

- B. Tell him there is a 3-mo observation period after symptom resolution before return to flight.
- C. Explain that he is grounded until all symptoms resolve and a waiver is approved.
- D. Return him to flight duties immediately after symptoms resolve.

## ANSWER/DISCUSSION

5. C. Aeromedically, the pilot should remain grounded due to his ongoing symptoms and medication use incompatible with flight duties. Symptoms of vestibular neuritis pose an immediate threat both to the pilot and mission. Sequelae include recurrence, which can appear in up to 11% of patients, and benign paroxysmal positional vertigo, which may occur in up to 15% of patients within a few weeks.<sup>8</sup> Knowing the natural course of vestibular neuritis, you counsel the pilot that he will likely need several more weeks for his symptoms to completely resolve and to allow for central compensation. According to the U.S. Air Force Waiver Guide, vestibular neuritis is the only peripheral cause of vertigo that can be considered for Flying Class I and unrestricted Flying Class II waivers.<sup>13</sup> Otolaryngology consult is required for waiver consideration, but the U.S. Air Force Waiver Guide does not impose an observation period prior to waiver submission. Return of the flyer with peripheral vertigo is not standardized across authorities. The U.S. Navy Aeromedical Reference and Waiver Guide allows return of a flyer with vertigo without waiver if symptom free for at least 4 wk.<sup>10</sup> The U.S. Army Aeromedical Policy Letters allow for waiver consideration of vertigo not caused by Ménière's disease.<sup>14</sup> According to the Federal Aviation Administration's (FAA) Guide for Aviation Medical Examiners, the Aviation Medical Examiner must evaluate the aviator and submit a current status report to the FAA, which will make the final determination whether to grant or deny a certificate.<sup>4</sup>

The pilot was returned to the United States for evaluation by an otolaryngologist, who agreed with the diagnosis. After resolution of his symptoms 6 wk later, the pilot became eligible for waiver per the U.S. Air Force Waiver guide. A waiver was submitted.

**Brown MR.** *You're the flight surgeon: vestibular neuritis.* *Aerosp Med Hum Perform.* 2016; 87(2):150–152.

## ACKNOWLEDGMENTS

The author would like to thank Dr. David Schall, FAA Great Lakes Regional Flight Surgeon and Aerospace Neurotologist, for his expert consultation and

mentorship. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

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This article was prepared by Paul Puchta, M.D., M.P.H.

You are the flight surgeon at a very active fighter base. Daylight Saving Time went into effect last weekend and you are still adjusting to it. Today you had a busy schedule and your last patient of the day is a 35-yr-old active duty aviator. The chart states that his appointment today is for seasonal allergies. You review his chart

and note that you have seen him for similar complications during the spring. It seems somewhat perplexing that he is having a new bout of allergies at this time of the year. Today his vital signs are

DOI: 10.3357/AMHP.4419.2016

unremarkable, with a blood pressure of 123/75 and heart rate of 85. You see the patient and discuss the issue of recurrent seasonal allergies and the proposed treatment. The patient seems very content. However, when you finish your encounter, he unexpectedly adds: "Doc, I have one more question for you. While I was having sex with my wife I ... um, well ... I haven't quite been myself and I was wondering if you could give me the blue pill." You recall that accurate history taking and physical examination have a 95% sensitivity but only a 50% specificity in determining the cause of erectile dysfunction (ED).<sup>4</sup>

### 1. What do you need to know about his overall medical condition at this time?

- A. Timing of onset of symptoms.
- B. Was it a nonsustained erection or failure to have any erection?
- C. Was the patient taking any medications either prescription or over the counter?
- D. Does the patient have nocturnal erections?
- E. All of the above.

### ANSWER/DISCUSSION

**1. E.** The importance of complete history taking in patients with ED cannot be stressed enough. The diagnosis of ED requires in-depth clinical evaluation as well as a sexual and psychosocial history. Comprehensive history taking will point the examiner in the direction of the root cause of clinical symptomatology. It is common for a flyer to come in with an unrelated chief complaint (here seasonal allergies during a nonallergy time of year). Rapid onset of ED would direct the examiner toward either psychogenic or trauma-related events. Nonsustained erections can be caused by anxiety or a venous leak, while complete loss of nocturnal erections directs the examiner toward vascular and/or neurological disease. Excessive alcohol consumption, a frequent cause of substance-induced ED, must also be ruled out.

The patient confirms three episodes in the past 2 wk when he was able to have an erection but was unable to maintain it. He denies relationship problems or a decrease in libido. He confirms having morning erections. However, he denies any history of cardiovascular diseases, diabetes, neurological disease, or recent trauma. Upon further inquiry he confirms increasing work-related stress. He seems uneasy discussing this subject and states that he is unable to provide more details due to the classified nature of his missions. On physical examination he has normal peripheral pulses, normal secondary sex characteristics, and normal male external genitalia.

