The Pope Air Force Base Aircraft Crash and Burn Disaster

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This report describes the initial hospital and burn center management of a mass casualty incident resulting from an aircraft crash and fire. One hundred thirty soldiers were injured, including 10 immediate fatalities. Womack Army Medical Center at Fort Bragg, North Carolina, managed the casualties and began receiving patients 15 minutes after the crash. As a result of repetitive training that included at least two mass casualty drills each year, the triage area and emergency department were cleared of all patients within 2 hours. Fifty patients were transferred to burn centers, including 43 patients to the US Army Institute of Surgical Research. This constitutes the largest single mass casualty incident experienced in the 57-year history of the Institute. All patients of the US Army Institute of Surgical Research survived to hospital discharge, and 34 returned to duty 3 months after the crash. The scenario of an on-ground aircraft explosion and fire approximates what might be seen as a result of an aircraft hijacking, bombing, or intentional crash. Lessons learned from this incident have utility in the planning of future response to such disasters. (J Burn Care Rehabil 2005;26:132–140)

The mass casualty incident resulting from an aircraft crash and fire at Pope Air Force Base (AFB) outside of Fayetteville, North Carolina, remains the largest such incident experienced by the US Army Institute of Surgical Research (USAISR) since its inception in 1947. Although this event occurred 10 years ago, the incident remains fresh in the minds of those who were involved in the management of the burn patients (D.W.M., D.J.B.) or who were at Womack Army Medical Center (WAMC; J.B.H.) at the time of the crash. With heightened interest in the need for planning for future mass-casualty events, the experience and lessons learned by the referring and receiving hospitals are noteworthy. Specifically, the nature and number of casualties produced by the explosion of a fully fueled aircraft located on the ground 50 feet from approximately 500 people may be similar to the medical aftermath of an intentional bombing of an aircraft as a terrorist act (Figs. 1 and 2).

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INCIDENT AND INITIAL RESPONSE

On March 23, 1994, a collision of three military aircraft created a mass casualty incident at Pope AFB, located outside of Fayetteville, North Carolina. At approximately 2:10 PM Eastern time, two aircraft collided in the air while attempting to land on the same runway. The crash involved a F-16D fighter jet and a C-130 cargo/transport plane. The collision was approximately 200 feet short of the runway at an altitude of 300 to 500 feet. The damaged C-130 was able to land, and the crew escaped injury. The F-16 became uncontrollable, and the crew safely were ejected. The F-16 crashed into an aircraft parking ramp, exploded and ignited, and then slid approximately 1200 feet into a parked C-141 cargo/transport plane, which was being prepared for a parachuting exercise. The fuel tanks on the C-141 containing 55,000 gallons of aviation fuel ruptured and ignited. A group of 500 paratroopers waiting to board the C-141 were assembled within 50 to 75 feet of the C-141 transport at the time of the collision. They were sprayed with a fireball of burning aviation fuel, debris

