Birth of Special Forces	A Bank	0891412719
From the Sierra to the Cities: The Urban Campaign of the Shining Path	GH McCormick	0833012320
Gangrene and Glory: Medical Care During the American Civil War	FR Freemon	0838637531
The Generals' War: The Inside Story of the Conflict in the Gulf	MR Gordon, BE Trainor	0316321729
General Crook & Counterinsurgency Warfare	WL Greenberg	CGSC 2001
Georgia's Confederate Hospitals	M Jordan	Emory U., 1942
Ghost Force: Secret History of the SAS	K Connor	0752826972
Ghost Soldiers: The Forgotten Epic Story of World War II's Most Dramatic Mission	H Sides	0385495641
Green Berets at War	SL Stanton	0804118841
Green Berets Seals and Spetsnaz	JM Collins	0080357466
Green Berets: Unconventional Warriors	H Halberstadt	0891412808
Guerilla	EP Hoyt	0025552104
Guerilla Surgeon	L Rogers	B0006DBYX8
Guerilla Warfare	C Guevara, et. al.	0803270100
Guerrilla Warfare: A Historical & Critical Study	W Laqueur	0765804069
Guerrillas, Unionists and Violence on the Confederate Home Front	DE Sutherland	1557285497
Hard to Forget	SM Yedinak	0804118094
Hazardous Duty: An American Soldier in the 20th Century	J Singlaub, M McConnell	0671705164
Heart's Work: Civil War Heroine and Champion of the Mentally Ill, Dorothea Lynde Dix	C Schlaifer, L Freeman	1557784191
Heavy Hook (Command and Control, No 4)	JD Mitchell	0425127281
Heavy Matter: Urban Operations' Density of Challenges	RW Glenn	0833029096
Hippocrates in a Red Vest: The Biography of a Frontier Doctor	BB Beshoar	0910118310

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History of Medicine in Alabama	HL Holley	0817300856
History of the Combat Support Branches	LW LaFramboise	
Hospital Life Within the Confederate Medical Department	CD Barnett	
Hospital Medicine in Richmond, VA during the Civil War: A Study of Hospital No. 21, Howard's Grove & Winder Hospitals	CF Ballou	
Hospital Sketches	LM Alcott	0918222788
Humanitarian Intervention: Assisting the Iraqi Kurds in Operation Provide Comfort, 1991	GW Rudd	B0006RRQRC
Hunter Holmes McGuire: Doctor in Gray	JW Schildt	0093677202
Hunting the Jackal	B Waugh, T Keown	0060564091
I Acted from Principle: The Civil War Diary of Dr. William M. McPheeters, Confederate Surgeon in the Trans-Mississippi (The Civil War in the West)	CD Pitcock, et. al.	1557287252
Illustrated Guide to Modern Elite Forces	M Walmer	0668060646
In Hospital and Camp: The Civil War Through the Eyes of its Doctors and Nurses	HE Straubing	0811716317
In Search of the Warrior Spirit	R Strozzi-Heckler, G Leonard	1556431163
In the Combat Zone: Special Forces Since 1945	R Neillands	0814757952
India-Burma. The U.S. Army campaigns of World War II	DW Hogan	0160358817
Inside the Blue Berets	SJ Zaloga	0891413995
Inside the Green Berets	CM Simpson	0425091465
Intelligence Operations of the Army of the Cumberland during Tullahoma and Chickamauga	DD Broome	CGSC 1989
Jedburgh Team Operations in Support of the 12th Army Group	SJ Lewis	B0006DA8FI
Joseph Jones, M.D: Scientist of the Old South	JO Breeden	0813112966
Kate: The Journal of a Confederate Nurse	K Cumming, et. al.	080712267X
Killing Pablo: The Hunt for the World's Greatest Outlaw	M Bowden	0871137836
Knight's Cross	A Bank, EM Nathanson	0843937246
Kommando: German Special Forces of World War Two	JS Lucas	030435127X
Leave No Man Behind: U.S. Special Forces Raids and Rescues from 1945 to the Gulf War	DC Isby	0297846744
Lessons for Contemporary Counterinsurgencies: The Rhodesian Experience	B Hoffman, et. al.	0833011235
Letters and Journal of a Civil War Surgeon	SJ Petrie, MW Robinson	1571970959
Letters to Laura: A Confederate Surgeon's Impressions of Four Years of War	UG Owen, et. al.	0961652632
LIC 2010: Special Operations & Unconventional Warfare in the Next Century	R Paschall	0080359825
Lieutenant Ramsey's War: From Horse Soldier to Guerrilla Commander	EP Ramsey, SJ Rivele	1574880527
Little by Little	MB Tyquin	1876439157
Looking for Trouble	P De la Billiere	0002552450
Lost Crusade: America's Secret Cambodian Mercenaries	P Scott	1557508461
Low-Intensity Conflict: The Pattern of Warfare in the Modern World	LB Thompson	066920045X
MACV-SOG Command Histories (Annexes A, N & M 1964-1966)	CF Reske	0939427621
MACV-SOG Command History Annex B 1971-1972	CF Reske	0939427613
MACV-SOG Command History Annex B 1971-1972: The Last Secret of the Vietnam War	CF Reske	0939427605
Madness, Malingering and Malfeasance: The Transformation of Psychiatry and the Law in the Civil War Era	RG Lande	1574883526
Manual of Confederate Surgery	JJ Chisolm	0890290687
Masters of Chaos: The Secret History of the Special Forces	L Robinson	1586482491

