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A case of a male-to-female transsexual pilot with questionable judgment affecting flight safety is reported. The definition, etiology, and presenting symptoms are discussed. Three theories of etiology include the following: biological/imprinting, nonconflictual identity, and conflict/defense. Therapy is pointed out, to include psychotherapy, cross-dressing and living as a member of the opposite sex, hormones, cosmetic surgery, and surgical sex reassignment. Aviation safety issues involve all the phases of therapy and can be significant. Though the transsexual tends to have more episodes of anxiety and depression than the norm, the conclusion is that, through practitioner awareness and rapport with the patient, the transsexual need not be considered unsafe to fly.

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TRANSSEXUALISM AND FLIGHT SAFETY

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TRANSSEXUALISM AND FLIGHT SAFETY

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INTRODUCTION

The transsexual phenomena of the 1960s and 1970s has faded slightly, but the condition known as transsexualism still exists and affects military and civilian aircrew members. Though the condition is less visible, the ability of society to adjust continues. The aviation community is learning about this rare syndrome slowly and sometimes painfully. Aeromedical considerations of any new syndrome require time and attention in order to be elucidated and understood. Individuals with transsexualism are, as a rule, not content to wait for aeromedical and societal understanding. Unfortunately, the judicial system has, once again, been forced to rule on issues of aeromedical consequence. The American Medical Association News has reported on an ongoing case that involves the understanding of aeromedical, flight safety, and financial aspects of a transsexual pilot employed by a major commercial carrier (1).

Though the aerospace medicine practitioner might think that a transsexual pilot is a 'quirk' and requires no intellectual energy and concern, another consideration is in order. The Federal Aviation Administration (FAA) has a pathology code for recording those persons who have undergone transsexual surgery. As of 1 January 1987, 24 transsexual individuals possessed a medical

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certificate for flying. Some already had undergone the surgical procedure; others were ready to undergo the surgery, in that they were stabilized on hormonal therapy and had undergone their prescribed time cross-dressing and behaving in the role of the opposite sex (Personal communication, FAA, Civil Aeromedical Institute, Aeromedical Certification Branch, Medical Statistical Section). The 24 pilots are all biological males who have undergone a male-to-female sex change. The medical certificates include the following:

Class I - 2
Class II - 11
Class III - 11

Interestingly, the most famous transsexual, Christine Jorgenson, whose publicity started the transsexual phenomenon, obtained a Class III medical certificate herself at one time.

This article will review the historical and psychiatric aspects of transsexualism, with a focus on the better-understood male-to-female transsexual. Aeromedically significant flight safety issues involving hormonal, surgical, and psychiatric therapy will be described. The issues involving diagnosis and prognosis will be touched on, and the issues involving hormonal and surgical procedures will not be addressed in detail.

CASE

S.C., a 33-year-old male instructor pilot working for the U.S. military as a civil service employee, was reported to the flight surgeon to be undergoing a sex change. The pilot had over 7,000 flying hours in helicopters, with over 3,000 hours of combat in the Republic of Vietnam. In April 1981, he was questioned by the military flight surgeon and admitted that he had been undergoing oral and systemic estrogen therapy since September 1980. He had undergone cosmetic facial surgery earlier, and was undergoing electrolysis on

his facial hair. In November 1981, S.C. was grounded by his supervisor for repeated episodes of poor judgment and was referred back to the military flight surgeon for medical consultation and evaluation. The pilot's unsafe acts involved excessive banking (greater than 60 degrees), using night vision goggles improperly, and similar excessive banks in air traffic despite being counseled that these acts were prohibited by the procedures manual. The patient was neither contrite nor able to admit the mistakes. Rather, he exhibited great confidence in his decision to do these maneuvers, based on his own experienc and knowledge.

Later that year, he began cross-dressing in female attire and living full time in the feminine role. In November 1982, he underwent sexual reassignment surgery. S.C. (henceforth referred to as 'she') was evaluated four months later to ascertain aeromedical fitness to return to flying duties. On that evaluation, the phenotypically female patient related the history that she was the product of a normal pregnancy and delivery. She related a normal childhood except for occasional assumption of the female role during play, including cross-dressing intermittently from age 5. She remembers always being very close to her mother, and remains so. Her mother assisted financially, in fact, in paying for her surgery. Her father was lewd and intrusive. As a young boy, and later, as a young man, S.C. never identified with her father, who was viewed as ineffectual and distant. He died two years previous to this exam and was not mourned by S.C. Her childhood and adolescent development was, to outside appearances, normal, including dating and petting. She admitted to secret cross-dressing and to occasional fantasies about being a female. At the insistence of her father, she entered a vocational school after high school,

but left after a short time. Desiring to be an aviator, S.C. joined the military and served five years, with two tours in SE Asia.