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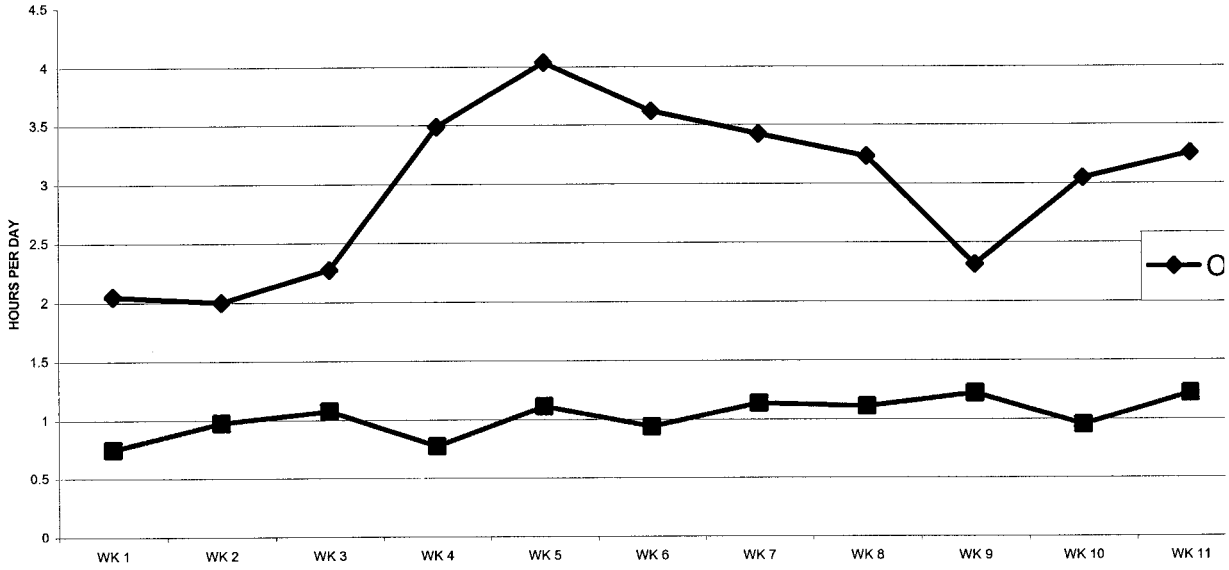

Figure 1. Daily occupational and physical therapy time per patient per day.

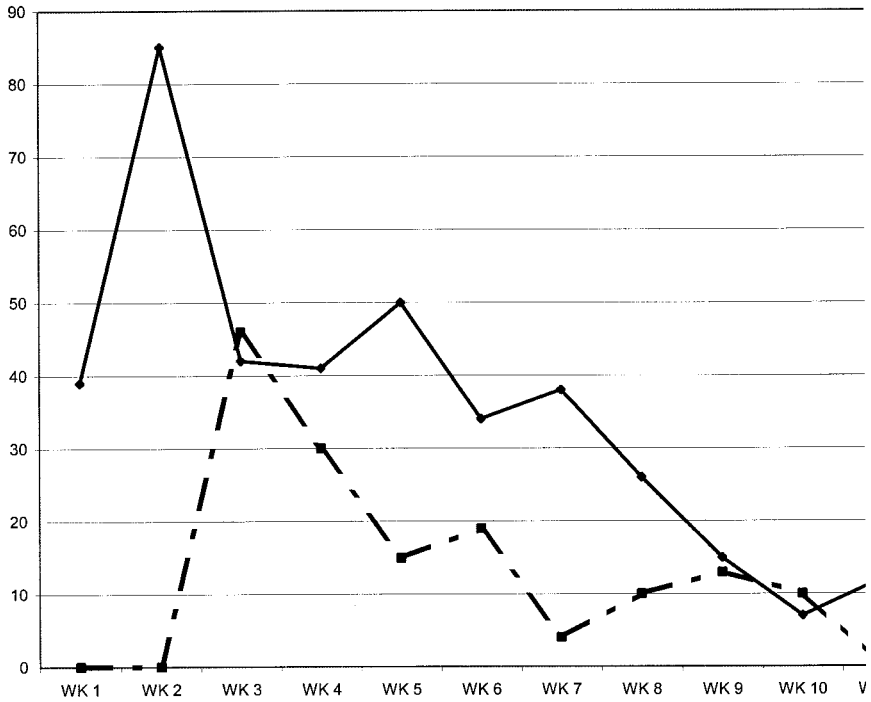

Figure 2. Weekly use of splints and compression garments for 43 burn patients in one mass casualty incident.

from the C-141, and parts of the still- burning F-16 jet. The crash occurred in a training area at the south end of the Pope AFB runway known as the Green Ramp. The incident thus became known as the Disaster on Green Ramp.[1]

The injured were assisted by each other and by nearby soldiers who rushed in to help. A group of special-forces medics were in class at the Jumpmaster School, also located at Green Ramp.[1] The medics and instructors were among the first volunteers on-scene. A unit of the 44th Medical Brigade was training nearby and immediately assisted[1]

The Pope AFB Fire Department was on-scene within 2 minutes.[1] Control of the fire was aided by the rapid response of the fire department, by a rapid mutual aid response from Fort Bragg and Cumberland County fire departments, and by the fact that the military and civilian fire apparatus used common appliances, facilitating equipment hookup.[1] Triage and rescue was hampered by the presence of 500 rounds of 20-mm ammunition on the crashed jet, which began to cook off and fire.[1] On-scene triage was largely unnecessary because transport of all victims to the hospital (5 minutes away) could be rapidly accomplished.[1] Nearly all victims were at the hospital within a half hour of the crash.