Title	Author	ISBN
Medical Cover-Ups in the White House	L Curry, EB MacMahon	0918535018
Medical Department of the U.S. Army in the Civil War	LC Duncan	0942211308
Medical Histories of Confederate Generals	JD Welsh	0873385055
Medical Histories of Union Generals	JD Welsh	0873385527
Medical Materiel Support to the Army of the Potomac	AE Rhodes	AWC, 1991
Medical Practices in the Civil War	SP Beller	1558702644
Medical Recollections of the Army of Potomac	J Letterman	1877791016
Medical Roots: The Evolution of Modern Support Doctrine in the American Civil War	ME Turner	AWC, 1983
Medicine: For Mountaineering & Other Wilderness Activities 5th Edition	J A Wilkerson (Editor)	0898867991
Medicine in Virginia in the Nineteenth Century	WB Blanton	B0006AMBZ6
Medicine Under Sail	Z Friedenberg	1557502978
Memoranda During the War	W Whitman, P Coviello	1557091323
Memories: A Record of Personal Experience and Adventure During Four Years of War	FA Beers	0809444704
Merrill's Marauders	EP Hoyt	052341529X
Merrill's Marauders: February to May, 1944		78813275X
Microbes and Minnie Balls: An Annotated Bibliography of Civil War Medicine	FR Freemon	0838634842
Mike Force	H. Burrus	0671669451
Military Leadership: In Pursuit of Excellence	RL Taylor, WE Rosenbach	0813330246
Mobile Guerrilla Force	JC Donahue	0312961642
Modern Guerrilla Warfare: Fighting Communist Guerrilla Movements, 1941-1961	FM Osanka	B0006AXT6G
Mountain and Arctic Warfare: From Alexander to Afghanistan	B Gregory	1852600144
Mountain Troops and Medics: Wartime Stories of a Frontline Surgeon in the U.S. Ski Troops	AH Meinke	0963374206
My Commando Operations: The Memoirs of Hitler's Most Daring Commando	O Skorzeny, D Johnston	0887407188
New York City Draft Riots: Their Significance for American Society and Politics in the Age of the Civil War	I Bernstein	0195050061
North Korean Special Forces	JS Bermudez	1557500665
Not a Good Day to Die	S Naylor	0425196097
Number and Losses in the Civil War in America 1861-65	TL Livermore	052757600X
On Guerrilla Warfare	Mao, SB Griffith	0252068920
On Killing: The Psychological Cost of Learning to Kill in War and Society	D Grossman	0316330000
On Wings of Eagles	K Follett	0451131517
One Hundred Unorthodox Strategies	M Sawyer, et. al.	0813328616
One Surgeon's Private War: Doctor William W. Potter of the 57th New York	WW Potter, JM Priest	1572490217
Operation Enduring Freedom: October 2001-March 2002	RW Stewart	0160515890
Operation Rollback: America's Secret War Behind the Iron Curtain	P Grose	0395516064
Operations Against Enemy Leaders	ST Hosmer	0833030280
Orthopedic Injuries of the Civil War: An Atlas of Orthopedic Injuries and Treatments During the Civil War	JE Kuz, BP Bengtson	0963586173
Out of the Mist: The Foundation of Modern Pathology and Medicine During the Nineteenth Century	HM Milking	0963768905
Outlines of the Chief Camp Diseases of the United States Armies	JJ Woodward, IM Rutkow	0930405439
Oxford Handbook of Tropical Medicine	M Eddleston, R Davidson, RWilkinson, S Pierini	0198525095
Pamwe Chete (Selous Scouts)	RF Ried-Daly	0620237562

Title	Author	ISBN
Parachute Badges and Insignia of the World: In Colour	JR Bragg, R Turner	0713708824
Partisan Hospitals in Yugoslavia, 1941-1945	D Dragic	B0006BXY7Y
Partisan Warfare 1941-45	TP Abbott	0850455138
Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy	LS Vandenbroucke	0195045912
Phoenix and the Birds of Prey	M Moyar, HG Summers	1557505934
Physician-Generals in the Civil War: A Study in 19th Mid-Century American Medicine	PE Steiner	0398018537
Pictorial Encyclopedia of Civil War Medical Instruments and Equipment, Vol. I, II, and III.	GE Dammann	0933126328
Piercing the Reich: The Penetration of Nazi Germany by American Secret Agents During World War II	JE Persico	076070242X
Prairie Fire	K White	0938936077
Project Omega: Eye of the Beasts	JE Acre	1555715117
Psychological Operations: Principles and Case Studies	FL Goldstein, BF Findley	9996617491
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Rats, Lice, & History	H Zinsser	0333395670
Red Berets and Red Crosses	C Naill	908047181X
Reflections of a Warrior	FD Miller, et. al.	0671753967
Regimental Losses in the American Civil War	WF Fox	0890290075
Reminiscences of the Cuban Revolutionary War	C Guevara	0237716321
Repairing the March of Mars: The Civil War Diaries of John Samuel Apperson, Hospital Steward in the Stonewall Brigade, 1861-1865	JH Roper, et. al.	0865547793
Resting Rebels: A Medical History of the San Antonio Confederate Cemetery	WD Farr	1990
Rorke's Drift 1879: Pinned Like Rats in a Hole	I Knight, et. al.	1855329514
Sabotage and Subversion: The SOE and OSS at War I Dear		0304352020
Saddle Bag and Spinning Wheel: Being the Civil War letters of George W. Peddy, M.D., Surgeon, 56th Ga. Vol. Reg., C.S.A. and his Wife Kate Featherston	GW Peddy, et. al.	0865540047
Sage of the OSS	J Sage	0440075807
Science and Medicine in the Old South	RL Numbers, TL Savitt	0807114642
Secret Armies: Inside the American Soviet and European Special Forces	J Adams	0871132230
Secret Army, Secret War: Washington's Tragic Spy Operation in North Vietnam	SD Tourison	1557508186
Secret Commandos	JL Plaster	0684856735
Secret Missions of the Civil War	P Stern	0517000024
Secret Soldier: The True Life Story of Israel's Greatest Commando	M Betser, R Rosenberg	0871136376
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Secret War in North Vietnam	D Andrade, K Conboy	0700610022
Secret Warriors: Inside the Covert Military Operations of the Reagan Era	S Emerson	0399133607
Semi-regular and Irregular Warfare in the Civil War	EC Barksdale	
Shadow Warriors: Inside the Special Forces	T Clancy, et. al.	0399147837
Shadows of Glory	O Parry	0380820870
Sideshow	W Shawcross	0671230700
Simon Baruch: Rebel in the Ranks of Medicine, 1840-1921	PS Ward	0817305890
Snake Eater	D Bendell	0440211417
SOG	JL Plaster	1581600585
SOG, MACV Studies and Observations Group: Behind Enemy Lines, 4 volumes	H Saal	0962597031
SOG: The Secret Wars of America's Commandos in Vietnam	JL Plaster	0684811057

