

You're the Flight Surgeon

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You are the flight surgeon deployed with your F-15 squadron to the Southwest Asia theater in support of Operations Enduring and Iraqi Freedom. It is January and early in the conflict. The base medical clinic is just being populated and support personnel are still arriving. Your squadron flew a trans-Atlantic flight 5 d ago requiring en route refueling and stayed 72 h at a transient air base before proceeding to theater. A 40-yr-old male F-15 command pilot becomes acutely ill immediately after arriving in theater. He is brought to the medical tent by a fellow pilot by way of the squadron commander's car with complaints of new onset vertigo, nausea, vomiting, and unsteady gait. The pilot tells you that he had watery eyes, nasal discharge, and a cough that resolved a few days prior to his trans-Atlantic flight. He currently denies headache, visual disturbance, loss of hearing, tinnitus, ear pain, fullness or pressure, nasal discharge, weakness, numbness, slurred speech, memory loss, rash, or fever. He denies any use of medication except for zolpidem given for jet lag while at the transient air base. His symptoms began spontaneously after awakening and he begs you to make the room stop spinning.

1. What do you do next?

- Tell him to rest, drink plenty of fluid, and return to the clinic in 24 h if his symptoms do not subside.
- Obtain a comprehensive history and physical exam with the limited resources in your clinic.
- Call a supporting downtown hospital to discuss the case with a specialist.
- Arrange for aeromedical evacuation to a military hospital with specialty support.

ANSWER/DISCUSSION

1. B. Have the pilot accompany you to an exam room to obtain a comprehensive history and physical exam. After being the flight surgeon for the squadron for 12 mo, you are aware that pilots are reluctant to present to the flight surgeon's office with symptoms or conditions that they feel are minor. Due to the acuteness and severity of the symptoms, you, too, are concerned and feel it inappropriate to tell him to rest and return in the morning. You acknowledge the pilot's chief complaint of vertigo and know there are many office tests that can be performed to help elucidate the etiology of his symptoms. You have the capability to call a downtown

hospital for diagnostic support if the history and clinical exam warrant and keep this as a future option. You also know that aeromedical evacuation may take days to coordinate but is always an option if needed.

The pilot awoke early in the morning with vertigo and nausea. Upon standing, he was unsteady on his feet. He tried to go back to sleep but was unable, reporting his nausea became worse, causing him to vomit at least three times, which prompted him to seek medical attention. You know that his immunizations are up to date, as these were a requirement for deployment. He received both the anthrax and small pox vaccinations in the last 6 mo. Upon questioning, he is not aware of other pilots with similar symptoms who share his tent and denies any contact with sick family members prior to travel. He denies any medication use except for two doses of 10-mg zolpidem taken en route for circadian dysrhythmia. He further tells you that as a child he experienced motion sickness while traveling on long car rides, but denies any vertiginous symptoms after becoming an adult. He denies any otological surgery in childhood. He has no vascular risk factors. He describes severe constant vertigo that worsens with head movement. Physical exam reveals a Caucasian man in his forties with normal vital signs. Examination reveals no evidence of head trauma. Eye exam shows spontaneous left beating horizontal-torsional nystagmus unchanged in direction with a change in gaze. He is unable to tolerate head-thrust or Dix-Hallpike testing. His hearing is intact. Tympanic membranes demonstrate normal light reflexes, appropriate movement with Valsalva, and no evidence of pathology such as cholesteatoma or acute otitis media. A right leaning unsteady gait occurs with ambulation. Romberg testing with feet together and eyes closed shows a rightward lean. Balance is intact with feet apart and while sitting.

2. You consider the differential diagnoses of vertigo. Based on the history and physical exam, which differential diagnosis is the most likely?

- Ménière's disease.
- Vestibular neuritis.
- Perilymph fistula.
- Labyrinthitis.
- Benign paroxysmal positional vertigo.