One hundred thirty soldiers were injured. Ten soldiers died immediately, with nine pronounced dead on-scene.[1] WAMC at Fort Bragg, North Carolina, a 155-bed hospital, managed the casualties, with the first group arriving approximately 15 minutes after the crash. A significant number of casualties were transported using whatever nonmedical vehicles were available. This included personal vehicles, high-mobility multipurpose wheeled vehicles, and large trucks[1]

MANAGEMENT AT WAMC

The casualties were managed at WAMC at Fort Bragg, North Carolina, which borders Pope AFB. Of the survivors, WAMC treated and released 51 casualties and admitted 55 patients, including 25 patients to intensive care units (ICUs). Six patients requiring urgent surgery were transferred to local area hospitals when the WAMC operating rooms filled. Seven patients were sent to the closest civilian burn center, the Jaycee Burn Center at the University of North Carolina (UNC) in Chapel Hill.[1] Of the deceased, 9 were dead on-scene, 2 died in transit to WAMC, 1 died within 30 minutes of hospital arrival, 1 died within 12 hours of arrival, and 10 died within 3 days, including 5 of the 7 transferred to the Jaycee Burn Center.[1] The remaining fatality occurred 10 months after the incident, when the last burn patient to be discharged from Brooke Army Medical Center died in a rehabilitation hospital.

At the time of the crash, WAMC was a community hospital with a four-bed surgical intensive care unit (SICU) and six operating rooms. The emergency department contained 22 beds, which were quickly filled with the most seriously injured. Casualties with less than 50% TBSA burns were evaluated in a makeshift triage area that was set up on the lawn immediately outside of the Emergency Department.

Approximately 20 patients required immediate endotracheal intubation because of airway burns and inadequate ventilation.[2] This created a secondary need for intravenous sedation and muscle relaxation among the intubated, and one pharmacy staff member was required full-time to manage this need.[2] In the next 8 hours, an additional 10 patients were intubated in intensive care or recovery units, some in anticipation of air transport.[2] Because a number of intubated patients were housed on hospital wards not normally used for the critically ill, the anesthesiologists made frequent airway rounds during the first night to monitor patients on mechanical ventilation.[2]

The Chief of the Department of Surgery was the acting Hospital Commander and was occupied with setting up the emergency operations center, gearing up the remainder of the hospital for the disaster, and in transferring patients to other facilities.[1] The chief of general surgery and the on-call general surgeon oversaw surgical triage. None of the on-site surgeons had significant experience with severe burn patients. The surgical staff quickly moved to the Emergency Department, consulted each other, and started distributing casualties throughout the hospital. All patients that could be safely be released from the hospital were instructed to leave, which opened up beds for the casualties. Two hours after arrival of the first patient, the triage and emergency departments were clear of patients, all having been admitted, transferred, discharged, or pronounced.[1]

In the operating rooms, ongoing elective surgery was expeditiously completed and further scheduled surgery cancelled, resulting in all operating rooms being available at 3 PM.[1] Operating space in the Labor and Delivery suite was used for the casualties, and the ambulatory surgery center became a recovery room, whereas the normal 8-bed recovery room became part of the now 12-bed SICU.[2] The medical ICU was largely used as an auxiliary surgical intensive care unit, creating 25 SICU beds. In the first 24 hours, 38 surgical procedures were performed on 16 patients, with an additional 13 patients having ward procedures[1] All emergency surgical procedures were completed by 3 AM, approximately 13 hours after the crash.[2]

Two wards were converted to burn wards and initially were staffed solely by surgical residents rotating from Walter Reed Army Medical Center and Duke Medical Center. The additional personnel, equipment, and supplies required to care for these casualties were provided by the enormous resources available at Fort Bragg. These assets were available because this post has the largest concentration of field medical units of any Department of Defense base in the world.