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Soldiers on Skis	F Whitlock, B Bishop	0873646762
Soldiers, Spies, and the Rat Line: America's Undeclared War Against the Soviets	JV Milano, P Brogan	1574880500
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Special Forces: A Guided Tour of U.S. Army Special Forces	T Clancy, J Gresham	0425172686
Special Forces: The Changing Face of Warfare	M Lloyd	1854091700
Special Forces in the Invasion of France, Histoire & Collections	P Gaujac	2908182947
Special Forces of the United States Army 1952-82	I Sutherland	0912138432
Special Operations Forces: An Assessment	JM Collins	0160431913
Special Operations Forces and Elusive Enemy Ground Targets: Lessons from Vietnam and the Persian Gulf War	W Rosenau	083303071X
Special Operations in the American Civil War	AM Raper	CGSC, 1996
Special Operations in United States Strategy		0160016126
Spetsnaz: The Inside Story of the Soviet Special Forces	V Suvorov	0393026140
Spies and Commandos: How America Lost the Secret War in North Vietnam	D Andrade, KJ Conboy	0700610022
War in the Shadows: The Guerrilla in History	RB Asprey	0688128157
Spies and Spymasters of the Civil War	DE Markle	08180227X
Spies for the Blue and Gray	HT Kane	385014643
Spies! Women in the Civil War	P Colman	1558702679
Spy of the Rebellion: Being a True History of the Spy System of the United States Army During the Late Rebellion, Revealing Many Secrets of the War	A Pinkerton	0803287224
Stonewall Jackson's Surgeon Hunter Holmes McGuire	MF Shaw	1561900478
Subnational Conflict in the Mediterranean Region	BM Jenkins, M Ghimire	9993340715
Sun Pin: The Art of Warfare	Sun Pin, et. al.	0345379918
Sun Tzu	J H Huang, Sun Tzu	0688124003
Sun Tzu's Art of War: The Modern Chinese Interpretation	T Hanshang, Y Shibing	0806927895
Sun-Tzu: The Art of War	RT Ames, Sun Tzu	034536239X
Sunzi Speaks	TC Chung, B Bruya	0385472587
Swords of Lightning: Special Forces and the Changing Face of Warfare	T White	0080409768
Tabulating Equipment and Army Medical Statistics	AG Love, et. al.	B0007DX0NY
Tailwind: A True Story	RV Buskirk	0849903416
Tarnished Scalpels: The Court-Martials of Fifty Union Surgeons	TP Lowry, JD Welsh	0811716031
Team Sergeant	WT Craig	0804117144
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The Air Force Role in Low-Intensity Conflict	DJ Dean	B0006EL93C
The Art of Rulership: A Study of Ancient Chinese Political Thought	RT Ames, Huai-Nan	0791420620
The Art of War	Sun Tzu	1570629781
The Art of War	Sun Tzu, J Minford	0670031569
The Art of War	Sun Tzu, J Clavell	0385299850
The Art of Strategy: A New Translation of Sun Tzu	RL Wing, Sun Tzu	0385237847
The Art of War: In Sun Tzu's Own Words	Sun Tzu, G Gagliardi	1929194005
The Bay of Pigs: The Leaders' Story of Brigade 2506	HB Johnson	0393042634
The Black Devil Brigade: The True Story of the First Special Service Force in World War II	JA Springer	0935553509
The Black Scalpel	G Parker	0718300815

Title	Author	ISBN
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The CIA's Secret War in Tibet	KJ Conboy, J Morrison	0700611592
The Civil War Letters of Dr. Harvey Black: A Surgeon with Stonewall Jackson	H Black, et. al.	0935523456
The Company They Keep	AJ Simons, C Bolte	0684828162
The Confederate Cause and Conduct in the War Between the States	HH McGuire, GL Christian	0964149109
The Country Team	R Moore	B0006BOOEQ
The Dahlgren Affair: Terror and Conspiracy in the Civil War	DP Schultz	0393046621
The Devil's Brigade	RH Adleman, GH Walton	1591140048
The Eagle's Talons: The American Experience at War	DM Drew, DM Snow	1410200698
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The Evolution of Preventive Medicine in the US Army	S Bayne-Jones	1114667943
The Fall of Eben Emael	J Mrazek	0891416641
The German Northern Theater of Operations, 1940-1945	EF Ziemke	B0007ETEOM
The Golden Jubilee of the Association of Military Surgeons of the United States, a History of its First Half-Century -1891-1941	EE Hume	B0007EZYV4
The Great Raid on Cabanatuan	WB Breuer	0471037427
The Green Berets	R Moore	0312984928
The Healers: A History of American Medicine	J Duffy	0252007433
The Healer's Road	JL Reasoner	0515117625
The Hunt for Bin Laden	R Moore	0375508619
The Illustrated Art of War	Sun Tzu, T Cleary	1570624224
The Imperial War Museum Book of War Behind Enemy Lines	JF Thompson	157488381X
The Intrepid Guerrillas of North Luzon	B Norling	0813121183
The Jungle is Neutral	F. Spencer-Chapman	0583128165
The Killing of Reinhard Heydrich: The SS Butcher of Prague	CA MacDonald	0306808609
The Kinder, Gentler Military	S Gutmann	0684852918
The Lincoln Conspiracy	DW Balsiger, CE Sellier	091721403X
The Man Who Tried to Burn New York,	NH Brandt	0425119181
The Medical Support System for the Confederate Army of Tennessee During the Georgia Campaign, May-Sept. 1864	FR Freemon	TN Hist. Q., 1993
The Medics' War. United States Army in the Korean War	AE Cowdrey	B0006ELAA4
The One That Got Away	C Ryan	1574881566
The Parachute Ward: A Canadian Surgeon's Wartime Adventures in Yugoslavia	BJ Street	0886191033
The Partisans, United States Holocaust Memorial Museum	Y Arad	0896040100
The Protected Will Never Know	L Wade	0804117136
The Roots of Counter-Insurgency: Armies and Guerrilla Warfare	IR Beckett	0713719222
The Secret War Against Hanoi: Kennedy and Johnson's Use of Spies, Saboteurs, and Covert Warriors in North Vietnam	RH Shultz	0060194545
The Secret War for the Union: The Untold Story of Military Intelligence in the Civil War	EC Fishel	0395742811
The Secret war report of the OSS	AC Brown	0425032531
The Seven Military Classics of Ancient China	RD Sawyer	0813312280
The Silent War: South African Recce Operations 1969 to 1994	P Stiff	1919854045
The Six Secret Teachings on the Way of Strategy	RD Sawyer, et. al.	1570622477
The Social Transformation of American Medicine	P Starr	0465079342
The Southern Soldier's Health Guide	JS Wilson	1877791075
The Soviet Partisan Movement, 1941-1944: A Critical Historiographical Analysis	LD Grenkevich, DM Glantz	0714644285
The Story the Soldiers Wouldn't Tell: Sex in the Civil War	TP Lowry	0811715159
The Story of the Arab Legion	JB Glubb	B0007J7994