### 2. Thoughts about the airman at this point?

- A. Investigate more about the work-related stress.
- B. Prescribe one of the phosphodiesterase type 5 (PDE-5) inhibitors.
- C. Evaluate for possible underlying causes, e.g., cardiovascular/diabetes.

### ANSWER/DISCUSSION

**2. C.** Even though it seems that this airman's issues are stress related, you need to rule out other mechanisms that can lead to sexual dysfunction in men: 1) loss or decreased sexual desire due to decreased testosterone, relationship issues, depression, or systemic illnesses; 2) ED due to vascular, neurological, hormonal, drug-induced, physical trauma, or psychogenic factors; and 3) ejaculatory disorders that include premature ejaculation, retarded ejaculation, and retrograde ejaculation. No history of recent or chronic illness in this airman indicates that we are likely dealing with the second group of disorders. In this case, the European Association of Urology guidelines for male sexual dysfunction recommend using the Minimal Diagnostic Evaluation Algorithm (basic work-up). For self-reporting patients, this algorithm includes medical and psychosexual history, focused physical examination, and laboratory tests.<sup>6</sup> Laboratory testing for ED may be sorted into four groups: blood tests, vascular assessment, sensory studies and nocturnal penile tumescence, and rigidity testing.

In this case, vascular and sensory causes were ruled out based on physical examination and unremarkable previous medical history. One has to remember that most hormonal dysfunctions responsible for ED revolve around the hypothalamic pituitary-gonadal axis and are associated with signs and symptoms related to decreased testosterone level and luteinizing hormone (LH), follicle-stimulating hormone (FSH), and prolactin disturbances. Other endocrine disorders that are associated with decreased libido or ED include hypo- and hyperthyroidism, adrenal insufficiency, and excess of adrenal corticosteroids. Your clinical findings at this time point toward a psychosomatic cause of his symptoms. However, you consider obtaining some labs to be complete.

### 3. What ancillary work-up is indicated at this point?

- A. Total serum testosterone level.
- B. Free serum testosterone level.
- C. Bioavailable testosterone level.
- D. FSH, LH, prolactin.
- E. No "gold standard" available.

### ANSWER/DISCUSSION

**3. E.** There is no laboratory gold standard for diagnosis of ED. Hormone level assays may be helpful in further evaluation of this patient. However, at this stage the nocturnal penile tumescence (NPT) test is more suitable. You try to explain the NPT to the aviator when he interrupts you and states: "Doc, I did some web research on my own and found info about the 'stamp test.' I completed it and the stamps were broken when I woke up in the morning. I guess it's a good sign." The NPT stamp test is a simple test used to evaluate nocturnal erections. A strip of four to six postage stamps is wrapped around the shaft of the penis at the base. In the morning the strip is checked for tearing or damage to the band of stamps. A torn strip indicates the presence of nocturnal erection.<sup>1</sup> You assure him that this is a good sign; nevertheless, additional investigation must be done to attain final diagnosis.

ED affects over 18 million men older than 20 in the United States.<sup>13</sup> It can be divided into organic and psychogenic impotence

with more than 10% of cases attributed to purely psychogenic factors.<sup>3</sup> Hypogonadism and other hormone disturbances are responsible for up to 47.5% of affected cases.<sup>9</sup> Patients with ED often have additional comorbidities such as cardiovascular disease, diabetes, and obesity.<sup>2</sup> Several studies indicated that patients referred to urology clinics with ED and hypogonadism were more likely to have decreased libido, hyperlipidemia, arterial disease, and psychological problems with their partner. The initial diagnosis of hypogonadism requires additional laboratory work-up that includes levels of LH and FSH. High levels of LH and/or FSH confirm primary hypogonadism, while low levels of LH and/or FSH confirm secondary hypogonadism. The American Urological Association recommends testosterone testing based on clinical assessment or failure of PDE-5 treatment. The European Urological Association, however, obligates measurements of bioavailable or free testosterone levels for all males with ED.<sup>6</sup> Testosterone therapy should be administered only to hypogonadal patients with clinical symptoms consistent with androgen deficiency and decreased testosterone levels. Patients receiving testosterone replacement therapy should be monitored to determine that normal serum testosterone was achieved and for potential adverse effects. Some men may experience erythrocytosis and exacerbation of symptoms related to sleep apnea and benign prostatic hyperplasia. Testosterone treatment of hypogonadal men has generally not been associated with increased cardiovascular risk.<sup>5</sup>

A week later, you receive the patient's laboratory results, which show total serum testosterone, free serum testosterone, LH, and FH all within normal limits. You discuss the lab results with your patient and confirm normal hormone levels. The patient confirms there are no changes in his intimate life. He states that he still is unable to have successful intercourse with his partner. He still believes that the "blue pill" would make a difference in his intimate life.