The first burn flight team from the Army Burn Center arrived 4 hours after the crash, with a larger, second team arriving 9 hours after the crash. The early arrival of the first team was fortuitous because they were diverted from an ongoing mission. The burn team leader initially made rounds on the 12 casualties in the SICU. During those rounds, one casualty died. The burn team leader then left to see the remaining 68 casualties, who were distributed throughout the hospital. The burn team assumed management of the burn patients and prepared some of them for transport. The after action reports of WAMC and the USAISR both document difficulties in initial management of the burn patients as these teams came together and shared information. Fortunately, patient care was not adversely impacted.

From the standpoint of the burn team, several of the escharotomies performed by nonsurgeons were inadequate and had to be reperformed. Because many of the burn patients suffered penetrating trauma from plane wreckage, some escharotomies were performed in the operating room under general anesthesia. These combined injuries resulted in some patients experiencing hemodynamic instability during resuscitation while under general anesthesia. Because 130 casualties presented to WAMC within 30 minutes, resuscitation volumes were impossible to track. This caused some consternation among the burn team members, who were used to having such data available to them on routine flights. The patients with burns requiring resuscitation in the SICU were all urinating 30 to 75 mL/hr within 4 hours of injury, had their nonthermal injuries treated, were hemodynamically stable, had palpable distal pulses, and had adequate escharotomies performed. Overresuscitation was caused both by the use of the Parkland formula rather than the Modified Brooke Formula and by the overestimation of burn size by personnel inexperienced in burn care.[3]

From the standpoint of the practitioners at WAMC, the arrival of the burn teams contributed to the confusion. The first burn team insisted on retriaging patients that had already been triaged and removed from a helicopter one patient being prepared for transport to a second civilian burn center.[1] The second flight team, arriving 5 hours after the first, retriaged the patients a second time. The routine of most flight teams is to examine patients before their flight to insure the safety and appropriateness of air transfer, and this was the rationale used by the teams.

The flight teams preferred the Modified Brooke Formula to the Parkland Formula, a fact not known by the referring facility or communicated by the burn teams. Patients with obviously mortal injuries were not accepted for transfer, nor was any guidance given on their care. Although the flight teams retriaged and prepared patients, the delay resulted in postponement of the use of one aircraft because of crew-rest requirements.[1]

Some of these difficulties arose from differences in institutional doctrine and attitude. The most obvious is the preference for the Modified Brooke Formula by the Brooke Team. The flight team, established in the 1950s, still relied on doctrine developed during the Vietnam war. In that conflict, the team functioned to transport stable patients from Vietnam via hospitals in Okinawa and Japan back to San Antonio for definitive treatment. In institutional memory, there had not been an in-flight death since 1979. All efforts were directed to avoid in-flight mortality because in-flight deaths on interstate or transcontinental flights create legal issues over jurisdiction. Patients with obviously mortal injuries were not (and still are not) accepted for flight or transfer. From the standpoint of the referring hospital, this policy is unrealistic and unworkable during a mass casualty incident.

The referring hospital relies on the burn center to manage burns, which means taking all of the burn patients out of the referring facility. This allows optimal care of the burn patients and conservation of local resources for use on the other trauma patients. It is difficult for a nonburn provider to know when a burn injury is not survivable. In the midst of a mass casualty incident, it is wiser to defer this decision to the burn center. For this reason, the first patients transferred out to the Jaycee Burn Center at UNC were the patients with the largest TBSA burns, most of whom later died. In addition, the burn patient not expected to survive who is kept at the referring hospital during a disaster still occupies an intensive care bed, still requires nursing and physician care, and still uses social work and pastoral care resources to deal with the family. Transfer of the mortally injured burn patient to a burn center frees up these resources at the referring hospital, which still had a sizable group of burned patients, including outpatients, to manage.