Title	Author	ISBN
The Sword and the Olive: A Critical History of the Israeli Defense Force	ML Van Creveld	1891620053
The Tao of War	Wang Chen, RD Sawyer	0813340810
The Tao of Peace	Wang Chen, RD Sawyer	1570625115
The Tao of Spycraft: Intelligence Theory and Practice in Traditional China	RD Sawyer	0813333032
The Uncivil War: Irregular Warfare in the Upper South, 1861-1865	RR Mackey	0806136243
The Vietnams of the Green Berets	GM Patric	B0006EKUAA
The War Between the Spies: A History of Espionage During the American Civil War	A Axelrod	0871134829
The War for the Cities	R Moss	0698104498
The Witch Doctor	M Temchin	0896040453
The Wounded River: The Civil War Letters of John Vance Lauderdale, M.D.	JV Lauderdale, P Josyph	0870133284
The Wrong War: Why We Lost in Vietnam	J Record	155750699X
Theory and Practice in American Medicine	GH Brieger	0882021583
This Awful Drama: General Edwin Gray Lee, C.S.A. and His Family	AL Levin	0533072425
Trends in Outside Support for Insurgent Movements	DL Byman, et. al.	0833030523
True Americanism: Green Berets and War Resisters	DM Mantell	0807724297
Twilight Warriors: Inside the World's Special Forces	MC Arostegui	0312152345
Ukrainian Resistance Movement-Medical Services	M Ripeckyi	0920092306
Unconventional Warfare: Rebuilding U.S. Special Operations Forces	SL Marquis	0815754752
Uneasy Warriors: Coming Back Home	V Coppola	1563521970
United States Army in World War II: Special Studies Military Relations Between the United States and Canada 1939-1945	SW Dziuban	0160018714
United States Army Logistics, 1775-1992: An Anthology	CR Shrader, JW Mountcastle	0898755301
U.S. Army Special Forces, 1961-1971	FJ Kelly	B0006C7SMK
U.S. Army Counterinsurgency and Contingency Operations Doctrine, 1860-1941	AJ Birtle	0788173278
U.S. Army Heraldic Crests: A Complete Illustrated History of Authorized Distinctive Unit Insignia	BJ Stein, PJ Capelotti	0872499634
U.S. Army Special Operations In World War II	DW Hogan	141021690X
U.S. Army Special Warfare: Its Origins	AH Paddock	0700611770
U.S. Special Operations Forces in Action: The Challenge of Unconventional Warfare	TK Adams	0714643505
USA Airborne 50th Anniversary Commemorative Edition	B Hagerman	0938021907
War in Cambodia 1970-75	K Conboy, KR Bowra	85045851X
War in the Shadows, Volumes 1 & 2	RB Asprey	0385034709
Warrior Politics: Why Leadership Demands a Pagan Ethos	Robert D. Kaplan	0375505636
Weapon of choice	CH Briscoe, et. al.	ACGSC 2003
When Sherman Marched North from the Sea: Resistance on the Confederate Home Front	J Glass-Campbell	0807828092
White Dragon Two	K Sibounheuang	1885354142
White Roses: Women Nurses in the Civil War	RD Larson	1577470117
White Tigers: My Secret War in North Korea	BS Malcom, R Martz	1574881981
Who's Who from MACV-SOG	S Sherman	1996
With Courage and Delicacy: Civil War on the Peninsula: Women and the U.S. Sanitary Commission	N Scripture-Garrison	1882810392
Women at the Front: Hospital Workers in Civil War America	JE Schultz	080782867X
Yellow Fever and the South	M Humphreys	0813518202
Yoni Netanyahu: Commando at Entebbe	D Newberger-Speregen	0827606427
You're No Good to Me Dead: Behind Japanese Lines in the Philippines	R Stahl	1557507937

TITLE	AUTHOR	ISBN
New Additions since first list:[1]		
A Hundred Osamas: Islamist Threats & the Future of Counterinsurgency	S Zuhur	SSI 2005
A Murder in Wartime: The Untold Spy Story That Changed the Course of the Vietnam War	J Stein	0312070373
Age of the Guerrilla	F Sully	0380023318
American Soldier	T Franks	0060731583
Auguste Blanqui and the Art of Insurrection	S Bernstein	0853152438
Chariots of the Damned: Helicopter Special Operations from Vietnam to Kosovo	M McKinney, M Ryan	0312291183
Charlie Wilson's War	G Crile	0802141242
Combat in Russian Forests and Swamps		0160019451
Counterinsurgency Warfare	D Galula	0275989410
Crisis Fleeting - Original Reports on Military Medicine in India and Burma in the Second World War	JH Stone	B000BKRZL6
Daring to Win: Special Forces at War	D Eshel	1854091557
Duel for Kilimanjaro: An Account of the East African Campaign, 1914-1918	LO Mosley	B0007EE85C
Effects of Climate on Combat in European Russia		9997584538
Fatal Glory: Narciso Lopez and the First Clandestine U.S. War Against Cuba	T Chaffin	0813916739
Five Years to Freedom	JN Rowe	0345314603
German Defense Tactics Against Russian Breakthroughs		9990202907
Guerilla warfare	NM Blair	B0007JTGE0
Guerrilla	D Rooney	1857533526
Guerrilla and Terrorist Organizations: World Directory and Bibliography	P Janke	0029161509
Guerrilla Strategies: An Historical Anthology from the Long March to Afghanistan	G Chaliand	0520044444
Guerrilla Warfare: Che Guevara	EC Guevara	0803270755
Guerrillas	JL Anderson	0142004979
Honduras To Haiti: Five Years In The Life Of A Special Forces Sergeant	RW Johnson	1410792781
Imperial Grunts	RD Kaplan	1400061326
Insurgency & Terrorism: Inside Modern Revolutionary Warfare	BE O'Neill, EC Meyer	1574883356
Insurgency and Counterinsurgency in the 21st Century	S Metz	1584871792
JSOU/NDIA Essays 2004-5		
Kitchener: Architect of Victory, Artisan of Peace	J Pollock	0786708298
Lapham's Raiders: Guerrillas in the Philippines, 1942-1945	R Lapham, B Norling	0813119499
Lettow-Vorbeck's Soldiers	W Dobbertin	089839340X
Macarthur's Undercover War: Spies, Saboteurs, Guerrillas, and Secret Missions	WB Breuer	0785820485
Medical support of the Army Air Forces in World War II	MM Link	0912799692
Medicine: For Mountaineering & Other Wilderness Activities 5th Edition,	Wilkerson, JA (Editor)	0898867991
Military Improvisations During the Russian Campaign		0160019443
Military Improvisations During the Russian Campaign		1410220842
Modern Insurgencies and Counter-Insurgencies; Guerrillas and Their Opponents Since 1750	IFW Beckett	0415239346
Modern Irregular Warfare: In Defense Policy and as a Military Phenomenon	FA Heydte	0933488491
Mogadishu!	K DeLong, S Tuckey	0275949257