Married at age 20 and a father at age 23, S.C. relates a history of satisfactory sexual relations with her wife until after the birth of their child. Since then, the relationship has been mutually supportive, with her wife devoting more energy to the child than to the marriage. When S.C. saw a TV special on transsexualism in 1979, her gender dysphoria became focused and she admitted to her wife the history of cross-dressing and unhappiness. After much research and consultation, S.C. made her decision to undergo a sex change. Since that time, she has had no sexual relations and has received a great deal of emotional support from her now ex-wife and their 13-year-old daughter. Her friends and non-family support come mainly from a group of transvestites and transsexuals in a nearby city. She has had a few dates with men since her surgery and has had no romantic or sexual inclinations. A very religious Christian, S.C. is content to contemplate her life spent in celibacy free from her now-gone testosterone-producing gonads.

Her current medications include ethinyl estradiol, 0.05 mg orally each day, and medroxyprogesterone acetate, 10 mg orally, seven days per month. Other than her nasal septal rhinoplasty, chin augmentation, castration, and vaginoplasty, no other surgical procedures were reported. There was no history of psychiatric illness in the family or with the patient. S.C. gives a history of smoking three pack-years of cigarettes, quitting five years ago. She averages four cups of coffee per day and an occasional iced tea. Her diet is unrestricted and she has no regular exercise program.

The patient is 169.9 cm (67 inches) tall and weighs 660 kg (145.5 pounds), with a sitting blood pressure of 112/68 mmHg and a pulse of 66 beats/min. She

was a reserved and feminine-appearing patient who possessed exceptional verbal skills. She was appropriately concerned about her examination and interested in being helpful throughout. She possessed above-average intelligence and was neither flamboyant nor hysterical. She was restrained in dress and behavior. Her physical examination was unremarkable except for the following findings. A cardiac examination revealed a grade II/VI systolic ejection murmur, considered to be functional in nature. The genital examination revealed a phenotypically normal female urethral meatus, labia, and introitus with a surgical result which could be characterized as "excellent." The vagina revealed no stricture or untoward post-surgical findings. On rectal examination, a small, uniform prostate gland was palpable. Laboratory values were essentially normal except that drumstick forms were present in the neutrophils. [These forms are associated with XX (female) and mosaic sex chromosome patterns and not associated with XY (male) genotype.] Chromosomal karyotyping was accomplished to address this, and S.C. was shown to be a genotypical male (XY). Additionally, a thyroid function profile revealed a T_4-RIA that was slightly elevated at 12.5 mcg/dl (normal range, 5.5-11.5 mcg/dl), and a T_3 uptake of 31.3% (normal range, 35%-45%). FTI and TSH-RIA were normal. There was no clinical correlation to these abnormal laboratory findings. Procedures accomplished and found to be normal included the following: pulmonary function tests, echocardiography, routine ECG, treadmill exercise tolerance test, 14 hours of Holter monitoring, radiography of the chest and abdomen, and audiogram.

At the time of this writing, S.C. is performing full duties as an instructor pilot and has had no further episodes of questioned judgment or episodes of psychologic dysfunction.

BACKGROUND

To understand the condition known as "transsexualism," one must define what it is and is not. One must understand its evolution into a new "disease," its prevalence and importance in society, and how the practicing physician might encounter it. Prior to 1980, the diagnosis of transsexualism was not recognized by the medical community at large. Then the American Psychiatric Association's Diagnostic and Statistical Manual of Medical Disorders was revised in its third edition (DSM III) to include transsexualism as a psychosexual disorder in the group of disorders categorized as gender-identity disorders. These conditions involve an incongruence between anatomic sex and gender identity.