#### 4. What else can you do to help this patient at this time?

- A. Request a Urology consult.
- B. Request a Mental Health consult.
- C. Consider a magnetic resonance imaging (MRI) of his brain.
- D. A and B.

#### ANSWER/DISCUSSION

4. **D.** Any of the above actions are reasonable options depending on the working diagnosis. However, answers A and B are best, advocating for a combination approach. Utilizing a mental health specialist together with a urologist and a flight surgeon leads to better treatment outcomes. In this "one team" approach, the flight surgeon acts as an occupational medicine specialist who links urological and pharmacological management with mental health specialist treatment. Mental health specialists can identify emotional health concerns such as anxiety, depression, or post-traumatic stress disorder (PTSD) that may contribute to ED. He can also help both partners to understand the disorder and ensure that both partners have realistic expectations of ED treatment. MRI is appropriate if you suspect a brain tumor, such as prolactinoma, which is responsible for disruption of the reproductive system and hypogonadism. An MRI is not recommended in routine ED work-up.

#### 5. Which are true regarding pharmacological treatment with PDE-5 medications?

- A. PDE-5 inhibitors are the first line of treatment.
- B. They cause visual disturbances.
- C. Insufficient data exist on long-term effects.
- D. All of the above.

#### ANSWER/DISCUSSION

5. **D.** It is well recognized in literature that lifestyle modifying changes and PDE-5 inhibitors are the first line of treatment options offered to patients with ED.<sup>14</sup> Patients receiving PDE-5 inhibitors regardless of dose experience significant clinical improvements in erectile functioning compared to those receiving placebo. Clinical benefits were also observed in distinct subgroups of patients with depression and PTSD; however, one study reported that PDE-5 inhibitors were no better than placebo when treating PTSD-related ED.<sup>12</sup>

Overall, PDE-5 inhibitors are regarded as well-tolerated pharmaceuticals. Commonly observed side effects with PDE-5 inhibitors are related to its vasodilatory properties and are similar to those induced by nitrates and include headache, flushing, rhinitis, and dyspepsia. Sildenafil occasionally causes "blue vision" by cross-reaction with the PDE-6 inhibitor, which is present in the human retina. Vardenafil and tadalafil have been associated with rare reports of sudden hearing loss.<sup>7</sup> Clinical practice guidelines from the American College of Physicians recommend that the choice of PDE-5 inhibitor be based on patient preference, which includes cost, ease of use, and side effects.<sup>11</sup>

#### AEROMEDICAL DISPOSITION

You do not issue the "blue pill" to the aviator. However, you refer him to a mental health specialist. When you see him for his Periodic Health Assessment 6 mo later, he claims that his problems with ED have completely resolved and he does not need the medication any more. He also states, "Doc, it wasn't the plumbing that was not working. I was a little bit messed up in my head."

For the Air Force, Army, Navy, and Federal Aviation Administration, erectile dysfunction is not a disqualifying condition on its own. Aeromedical concerns regarding ED mainly pertain to the management via prescription medication or underlying medical issues that may cause ED. PDE-5 inhibitors can cause some disruptive symptoms, but are particularly concerning for aviators when considering changes in color vision. Federal Aviation Administration aeromedical regulations suggest grounding of aviators for five times the half-life or dosing interval of whichever medication they take.<sup>8</sup> The Air Force medical standards regarding ED require that aviators remove themselves from flying status after medication use [only sildenafil (Viagra) and vardenafil (Levitra) are approved for aircrew] for 24 h.\* Outside of treatment for true hypogonadism with hormone replacement, the Air Force Waiver Guide has no further recommendations

\* U.S. Air Force. Official Air Force aerospace medicine approved medications. Washington (DC): Department of the Air Force; 2014 Jan 9. [Accessed 15 Jan. 2015]. Available to those with access from <https://kx2.afms.mil/kj/kx4/FlightMedicine/Documents/Standards/MedList09JAN2014.doc>.

for ED.<sup>16</sup> U.S. Army regulations state that sildenafil is the preferred medication. Aviators may return to flying duties once they are free of side effects for two doses after starting the medication and after 8 h of the last dose (two half-life).<sup>15</sup> The Navy allows either sildenafil or vardenafil, and the regulations are the same as the Army's except aviators must wait for 12 h after the last dose to resume flying duties.<sup>10</sup>

**Puchta P. *You're the flight surgeon: erectile dysfunction*. *Aerosp Med Hum Perform*. 2016; 87(2):152–155.**

## ACKNOWLEDGMENTS

The author would like to thank Colonel (Dr.) Mark Hubner, U.S. Air Force School of Aerospace Medicine, Aeromedical Consult Service, Neuropsychiatry, Wright-Patterson Air Force Base, OH, for his professional and thorough review of this manuscript. The views expressed in this article are those of the author and do not necessarily reflect the official policy or position of the Air Force, the Department of Defense, or the U.S. Government.

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