Title	Author	ISBN
My Reminiscences of East Africa	P Lettow-Vorbeck	0898391547
Night Combat	A Toppe	0788170805
Night Stalkers: 160th Special Operations Aviation Regiment (Airborne)	F. Pushies	0760321418
Non-state Threats and Future Wars	R Bunker	0714683086
Operationalizing COIN	J Celeski	
Operations of Encircled Forces - German Experiences in WWII		B000AW7DIA
OSS	RH Smith	1592287298
Oxford Handbook of Tropical Medicine	Eddleston, M; Pierini,S; Wilkinson, R; Davidson R.	0198525095
Red Acropolis, Black Terror: The Greek Civil War and the Origins of Soviet-American Rivalry, 1943-1949	A Gerolymatos	0465027431
Resisting Rebellion: The History and Politics of Counter-insurgency	AJ Joes	0813123399
Revolutionary War in World Strategy, 1945-1969	RG Thompson,	0800867858
Rumsfeld's War: The Untold Story of America's Anti-Terrorist Commander	R Scarborough	0895260697
Russian-Soviet Unconventional Wars in the Caucasus, Central Asia, and Afghanistan	R Baumann	0160419530
SAS: With the Maquis	I Wellsted	85367186X
Sharp Corners: Urban Operations at Century's End	RJ Spiller	B0006RP25U
Small Unit Actions During the German Campaign in Russia		B000AMB17Y
Soldiers to the Rescue. The Medical; Responce to the Pentagon Attack.	S Marble, E Milhider	
Special Men and Special Missions: Inside American Special Operations Forces, 1945 to the Present	J Nadel, JR Wright	1853671592
Stoic Warriors	N Sherman	0195152166
Sub Rosa	S Alsop	0156863006
Tanganyikan Guerrilla	JR Sibley	
Terrain Factors in the Russian Campaign		016001946X
The Art of War Plus The Ancient Chinese Revealed Sun Tzu		1929194196
The Dressing Station: A Surgeon's Chronicle of War and Medicine	J Kaplan	0802117074
The First Professional Revolutionist	EL Eisenstein	0674304004
The Medical Department: Medical Service in the War Against Japan	M Condon-Rall, A Cowdrey	0160492653
The Philippine War, 1899-1902	BA Linn	0700612254
The Politics of Resistance in France, 1940-1944: A History of the Mouvements unis de la Résistance	J Sweets	0875800610
The Propensity of Things: Toward a History of Efficacy in China	F Jullien, J Lloyd	0942299949
The Shadow Warriors: O.S.S. and the Origins of the C.I.A.	BF Smith	0233975772
The Shining Path: A History of the Millenarian War in Peru	GG Ellenbogen, G Gorriti	0807846767
The Withered Vine	CR Shrader	0275965449
The Women Who Lived for Danger	M Binney	0060540877
The Zapatista Social Netwar in Mexico	D Ronfeldt, et. al.	0833026569
Theoretical Perspectives of Terrorist Enemies as Networks	RG Spulak	
They fought alone	J Keats	B0006AYKWI
Tito's Partisans 1941-45	V Vuksic	1841766755
U.S. Special Operations Forces in the Cold War	L Thompson	1853675067
United States Army and World War 2: Selected Papers From the Army's Commemorative Conferences	JL Bellafaire	016049589X
War of the Flea: Classic Study of Guerrilla Warfare	R Taber, BE O'Neill	1574885553
War Stories of the Green Berets	H Halberstadt	076031974X
Warfare in the Far North	W Erfurth	00075X6

The following is a compiled list of SOF related books recommended for your reading by those who were there. This list is complements of Len Blessing.

Every attempt is made to maintain the list's integrity with respected and legitimate works. I have removed the books that duplicated COL Farr's list.

Readers who feel a selection does not merit inclusion are encouraged to contact us with disputes.

Title	Author
00:19:57	Dave F Stafford
A Tear For Somalia (Written by a Brit who married a Somali woman while serving as a member of the British Camel Corps after the end of WWII. Not a history, but it does give insight into Somali society.)	Douglas T Collins
A Very Short War (About the last gunfight and the last sacrifices of the Vietnam-era war in the recovery of the crew and ship SS Mayaguez in 1975.)	John F Guilmartin Jr
Advice and Support: The Early Years	Ronald H Spector
Airborne and "Special Forces" (non-fiction, good quick references, especially for family or civilians)	Hans Halberstadt
American Guerrilla (WW II U.S. led guerrillas in Phillipines)	Unknown
Band of Brothers (A great story about "E" Company, 506th PIR, 101st ABN Division in WWII.)	Stephen Ambrose
Battle for the Central Highlands: A Special Forces Story	George E Dooley
Beyond Nam Dong	Roger Donlon
Black Eagles (Fiction)	Larry Collins
Blackburns Headhunters (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	COL Donald Blackburn
Blackjack -33: With Special Forces in the Viet Cong Forbidden Zone	James C Donahue
Blackjack -34 (Previously titled "No Greater Love")	James C Donahue
Break Contact Continue Mission (Fiction)	Raymond D Harris
Bunard: Diary of a Green Beret	Larry Crile
Che Guevarra on Guerrilla Warfare	Ernesto Gueverra
Covert Warrior	Warner Smith
Danger Close (Non-fiction. SF member charged with murder in a bar fight within 3 days of graduation from the Q Course.)	Mike Yon
Fighting Men: Stories of Soldiering	Jim Morris
Fire Your FPL's	Mike Di Rocco
Five Fingers	Gayle Rivers
Five Years To Freedom	James N Rowe
Flags of our Fathers	James Bradley & Ron Powers
Foreign Devils on the Silk Road (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Greatest Rescue Mission (Ranger operation to free POWs in the Philippines)	
Green Berets at War: U.S. Army Special Forces in Asia 1956-1975	Shelby L Stanton
Green Berets in the Vanguard: Inside Special Forces 1953-1963	Chalmers Archer Jr
Guerrilla Warfare: On Guerrilla Warfare	Mao Tse tung
Hazardous Duty	David H Hackworth (COL) & Tom Mathews

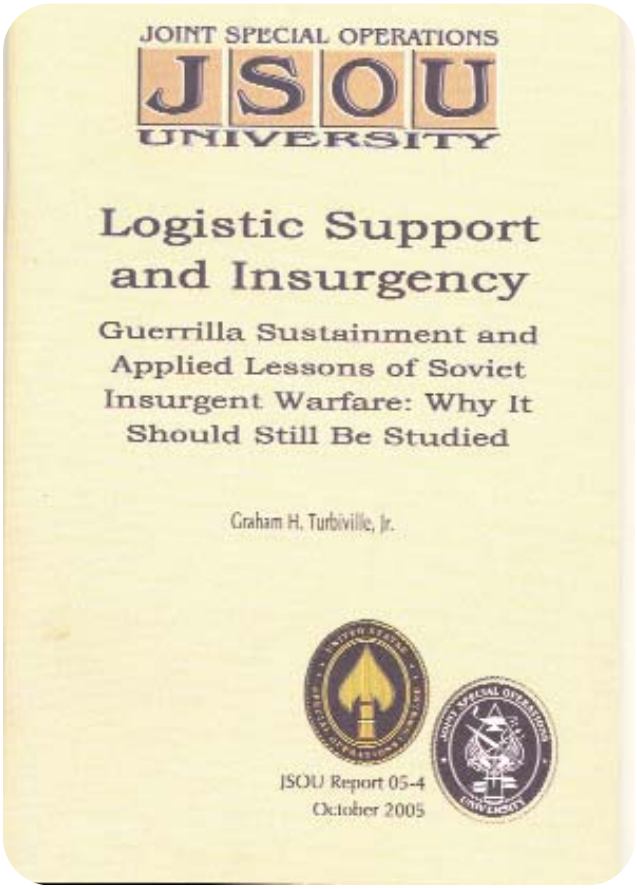
Title	Author
Hell In A Very Small Place (Siege of Dien Bien Phu)	Bernard Fall
Ho Chi Minh: A Life	William J Durker
In The Village of the Man	Loyd Little
Inside Al Qaeda, Global Network of Terror	Rohan Gunaratna
Inside Delta Force: The story of America's elite counterterrorist unit	Eric L Haney
Inside the Green Berets: The First Thirty Years	Charles M Simpson III
It Doesn't Take A Hero	Norman H Schwarzkopf (GEN Ret); Peter Petre
Laos: War and Revolution	Nina S Adams (Ed)
Like Hidden Fire (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Logistical Support of Special Operations Forces During Operations Desert Shield and Desert Storm	Donald W Betts
Long Shadows (Fiction)	Kent White
Lost Crusader: The Secret Wars of CIA Director William Colby	John Prados
Love and Duty	Ben & Anne Purcell
Medal Of Honor	Roy P Benavidez
Memories Of Maggie: Martha Raye: A Legend Spanning Three Wars	Noonie Fortin
My American Journey	Colin Powell (GEN Ret); Joseph E Persico
My Secret War	Richard S Drury
Night Jungle Operations	Thomas B Bennett
Night of the Silver Starts: The Battle of Lang Vei	William R Phillips
No Surrender (Japanese soldier who evaded capture and survived 30 years in the Philippines; it's a great book about perseverance and commitment to warrior ideals.)	Hiroo Onoda
Once A Warrior King: Memories of an Officer in Vietnam	David Donovan
O O T W Target Cuba	Robin Moore & JC Lamb
Operation Vulture	John Prados
OSS to Green Berets	Aaron Bank (COL Ret)
Parthian Shot	Loyd Little
Pathfinder: First In, Last Out (A very well written account of Richie Burns' first tour in RVN, during which he provided support to a Mike Force mission, and which describes other activities very similar to SF missions during the war.)	Richard C Burns
Peoples' War, Peoples' Army	Vo Nguyen Giap
Perilous Options: Special Operations as an Instrument of U.S. Foreign Policy	Lucien S Vandenbroucke
Phantom Warriors, Book II	Gary A Linderer
Phantom Warriors: LRRPs, LRPs, and Rangers in Vietnam, Book I	Gary A Linderer
Presidents' Secret Wars: CIA and Pentagon Covert Operations from World War II Through the Persian Gulf	John Prados
Rangers at War: Combat Recon in Vietnam	Shelby L Stanton
Rescue Of River City	Drew Dix
Return of The Enola Gay	Paul W Tibbets
Return With Honor	Scott O'Grady (Capt); Jeff Coplon
Setting the East Ablaze (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Seven Pillars of Wisdon	TE Lawrence