Once the flight teams departed, a number of burn patients remained at WAMC. Many of these patients were later transferred to the USAISR on March 28, 1994. A comment was made that a burn team should have remained at WAMC to assist in the care of these patients.[1] Inasmuch as many of the staff at the USAISR were occupied in the transfer of the patients and all were needed at the Army Burn Center to manage the burn casualties, this request could not have been met. Irregardless, increased communication on the optimal care of these patients could have been accomplished.

Several factors contributed to the success in the initial management of the disaster. The incident occurred at a nursing change of shift during daylight hours. The shift change doubled the staff available and the daylight allowed use of the lawn as a triage overflow area.[1] Each critical patient was cared for by two nurses, albeit some were inexperienced. More importantly, mass casualty incidents are an expected part of military health care practice. Before this event, WAMC had been holding mass casualty drills at least twice a year. A number of the health care providers had previous recent mass casualty experience, including combat experience. Fort Bragg is home to a Special Forces Group, the 44th Medical Brigade, a Mobile Army Surgical Hospital, five Forward Surgical Teams, and three Combat Support Hospitals. All volunteered their resources and personnel during the mass casualty incident.

Deficiencies noted in the after-action review process included lack of direct phone lines between WAMC and area hospital emergency departments, lack of direct radio communication between the emergency department and aeromedical aircraft, lack of portable radios to facilitate communication between the triage area and the inpatient units and wards, and the usual confusion in trying to rapidly locate surgical trays and other supplies.[1] The anesthesiologists noted a critical shortage of laryngoscopes, suction catheters, endotracheal tubes with stylets, narcotics, and muscle relaxants in the emergency area.[2] Most, if not all, of these deficiencies were addressed after the crash.[1] Most WAMC providers recognized their lack of burn experience and discussed ways whereby the USAISR could become more involved in outreach to the larger military medical community.

Deficiencies noted by the burn team included lack of standardized burn training among emergency providers, lack of standardization in burn mass casualty operations between military hospitals, and knowledge deficits in the proper performance of such techniques as escharotomy. In many cases, escharotomy incisions were not carried across burned joints. A recommendation was made to have more military nurses and physicians rotate at Brooke Army Medical Center to gain experience in burn management. An important lesson learned is the need to train nonsurgical physicians in advanced trauma and advanced burn life support. Although we would prefer to have surgeons managing the workup and resuscitation of all multitrauma patients, in reality, a number of the surgical staff was rapidly occupied in the operating rooms or in administrative capacities and thus were unavailable for direct patient care in the triage and resuscitation areas.

TRANSFER TO THE ARMY BURN CENTER

The USAISR/Army Burn Center trains and staffs burn flight teams for the safe long-range transfer of burn patients to the Institute.[4–9] A flight team consists of a general surgeon or burn center general medical officer, a burn ICU nurse, a licensed practical nurse, and a respiratory therapist. At the time of the crash, one burn flight team was en-route to the Jaycee Burn Center at UNC to pick up a Marine injured in a motor pool gasoline explosion at Camp Lejeune. On arrival, the team learned of the disaster and was transported by helicopter to WAMC at Fort Bragg, arriving approximately 4 hours after the crash.

Simultaneously, the USAISR mobilized additional resources to augment the deployed team in North Carolina. A second team was formed consisting of two general surgeons and one general medical officer, four ICU registered nurses, four licensed practical nurses, and four respiratory therapists. The additional equipment included 23 cardiac monitors, 60 intravenous infusion pumps, 8 cases of central venous catheters, 120 liters of lactated Ringer's solution, 15 bed rolls with 36 insulated space blankets, 26 pressure-controlled transport ventilators, and 20 standard Bear ventilators. This team departed from Randolph AFB, Texas at 8:28 PM and arrived at WAMC at 11:15 PM, 9 hours after the crash.[3]

After an initial briefing by the hospital commander and his staff, the burn teams immediately began an evaluation and triage of the burned soldiers who had been admitted to WAMC. It was decided that the most severely injured soldiers (excluding those already transferred to the Jaycee Burn Center at UNC and those deemed too unstable to tolerate aeromedical transfer) would be expeditiously transported to the Army's Burn Center on two separate aircraft. Twenty soldiers, whose extent of burn ranged from 6.5% to 88% TBSA, were prepared for transport. Some soldiers had associated inhalation injury, and others had traumatic amputations and penetrating wounds.