It is important to understand the difference between "gender" and "sex." Gender identity is the private experience of gender role ("I am male" or "I am female") as opposed to the public expression of gender identity (3). Put another way, gender or gender identity is a psychological construct which refers to a basic sense or conviction of maleness and femaleness. In contrast, sex refers to the biology of maleness or femaleness, like 46, XY karyotype, testes, or penis (5).

Though the diagnosis is new, Pauley (11) has pointed out that the condition is old. Gender dysphoria has been attributed to the historical figures of Caligula, the Roman emperor, and Chevalier d'Eow, a French diplomat. Medical literature contained the first mention of this condition in Germany in 1830 and transvestism, another form of gender dysphoria, was mentioned in French medical literature in 1845. An American, Caldwell, used the term "psychopathia transsexualis" in 1949, but Benjamin, a sexologist, and the Christine Jorgenson story popularized the term "transsexual" in 1953.

The transsexual phenomenon really mushroomed in the next twenty years in both the medical research literature and the popular press. Time estimated the prevalence at 2,000 people in the United States in 1966 (18). Later, Newsweek gave the 1976 estimate at 10,000 (10). These estimates probably represent an increase in incidence rather than prevalence. Ross et al. (14) pointed out that the publicity of this condition increased the incidence in other countries, followed by a later decrease. In fact, Ross et al. very nicely analyzed the prevalence of transsexualism in Sweden, England and Wales, and Australia in their comparative study. The ratio was 1:54,000, 1:55,000, and 1:42,000, respectively. Interestingly, the longer the condition has been publicly acknowledged in these countries, the closer the male-to-female ratio has come to 1:1 (2.8:1, 3.2:1, and 6.1:1, respectively). Using a U.S. census of 240 million people and the Swedish or English prevalence ratios, the total number of U.S. cases is estimated at less than 5,000 cases.

The 5,000 estimated cases have generated so much interest that now there are hundreds of articles in the world literature, with an estimate of 50 new articles each year and 40 new presentations at a world-wide gender dysphoria symposium every other year.

ETIOLOGY AND PRESENTATION

Practitioners of many specialties are encountering these patients in the course of their practices. Surgeons, psychiatrists, and gynecologists obviously have some familiarity with such patients. Meyer (8) has reported that the first medical contact can occur at any age, as children, adolescents, adults, and the elderly have actively sought sexual reassignment. The practitioner of aerospace medicine must be familiar with the etiology of the syndrome of transsexualism.

There are three generally accepted hypotheses regarding the male-to-female transsexual. The most fundamental one is the biological/imprinting hypothesis. This is the view that transsexualism is a predisposition growing out of a biological vulnerability. According to Money and Gaskin (9), the syndrome can be triggered or set off by certain effects occurring in a critical period in life. This is consistent with animal models and implies that surgical therapy is rehabilitative.

The nonconflictual identity hypothesis, most popularly associated with Stoller (16), regards transsexualism as the result of unconflicted identity formation. A depressed mother with bisexual feelings binds her son to her in the emotional absence of a father figure. The father can be absent physically or emotionally, or just uninvolved. The child develops no Oedipal conflicts or castration anxieties. As a result, he reveals his neurotic feelings earlier than do related neurotics such as homosexuals or transvestites.

The third hypothesis includes some of the same characteristics, but with a different interpretation. The conflict/defense hypothesis is based on the premise that the desire for sexual reassignment is a pathological compromise. It is related to the separation-individuation phase of development. According to Person and Ovesey (12), the child perceives the threat of abandonment by the mother and handles this conflict by forming a defensive symbiotic merger with her. This is much more severe than other conflict/defense mechanisms which only seek to merge with the maternal figure symbolically (i.e., homosexuals and transvestites). Thus, sexuality in the transsexual tends to be secondary to security.

Feinbloom (5) has summarized some commonalities which help the nonpsychiatric practitioner. She emphasizes that transsexuals all are biologically and

physiologically normal, yet all have had an unusual relationship with their mother in early life. Since their early childhood, they have had a sense of disquiet, a feeling of "not being right," particularly in adolescence. Additionally, they tend to be relatively asexual in their feelings. Transsexuals are more interested in body congruence and self-image than in an active sexual life. Finally, many authors have identified the omnipresent mother and the absent father as a rather consistent finding.