Title	Author
(Middle East insight)	
SF Bibliography: Collection of articles and other readings with Special Forces topics	Radix Press/Dan Godbee
Shadow War: Special Operations and Low Intensity Conflict	HT Hayden
Silent Birdmen	Al Rampone
(281st AHC pilot account; Project Delta Ops in Ashau Valley.)	
Slow Walk In A Sad Rain	John P McAfee
SOG and SOG Photo Book	John Plaster
SOG: Volume I, II, III and IV	Harve Saal
SPEC OPS: Case Studies in Special Operations Warfare: Theory and Practice	William H McRaven
Special Forces 1941-1987	LeRoy Thompson
Special Forces, the U.S. Army's experts in Unconventional Warfare	Caroll B Colby
Special Men and Special Missions: Inside American Special Operations Forces, 1945 to the Present	Joel Nadel & JR Wright
Spies And Commandos	Kenneth Conboy
Stolen Valor	B G Burkett; Glenna Whitley
Strategy and Policy Background Umbrella Concept for Low Intensity Conflict	Alex and Hamilton Booz
Street Without Joy	Bernard B Fall
(French in Indochina; Good groundwork for SF in Vietnam)	
Taking The High Ground: Military Moments With GOD	Jeff O'Leary (Col)
Talking with Victor Charlie: An Interrogator's Story	Sedgwick D Tourison Jr
Tam Phu	Leigh Wade
The Barking Deer	Jonathan Rubin
(Fiction)	
The Blood Road: The Ho Chi Minh Trail and the Vietnam War	John Prados
The Chindit War	Shelford Bidwell
(Good section on Merrill's Marauders)	
The Devil's Guard	George R Elford
(A non-SF book; a good read and supposedly historically accurate. Covers the war from the viewpoint of the ex-Nazi's who were in the French Foreign Legion fighting the Viet Minh.)	
The Dying Place	David A Maurer
(Fiction)	
The Great Game	Peter Hopkirk
(Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	
The Green Berets in Vietnam, 1961-71	Francis J Kelly
The Hidden History of the Vietnam War	John Prados
The Last Confucian	Denis Warner
The Making of a Quagmire	David Halberstam
The Montagnards of South Vietnam	Robert L Mole
The New Legions	Donald Duncan
The Politics of Heroin in SE Asia	Alfred McCoy
(Essential reference for understanding the Golden Triangle.)	
The Price of Exit	Tom Marshall
(Helicopter pilot, Lam Son 719 and CCN)	
The Raid	Benjamin F Schemmer
The Ravens	Christopher Robbins
(The classic about our Bird Dog brothers)	
The Rescue of Bat-21	Darrel D Whitcomb
The Road to Arnhem: A Screaming Eagle in Holland	Donald R Burgett
The Secret Wars: A Guide to Sources in English, Volume II, Intelligence, Propaganda and Psychological Warfare, Covert Operations, 1945-1980	Myron J Smith

Title	Author
The Sorrow of War: A Novel of North Vietnam (This is a work of fiction with many facts written by a NVA Officer.)	Bao Ninh
Tiger the Lurp Dog (Fiction)	Kenneth Miller
Tragedy in Paradise: A Country Doctor at War in Laos	Charles Weldon, MD
Trespassers on the Roof of the World (Part of a series of books on the area from Turkey to Tibet. Well researched and an excellent view of the region, its history, and various societies that live within the region.)	Peter Hopkirk
Umbrella Concept for Low Intensity Conflict	Alex & Hamilton Booz
Unconventional Operations Forces of Special Operations	Mark D Boyatt
Uneasy Warrior	Vincent Coppola
U.S. Army Special Forces 1952-84	Gordon L Rottman
U.S. Army Handbook for North Vietnam Dept. of Army: 550-57	
U.S. Army Handbook for Cambodia Dept. of Army: DA Pam: 550-50	
U.S. Army Handbook for Laos Dept. of Army: DA Pam: 550-58	
U.S. Army Handbook for South Vietnam Dept. of Army: DA Pam: 550-55	
U.S. Army Handbook: Minority Groups in the Republic of Vietnam: Ethnographic Series Dept. of Army:DA Pam: 550-105	
U.S. Army Special Operations in World War II	David W Hogan Jr
U.S. Special Forces	Peter McDonald
Urgent Fury: The Battle for Grenada	Mark Adkin
Valley of Decision: The Siege of Khe Sanh	John Prados
Vietnam Above The Tree Tops: A Forward Air Controller Reports	John F Flanagan
Vietnam in American Literature	Philip H Melling
Vietnam Military Lore: Legends, Shadow and Heroes	Ray E Bows (MSG Ret)
Vietnam Order of Battle: A Complete, Illustrated Reference to the U.S. Army and Allied Ground Forces in Vietnam, 1961 - 1973	Shelby Stanton
Vietnam Studies: Command and Control 1950-1969	Maj Gen George Eckhardt
Vietnam: A History	Stanley Karnow
Vietnam: The Origins of Revolution	John T McAlister Jr
Vietnam: The Secret War	Kevin M Generous
War Stories of the Green Berets: The Vietnam Experience	Hans Halberstadt
War Story	Jim Morris
Warrior Healers	Leonard D. Blessing Jr.
We Were Soldiers Once And Young	Harold G Moore (LTG); Joseph L Galloway

Book Review

Reviewed by COL Rocky Farr



Turbiville, Graham H., Jr. *Logistical Support and Insurgency. Guerrilla Sustainment and Applied Lessons of Soviet Insurgent Warfare: Why it Should Still Be Studied.* JSOU Report 05-4. The JSOU Press: Hurlburt Field, Florida. 2005. ISBN: 0-9767393-5-6. 39 pages.