Most of the patients required mechanical ventilation during aeromedical transport. Before departure of the flight team from Randolph AFB, 20 Bear ventilators, some of which were rented from local companies, were transported to augment those provided by the Air Force. Because of a miscommunication, the extra ventilators transported to North Carolina were incompatible with the electrical requirements of

the C-9 aircraft.[3] Fortunately, 26 Bird pressure-controlled transport ventilators (TXP Military Transport Ventilator, Percussionaire Corp, Sandpoint, ID) also were transported to North Carolina to be used during ground transportation of patients to the aircraft. These ventilators have no electrical requirement and are completely driven by oxygen.[7] In use by the burn flight teams since 1987, the TXP transport ventilator remains a first-line option for in-flight ventilation and was successfully used for transport of intubated burn patients between Germany and San Antonio during Operation Iraqi Freedom in 2003.

At 4 AM on March 24, the first 11 burn patients were packaged for transport to the Army Burn Center and were loaded onto military ambulances for a short trip to Pope AFB.[1] They left for San Antonio at 7:20 AM aboard a US Air Force C-9 aircraft. The C-9, a military version of the DC-9, is specifically designed for patient transport and has on-board oxygen and suction. As many as 40 severely injured patients can be carried at one time on a C-9 aircraft.[10] The first 11 patients transported included 9 who required mechanical ventilation. On arrival in San Antonio, the burn center Clinical Chief met the flight and rapidly assigned patients to the intensive care and stepdown wards before ground transport. The first group of patients arrived at the burn center at 11 AM Central time. A second group of nine patients, including four requiring mechanical ventilation, left WAMC at 10 AM and departed Pope AFB on a second C-9 aircraft at 12:50 PM.[1] This group arrived at the Army Burn Center at approximately 2 PM Central time. There were no in-flight medical problems encountered. After the USAISR Flight teams departed, three additional burn patients were transported from Womack Hospital to the Jaycee Burn Center at UNC later in the day, by military helicopter.[1]

On March 28, a burn flight team from the USAISR returned to the Jaycee Burn Center at UNC to pick up the remaining injured soldiers who had been sent there at the time of the accident. During that mission, a staff surgeon returned to WAMC to evaluate an additional 50 patients with nonlife-threatening, but functionally significant, burns. Twenty of these patients required burn center specialty care and were transported to the USAISR on two flights on March 28, 2004

BURN CENTER TREATMENT AT THE USAISR

At the time of the crash, the Army Burn Center had a capacity of 16 ICUs and 24 step-down beds. The step-down beds were all equipped with oxygen, suction, and EKG monitoring, which allowed their rapid conversion to ICU use when needed. The inpatient burn census on March 23 was reported as 26 patients in one reference[3] and as 32 patients by recollection of the staff.

Initial burn center notification of the disaster indicated that 60 to 100 burn patients would be transferred. While the flight teams prepared to leave, one senior surgeon was occupied with creating bed-space. The large ward room on the step-down floor was converted to a third ICU. All but 11 of the inpatients were discharged or transferred to other hospitals in the area. One hospital administrator called back after initially agreeing to take several patients to confirm that this was only a drill. He was told "turn on the TV, look at CNN, and then call me back." The requested patient transfers subsequently took place. Ward 15A, which normally housed gynecologic patients, was given to the burn center and became a step-down unit. With the arrival of 20 additional patients on March 28, burn center census peaked at 53 patients.