As previously alluded to, the transsexual patient can present in many different ways and to many different kinds of specialty practices. Stoller has been reported to have evaluated a four-and-one-half-year-old boy who was charming, feminine, graceful and who desired to be a girl (16). More commonly, it is the social and psychologic forces of adolescence which propels the patient to a health care provider. As his friends are devoting increasing time, thought, and action to their sexuality, the transsexual is undergoing severe psychological stress. Many have no sexual feeling (as with our case report) and thus feel "abnormal," not fitting in. Some are aroused by members of their own sex and only later realize or admit to feeling like they are not homosexual because they are "really" of the other sex.

Many transsexuals have a life-long history of dressing in clothes of the opposite sex. Unlike the transvestite, who becomes sexually aroused by the thought or experience of cross-dressing, the transsexual feels "better" or more appropriate cross-dressed. Heterosexuals, as in the cited case, can function quite productively for years with no one else knowing or suspecting their gender dysphoria. Males in their fourth and fifth decades of life have pursued a transsexual treatment program only after seeing dutifully that their children were married or college educated. It is far more typical, however,

for the transsexual to be very troubled. Moderate to severe coexisting personality disturbances are the rule rather than the exception, according to the DSM III. The patient suffers anxiety with or without depression. The depression is severe enough to lead to suicidal actions and genital mutilation. The astute practitioner must be attuned to these risks while counseling. An essential feature of the diagnosis is that the gender dysphoria be continuous for at least two years and that it not be limited to only periods of stress. Additionally, no other mental disorder, such as schizophrenia, can o present.

Typically, the transsexual passes through periods, beginning in adolescence, when he/she experiences his/her differentness acutely, but tries even harder to fit in. He/she resolves to adjust to these stressful times by asserting his/her maleness/femaleness. Person and Ovesey give examples of this "last effort" in male transsexuals as going out for football or joining the Army. Other stressful times in life can also regenerate this dysphoria and lead to other "last efforts" until the transsexual seeks help for the dysphoria. Oftentimes, the patient, through reading or watching television, comes to the conclusion that his dysphoria can best be handled by accepting the powerful need for sexual reassignment rather than fighting it. These patients then drift to transsexual or transvestite groups and avail themselves of cross-dressing, illicitly obtained hormones, and cosmetic procedures to appear more like the other sex, all before seeking out the physician or mental health practitioner.

THERAPY

Once the diagnosis of transsexualism is made by competent medical authority, the treatment is long and arduous. Person and Ovesey (13) agree with Stoller that "...no matter what you do, including nothing, as far as the

transsexual patient is concerned, you will probably be wrong." The therapy is progressive so that reversibility is maintained as long as possible. It consists of psychotherapy first, followed by cross-dressing and passing for a member of the opposite sex, hormonal therapy and, possibly, cosmetic surgery, and, finally, sex reassignment surgery.

Psychotherapy from competent, nonjudgmental psychiatrists, like those found in gender identity centers, is preferred. Many transsexuals are reticent about dealing with the psychiatric profession for fear of being judged psychotic. Person and Ovesey's experience revealed that nearly all their patients had sought out psychiatrists in adolescence and early adulthood, and did not continue because of their fears and their noninsightful personalities.

Nevertheless, it must be remembered that patients who seek sexual reassignment may have significant pathology in addition to their current fixation. The psychiatrist will spend a great deal of time evaluating and attempting to see if psychotherapy alone will alleviate the condition. Many patients will respond to this and be content to return to a more adapted life as a transvestite or homosexual. In the event that psychotherapy is unsuccessful, the patient will need continued support as he undergoes the rest of the treatment.

Most treatment centers require the patient to live and dress as a member of the opposite sex for a prolonged period of time (up to two years in some places). During this time period, the patient's basic personality doesn't change. He is still narcissistic and depressed. Feinbloom equates the patient's mood swings to those of an adolescent. The male-to-female transsexual patient will fluctuate between elation at being liberated to his female-like appearance, congruent with his ego image, and severe depression

as she is reminded of her status, through various incidents such as mockery, assault, or rejection of her appearance, which leads to more ego-dystonia.