The JSOU (Joint Special Operations University) at Hurlburt Air Force Base, Florida is attempting to fill a void in the guerrilla/unconventional warfare literature by publishing a series of paperback monographs on various aspects of special operations. They can be accessed through https://jsou.socom.mil. They also have a number of SOF short courses, both medical and non-medical, worth attending.

Guerrillas have to sustain themselves logistically to simply exist and more importantly to be able to expand their operations. This area of unconventional warfare is not well represented in the literature. Conventional logistics has a small collection of good works but unconventional logistics does not yet have a similar body of literature. This study concentrates on how the Soviet Union supplied its partisan forces against the Germans on the Eastern front in World War II. It then tries to draw parallels on methods the Soviets used to support their wars of national liberation that they organized or sponsored and supported in the post-war Cold War period.

It covers the three distinct types of guerrilla supply sources: Local or prepositioned; captured; and support from external sources. These three categories remain true today. Although the focus is logistics-wide, mention is made of medical requirements to include support from humanitarian groups and the fact that medical, being small in cubic mass, lends itself to aerial resupply. The monograph closes with a useful list of the thirteen key elements of insurgency sustainment.

Picture This….

Wisco, Oliver J DO; Edhegard, Kim MD; Hodson, Darryl S MD

After spending the past 10 days with your unit traversing an undisclosed mountainous area in Afghanistan, your first sergeant quietly pulls you aside and says, "Doc, can you look at this rash…it really itches." He adds that he's "got it all over" and pulls down his shirt and shows you his right upper chest (Picture 1) and then lifts up his shirt and shows you his left lower back (Picture 2). He is an otherwise healthy male and the only medication that he has been taking is Naprosyn (naproxen) for occasional lower back pain. He says "the bumps last a few hours and may start after taking the medication." Using the primary lesion definitions outlined in your SOF medical handbook, how would you describe the morphology of the pictured lesions? What is your differential diagnosis for widespread pruritic transient lesions on the trunk and extremities?

Answer:

Morphology

Multiple widespread erythematous edematous plaques (wheals) ranging from 1 to 6cm with a faint white halo.

Differential diagnosis

Urticaria. Erythema multiforme (lesions are more targetoid or bulls-eye appearing and persist for days to weeks, may also be associated with an underlying herpes simplex outbreak).[1] Papular urticaria (presents as a group of small papules with or without a central punctum grouped around the site of a local insult, such as an insect bite).[2] Dermatitis herpetiformis (autoimmune disorder associated with gluten sensitivity causing diarrhea, typically presents as vesicles/bullae on the elbows, knees, buttocks, and shoulders).[3] Bullous pemphigoid (autoimmune blistering disease, that can have a pruritic uriticarial reaction in early stages).[4] Subacute cutaneous lupus erythematosus (autoimmune disorder presenting as chronic erythematous plaques in photodistributed areas, may be induced by non-steroidal anti-inflammatory medications).[5]

Urticaria

Urticaria, commonly called hives, is defined as pale or erythematous pruritic edematous plaques (wheals) typically with a white halo that blanch with pressure.[6,7] Symptoms appear shortly after exposure to a "triggering" entity, which can range from food to sunlight, but in most cases is never identified. Soldiers deployed to distant parts of the world frequently encounter environmental changes and contact many foreign agents and vectors which can potentially cause urticaria. The pruritic wheals of urticaria typically fade in less than an hour, only to be replaced by other transient lesions possibly for several weeks until the episode resolves. Urticaria can assume several patterns, such as linear, circular, or curvilinear. Occasionally, urticaria can develop over areas of skin subjected to patterned pressure (such as scratching), in a phenomenon termed dermatographism. Wheals develop following the outline of the pressure pattern, and can be made to form words or shapes.[8] When the edema produced by urticaria extends into deeper layers of the skin and connective tissue, patients are said to have developed angioedema.[4] Death may occur if this reaction is severe enough to cause angioedematous closure of the airway or anaphylaxis.[6,9] Urticaria that lasts less than six weeks is termed acute urticaria while uticaria that lasts longer than six weeks is called chronic urticaria. Most cases occur in the second and third decades of life with women having a greater overall chance of developing urticaria compared to men.[4] It is estimated to affect up to 25 percent of the population in the United States at some point during their life.[6]

When evaluating a patient for urticaria, the patient must first be assessed for life-threatening symptoms that would indicate anaphylaxis or angioedematous airway compromise. Basic life support measures and intramuscular or subcutaneous epinephrine are the first-line treatments for these rare but serious conditions; respiratory and intravascular fluid may be necessary as supportive measures. In such situations, treatment supersedes diagnostics and the search for a cause must be delayed until the patient is stabilized. In non-emergent cases factors such as the frequency of urticarial episodes, time elapsed since the first episode, known prior triggers, and a medical history of asthma or allergies may be helpful in establishing the diagnosis and cause. The interviewer may wish to ask about recent travel or illness, since urticaria may present as a symptom of an underlying disease such as a lymphoproliferative disorder, autoimmune disease, hepatitis, or even a parasitic infection.[4] Dietary, dress, or activity changes are also worth investigating. Strawberries, tomatoes, shrimp, lobster, cheese, spinach, and eggplant are the most common dietary triggers of urticaria.[6] Changes in dress may include the addition of new jewelry or fabrics, while increased sun, cold, or allergen exposure are noteworthy environmental changes.[4] Recent addition or cessation of medications, vitamins, or herbal supplements should also be addressed. Medications frequently causing urticaria are non-steroidal anti-inflammatory drugs, muscle relaxants, opiates, antibiotics (particularly vancomycin) and radiographic contrast material. New pets or even pregnancy may be to blame and deserve inquiry.[6]

Treatment for urticaria is fairly straightforward and generally successful soon after implementation. Besides identifying and avoiding any possible triggers, H1 antihistamines are the treatment of choice. Antihistamines differ little in their efficacy, though side effects can vary.[4] First generation antihistamines such

as hydroxyzine and diphenhydramine are effective and cheap, but can cause marked sedation. This side effect may be particularly undesirable in the situation of a deployed Soldier, given the erratic and unpredictable nature of life in the field. Some reports indicate newer-generation H1 antihistamines such as loratadine, fexofenodine, and cetirizine are as effective as the sedating versions, but cause less drowsiness.[6] The addition of H2 antihistamines such as cimetidine or ranitidine, which are usually used to decrease acid levels in the stomach, can be helpful in cases which do not clear after treatment with an H1 antihistamine alone.[4] For cases that do not respond to antihistaminic therapy, a 15-day slowly tapering course of oral corticosteroids may be helpful to curtail inflammatory mediators other than histamine.[10] Leukotriene modifiers may be helpful in some refractory situations; in the worst cases, treatment with plasmapheresis, intravenous immunoglobulin, or cytotoxic medications may be indicated under the direction of a specialist.[6] Patients who are considered at risk of progression to angioedema with compromise of the airway or anaphylaxis should carry an EpiPen® (epinephrine auto-injector) but should only use it if such a situation arises and not just for what is perceived as extensive hives. Long-term management of urticaria is based on avoidance of precipitating factors if they can be identified. In cases where the active duty member suffers from chronic urticaria or recurrent acute episodes of urticaria, medical disposition on fitness for operational duty must be determined.