A special fund was established to purchase necessary medical supplies and equipment. More than $200,000 in additional expenditures were required in the first 2 weeks after the accident. The transfer of funds from The US Army Health Services Command occurred quickly and with a minimum of administrative processing time. This greatly facilitated the ability to obtain the additional equipment and supplies needed for the care of these soldiers. A similar transfer occurred at WAMC, where $37,000 worth of medical supplies were transferred within an hour of the crash from warehouses to the hospital[1]

The Institute's staff extended their workweek to 60 hours to provide the needed level of intensive care. Nursing staff was augmented by employing, on a contract basis, several USAISR civilian and military alumni who were now practicing in the San Antonio area. The nursing aspects of the disaster response are discussed in detail by Greenfield and Winfree.[11] Additional respiratory therapists, physical and occupational therapists, psychiatric nurse specialists, and social workers were obtained from other San Antonio military facilities, including Brooke Army Medical Center, Wilford Hall Air Force Medical Center, and the Army Medical Department Center and School. A total of 6115 additional nonphysician personnel-hours were supplied. The actual person-hours of additional nonphysician staffing needed to support this mass casualty response, in addition to those hours provided through extension of the USAISR staffs' duty day, appear in Table 1.

Surgical treatment of these injured soldiers continued shortly after their arrival. Orthopaedic and me-

Table 1. Additional staff required to support the ISR Mission during the Pope AFB disaster Staffing is expressed in actual man-hours worked from March 24 to April 30, 1994

Source	Section Assigned	Officer	Enlisted	Total Hours
BAMC	ICU	376	0	376
	Acute	0	112	112
	OR	255	78	333
	PT	185	290	475
	OT	250	815	1065
	RT	0	200	200
AMEDDC&S	ICU	30	80	110
	Psych	60	0	60
	PT	0	195	195
	OT	0	300	300
	RT	0	44	44
Wilford Hall	Acute	388	400	788
	PT	0	344	344
Randolph Clinic	PT	0	120	120
Agency Nurses		(RN)	(LVN)	
		376	969	1345
Casuals (187th Med Bn)			248	248
Total		1920	4195	6115

AFB, Air Force Base; *BAMC*, Brooke Army Medical Center; *ICU*, intensive care unit; *ISR*, Institute of Surgical Research; *LVN*, licensed vocational nurse; *OT*, occupational therapy; *PT*, physical therapy; *RN*, registered nurse; *RT*, respiratory therapy.

chanical soft tissue injuries were treated. After the resuscitation phase of burn care, excision and grafting of the burns was performed to achieve timely and definitive closure of the wounds. The surgical staff was augmented by reassignment of USAISR surgeons engaged in full-time research to the Clinical Division. Three general surgery residents from the Brooke Army Medical Center with burn center experience were used to augment the surgical staff. In addition to the Institute's dedicated operating room, two additional operating rooms were made available by the Brooke Department of Surgery. To ensure prompt surgical treatment, all three operating rooms were continuously used for the first 2 weeks and two operating rooms were still necessary for another 10 days.[3] For the first 2 weeks, operating time was maximized by having two surgical attendings and two residents operating simultaneously in each room whenever possible. Because most of the patients were young healthy troops, the complete excision and grafting of up to 40% TBSA burns could be accomplished in one long operation when two experienced teams were used.

The disaster cohort underwent 107 operative procedures. The support offered by the Brooke Department of Surgery enabled prompt surgical treatment and timely closure of the burn wounds of these injured soldiers and was instrumental in the success of this operation.

A particular problem was created by the fact that there were 82 hand burns among the 43 patients admitted from this disaster. Sixty-four hands required excision and grafting. The management and outcome of the hand burns has been previously reported (12). Physical and occupational therapy personnel were augmented from other San Antonio area military health facilities. The utilization of therapy resources was longitudinally recorded for 11 weeks following the crash and is presented in Figures 1 and 2. These figures do not include staffing requirements for the non-disaster patients treated in the burn center at the same time. A mean of 1.0 hours of physical therapy time and 2.9 hours of occupational therapy time was required per patient per day for the disaster cohort. Overall, during the first month following the air crash, physical and occupational therapists and technicians provided a mean of 117 hours of direct patient contact per day.