Usually about this time in the therapy, the patient starts (if she has not already started) hormonal treatment. Estrogen therapy is fraught with risks, but is necessary to change the body habitus and to relieve the male of unwanted and unanticipated penile erections and other libidinous feelings. This has been well documented by Kwan et al. (6). The estrogens, though closely related to testosterone, have untoward side effects. Nausea, vomiting, and salt and water retention are common and expected. Additionally, the risk of thromboembolic phenomenon increases while mood changes and depression have been reported, at least in the oral contraceptive preparations (2). This is not surprising, since estrogens are closely related to and derived from the corticosteroids. Interestingly, Slater et al. (15) has documented the increase in stroke volume and cardiac output of male transsexuals on estrogen therapy with good tolerance of the changes for two months. Also, the dose tested was typically twenty times the oral contraceptive dose, equivalent to a level encountered during pregnancy.

As mentioned, during this phase of therapy, the patient is dressing as a member of the opposite sex, receiving hormonal therapy, and often having cosmetic surgery. The cosmesis recorded are diverse. Depilation, rhinoplasty, chin augmentation or reduction, thyroid cartilage shaving, and breast augmentation or reduction have all been reported. Notably, none of these are related to actual sex reassignment directly, yet all bear the risks of a variety of complications and require healing for full function.

In male-to-female patients, the sexual reassignment surgery procedures are well documented and produce excellent aesthetic and functional results.

The castration, penectomy, and neovaginoplasty are all done at once. The skin of the penis is inverted to form the vagina. The urethra is shortened, mobilized, and placed in an anatomically correct position. Healing is usually rapid. The sexual reassignment surgery for female-to-male transsexuals is still not fully developed. First, a vaginectomy, a hysterectomy, and a salpingo-oophorectomy are done. Then, in stages, the penis is constructed and the urethra moved. The aesthetic results are not comparable to the male-to-female results, and of course the functional results are incomplete. The penis is nonerectile but can be constructed as partially erect. A ful erection is not possible, nor is ejaculation.

One of the most interesting aspects of this is that the transsexual tends to not be as interested in sex, per se, as the norm, though many do marry and adopt children, according to Person and Ovesey. Pauley reports an 85%-90% rate of satisfied patients following the surgery. Contrary to the above-mentioned results, Pauley found that female-to-male transsexuals are more satisfied with the surgical results than the male-to-female transsexuals. Lothstein (7) reports that the satisfaction is as low as 68%, and all surveys of satisfaction are suspect because of a lack of long-term follow-up and inadequate measure of "psychological function." In fact, adverse psychological reactions with depression and suicide are not uncommon. Lothstein attributes this to poor diagnosis in separating the types of transsexuals (refer to Person and Ovesey for a more complete discussion) and to inadequate psychotherapy for these individuals undergoing this massive, irreversible change.

CONCLUSION AND AVIATION SAFETY

The transsexual aircrew member is no more likely to be unsafe than the nontranssexual, all other things being equal. The forces that enter into

flying safety are many and varied. Interaction with crewmembers, the response of paying customers to personalities, marketing, and legal forces all affect judgments of aviation safety in the eyes of supervisors.

The aeromedical practitioner must be alert to the aeromedical implications and respond accordingly. Transsexualism is a rare but real syndrome. The definition is limited to those gender dysphoric patients who wish to be rid of their genitals and who have so wished for more than two years. Additionally, and most important aeromedically, there can be no abnormalities of physical or genetic "intersex," nor can the dysphoria be due to another psychiatric disorder. The transsexual aircrew member will need repetitive support from their aviation medical officer and occasional referral to a competent and experienced psychiatric professional. Attention to the possibility of self-medication should be uppermost in the aerospace medicine practitioner's mind.

Aeromedical safety considerations are still plentiful. A high incidence of depression and suicide occurs in these patients. Susceptibility before surgery is constant. Post sexual reassignment surgery reactions to unsatisfactory results or to discrimination tend to be severely depressive; therefore, the practitioner should be alert at those times.

As mentioned, hormonal therapy, whether prescribed or illicit, can affect mood and the sense of well-being. The alert practitioner must be aware of effects on judgment while flying at those times.

All surgical procedures are fraught with aeromedical concerns for flight safety. Pain and wound healing can affect safe functional flight until they have progressed to full function. The complications associated with the surgeries will prolong the period of unsafe aviation duties.

In summary, the transsexual has many associated factors which affect flight safety, though the disorder itself appears to be unrelated. Constant supervision, support, and follow-up of the transsexual aircrew member will encourage the transsexual to avail himself/herself of medical support and will assist in continued safe flight activities.

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