If you are deployed and have a concern about a puzzling skin lesion, you can email your clinical photos and, with the aid of your SOF manual, a concise morphologic description of the difficulty to our Operational Teledermatology site at derm.consult@us.army.mil or to Daniel.Schissel@US.Army.Mil. The lesion you describe just may make its way to **Picture This…**

As always, thanks for all you do.

References

1. Huff JC, Weston WL, Tonnesen MG. Erythema multiforme: a critical review of characteristics, diagnostic criteria, and causes. J *Am Acad Dermatol*. 1983 Jun; 8(6):763-75.
2. Stibich AS, Schwartz RA. Papular Urticaria. Cutis. 2001; 68:89-91.
3. Kosann MK. Dermatitis herpetiformis. *Dermatol Online J.* 2003 Oct;9(4):8.
4. Charlesworth EN. Urticaria and angioedema: a clinical spectrum. *Ann Allergy Asthma Immunol.* 1996 Jun; 76(6): 484-95.
5. Chaudhry SI. Murphy LA. White IR. Subacute cutaneous lupus erythematosus: a paraneoplastic dermatosis?. *Clinical & Experimental Dermatology.* 2005 Nov; 30(6):655-8.
6. Muller BA. Urticaria and Angioedema: A Practical Approach. *Am Fam Physician* 2004;69(5):1123-28.
7. Cohen BA: *Pediatric Dermatology*, ed 2. St. Louis, Mo.: Mosby, Inc., 1999, pp 154-6.
8. Sheikh J. Urticaria. eMedicine. http://www.emedicine.com/med/topic3014.htm Accessed March 15, 2006.
9. Koh YI, Choi IS. Oropharyngeal angioedema induced by inhaled histamine. *J. Korean Med Sci*. 2002 Dec; 17: 830-2.
10. Kulze A, Greaves M. Contact urticaria caused by stinging nettles. *Br J Dermatol.*1988 Aug; 119(2):269-70.

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Dedication

Master Sergeant Thomas D. Maholic

MSG. Thomas D. Maholic, 38, a Special Forces team sergeant assigned to 2nd Battalion, 7th Special Forces Group (Airborne), died June 24 in the Kandahar Province, near Ghecko, Afghanistan when he was fatally struck by enemy small arms fire during a cordon and search mission.

Maholic, a native of Bradford, Pa., enlisted as an infantryman in 1991. His first assignment was with the Pennsylvania National Guard where he was an infantryman for five years. In July of 1991, he transitioned to active duty and was assigned to the 1st Battalion, 508th Infantry Battalion at Fort Kobbe, Panama where he served for two years. In 1993, he volunteered to become a Special Forces Soldier.

Maholic graduated from the Special Forces Qualification Course in 1995 and was assigned 1st Bn., 7th SFG, as a Special Forces medical sergeant. In 2003, after serving more than seven years in 7th SFG, he was assigned to the U.S. Army John F. Kennedy Special Warfare Center and School at Fort Bragg, N.C., where he served as an Advanced Noncommissioned Officer Course instructor. In April 2005, Maholic was assigned to 2nd Bn., 7th SFG and served there as an Operational Detachment – Alpha team sergeant until his death.

His military education also includes the Basic and Advanced Noncommissioned Officer Courses, Combat Diver Qualification Course, Combat Diver Supervisor Course, Advanced Special Operations Techniques Course, Basic Instructor Training Course, Air Assault Course, Special Forces Assessment and Selection Course, Basic and Advanced Airborne Courses, Spanish Language Course, Survival, Evasion, Resistance, and Escape Course and both the winter and summer mountain warfare schools.

Maholic's awards and decorations include the Meritorious Service Medal, Army Commendation Medal, Joint Service Achievement Medal, Army Achievement Medal, Army Good Conduct Medal, National Defense Service Medal, Afghanistan Campaign Medal, Global War on Terrorism Service Medal, NCO Professional Development Ribbon, Army Service Ribbon, Overseas Service Ribbon, Expert Field Medical Badge, Special Operations Dive Badge, Master Parachutist Badge, Air Assault Badge, and Special Forces Tab. He was posthumously awarded the Bronze Star Medal for valor, Bronze Star Medal for service, Purple Heart, Meritorious Service Medal and Combat Infantryman Badge.

He is survived by his wife and son, as well as his mother, sister, and four brothers.

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Special Forces Aidman's Pledge

As a Special Forces Aidman of the United States Army, I pledge my honor and my conscience to the service of my country and the art of medicine. I recognize the responsibility which may be placed upon me for the health, and even lives, of others. I confess the limitation of my skill and knowledge in the caring for the sick and injured. I promise to follow the maxim "Primum non- nocere" ("First, thou shalt do no harm"), and to seek the assistance of more competent medical authority whenever it is available. These confidences which come to me in my attendance on the sick, I will treat as secret. I recognize my responsibility to impart to others who seek the service of medicine such knowledge of its art and practice as I possess, and I resolve to continue to improve my capability to this purpose. As an American soldier, I have determined ultimately to place above all considerations of self the mission of my team and the cause of my nation.

Pararescue Creed

I was that which others did not want to be. I went where others feared to go, and did what others failed to do. I asked nothing from those who gave nothing, And reluctantly accepted the thought of eternal lonliess ....should I fail. I have seen the face of terror; felt the stinging cold of fear, and enjoyed the sweet taste of a moment's love. I have cried, pained and hoped...but most of all, I have lived times others would say best forgotten. Always I will be able to say, that I was proud of what I was: a PJ It is my duty as a Pararescueman to save a life and to aid the injured. I will perform my assigned duties quickly and efficiently, placing these duties before personal desires and comforts.

These things I do,
"That Others May Live."

A Navy Poem

I'm the one called "Doc"... I shall not walk in your footsteps, but I will walk by your side. I shall not walk in your image, I've earned my own title of pride. We've answered the call together, on sea and foreign land. When the cry for help was given, I've been there right at hand. Whether I am on the ocean or in the jungle wearing greens, Giving aid to my fellow man, be it Sailors or Marines. So the next time you see a Corpsman and you think of calling him "squid", think of the job he's doing as those before him did. And if you ever have to go out there and your life is on the block, Look at the one right next to you...

I'm the one called "Doc". *~ Harry*

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