Physical and occupational therapy staffing requirements were maximal at the time of admission for initial evaluations, at the time of discharge for functional assessment and compression garment measurement, and at 3 weeks post-crash concomitant with wound closure and ambulation of a number of patients. The availability of a computer-assisted hand evaluation system facilitated treatment by decreasing the time required for a full hand and upper extremity evalua-

tion to 20 minutes compared with 63 minutes per patient when performed manually (13).

There were 389 splints fabricated and 107 compression garments measured. Most of the splints were fabricated early during the course of the incident, for the initial surgical procedures. The compression garments, on the other hand, were measured and fitted later in the treatment phase, beginning in the third week, and continuing well into the tenth week of the incident. A mean of 9.2 splints and 2.4 garments per patient were required during hospitalization, counting each glove and vest as a separate garment.

In addition to augmentation of the Clinical Division, the Laboratory Division also required increased logistical and manpower support; however, no additional outside staffing was required. During the period of March 24 to June 30, 1994, a total of 1760 microbiologic specimens were processed from the patients injured at Pope AFB.[3]

A total of 1242 organisms were isolated and identified, and 467 in vitro antibiotic sensitivity panels were completed. Microbiology laboratory personnel increased work hours from 8 to 12 hours per day during the first month after the accident. This modification allowed workload completion and maintenance of night and weekend coverage. No significant logistical or supply problems were identified. Similar increases in workload and frequency of specimen submission were observed in the Biochemistry and Pathology Branches of the Laboratory Division. The increased personnel requirements were provided by increasing the usual work hours of existing personnel and additional outside help was not required.

DISCHARGE AND FOLLOW-UP

The first patient was discharged from the USAISR on April 4, 1994, and by late June, all but one of the 43 soldiers receiving treatment for burns at the USAISR had been returned to duty (34 patients), transferred to other facilities for rehabilitation (4 patients), or on convalescent leave (4 patients).[3] The last patient was discharged to an inpatient rehabilitation facility on October 11, 1994. All patients survived to burn center discharge. The final patient to be discharged, a soldier with an 88% TBSA burn, later died of a complication during inpatient rehabilitation. After burn center discharge, the occupational and physical therapists from the USAISR were in close contact with their counterparts in the Department of Physical Medicine at WAMC, where most of the follow-up care was provided. The senior plastic surgeon and occupational therapist from the USAISR traveled to WAMC to provide ongoing patient evaluation and to assess the need for reconstructive surgery in these patients. Several patients were returned to Brooke Army Medical Center for reconstructive surgery, whereas others had reconstructive surgery at other facilities. Through a constant exchange of information, the postburn rehabilitation provided at WAMC was, in general, very effective as most patients had been returned to duty by mid-July.

SUMMARY

A mass casualty incident involving 130 patients was successfully managed at both the referring and receiving hospitals. Patients without significant burn injury were quickly processed, with 51 casualties treated and released on the day of injury. Patients with significant burns, however, continued to consume significant medical resources at both hospitals for several months after the incident. The utility of regularly scheduled mass casualty drills was demonstrated.

A controversial point in burn disaster management is the question of whether it is better to bring burn providers into a disaster area to assist or to transport burn patients out of the disaster area for treatment at other burn centers. In military practice, either solution can be accomplished. The air assets to transport patients are readily available, and military health providers, as federal employees, can practice at other military health care facilities without regard to state licensing issues. In the Pope disaster, a number of burn patients were successfully transported to burn centers in North Carolina and Texas. In retrospect, it would have also been helpful to leave a small contingent of experienced burn care providers at WAMC to advise and assist in the care of the burned patients who remained at Fort Bragg.

Surgeons are the best personnel to manage the initial care and resuscitation of the multiply injured. In a mass casualty incident, the availability of sufficient surgeons to manage all casualties in the triage and emergency department areas is unlikely. The nonsurgical physicians called to augment this role must be thoroughly trained, including completion of Advanced Burn Life Support and Advanced Trauma Life Support curricula.[12,13]

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