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ANSWER/DISCUSSION

2. B. Symptoms of vestibular neuritis include spontaneous vertigo, nausea, vomiting, oscillopsia, and unsteady gait. It differs from labyrinthitis in that hearing is spared. Vestibular neuritis was first described in 1952 by Dix and Hallpike and has an incidence of 3.5 per 100,000.⁸ Many terms have been used in the literature to describe this constellation of symptoms, including vestibular neuronitis, acute viral labyrinthitis, epidemic vertigo, and vestibuloneuropathy.¹¹ The typical age of onset is between the fourth and seventh decades of life, with 30% of individuals reporting a cold-type illness prior to acquiring symptoms.⁷ Vestibular neuritis most commonly affects the superior labyrinth and is a diagnosis of exclusion.⁸ Comorbidities associated with vestibular neuritis in rank order include hypertension, diabetes mellitus, hyperlipidemia, and hypothyroidism.¹ Recent evidence suggests that symptoms may be due to the reactivation of latent herpes simplex virus type 1.⁸ Ménière's disease or endolymphatic hydrops is characterized by vertigo, tinnitus, and hearing loss. Symptoms can range from mild to severe and can occur chronically. Perilymph fistula may occur following head or barotrauma. Perforation of the tympanic membrane and unilateral hearing loss are often found. Recommended testing for perilymph fistula includes electronystagmography, audiography, and brain computed tomography (CT).³ Labyrinthitis is also acute and testing shows unilateral caloric hypoexcitability and moderate-to-severe ipsilateral sensorineural hearing loss.³ Benign paroxysmal positional vertigo is characterized by episodes of vertigo lasting less than 1 min, is provoked by sudden head movements, and is usually not associated with vomiting.

You have internet access and time to review the most recent literature on vertigo. You find current evidence reveals 93% of vertigo presenting to primary care clinics is diagnosed as benign paroxysmal positional vertigo, acute vestibular neuritis, or Ménière's disease.⁹ Vestibular neuritis is your top working diagnosis, as the patient's history and physical findings are consistent with the signs and symptoms of this disease. Your deployed location has the capability to perform basic laboratory tests such as glucose, complete blood count, and electrolytes. Diagnostic imaging is not available at your location and requires coordination with the supporting host nation hospital downtown. In addition, non-emergent transportation of any military member requires base authorization. You decide that diagnostic imaging is not indicated at this time; however, you review the criteria for imaging in case it is indicated later due to sustained vertigo, new onset headache, or focal neurological signs.

3. According to the American College of Radiology appropriateness criteria, which diagnostic test has the most evidence supporting its use in diagnosing vertigo originating either from the central or peripheral nervous system?

- A. CT temporal bone without contrast.
- B. CT head without contrast.
- C. CT head with contrast.
- D. Magnetic resonance imaging of the brain and internal auditory canal with and without contrast.

ANSWER/DISCUSSION

3. D. Magnetic resonance imaging of the brain and internal auditory canal with and without contrast is the most common imaging study ordered to evaluate patients with vertigo.² In patients with central vertigo and

suspected vertebral artery dissection, CT angiography or magnetic resonance angiography of the head and neck should also be ordered.² CT temporal bone without contrast is most sensitive in evaluating for conductive hearing loss and presurgical planning.² CT head with or without contrast is used to quickly aid in diagnosis and management of the trauma patient or evaluate for intracranial hemorrhage, hydrocephalus, tumor, or infection.

The pilot asks if you can make the nausea, vomiting, and spinning stop. He is lying very still on the examination table and afraid to move his head. You are aware that the symptoms of vestibular neuritis decrease gradually over the course of weeks and know that you must treat the acute symptoms. You have a limited selection of medications at your location, but have the capability to order specific medications that will be shipped from a military base in Germany. Medical supply shipments typically take between 72-96 h to arrive according to pharmacy and medical logistics personnel.

4. What are the short- and long-term evidence-based treatments for vestibular neuritis?

- A. Acute symptomatic treatment with antiemetics.
- B. Etiological treatment with corticosteroids and/or antivirals.
- C. Vestibular rehabilitation.
- D. All of the above.

ANSWER/DISCUSSION

4. D. Treatment of vestibular neuritis focuses on symptom relief, inflammation reduction with use of steroids, and vestibular rehabilitation. Antiemetics, antihistamines, anticholinergics, and benzodiazepines are typically used for acute symptomatic care. Symptomatic care should not extend beyond the initial acute phase, as experts believe that suppression of the vestibular system interferes with the central compensation response essential for recovery.⁸ Use of corticosteroids for etiological treatment is controversial, as long-term complete functional recovery has not been shown.⁸ Meta-analysis evaluating the efficacy of corticosteroid use showed complete caloric recovery at 1 mo, but not at 12 mo.⁵ Studies evaluating corticosteroids versus antivirals show methylprednisolone is more effective than methylprednisolone plus valacyclovir or valacyclovir alone.¹² Vestibular exercises are effective in reducing the duration of vestibular neuritis symptoms and improving gaze stability and vestibulospinal compensation; a home-based or formal rehabilitation program should be prescribed after the acute symptoms have subsided.⁶

The pilot receives intravenous antiemetics, hydration, and methylprednisolone while waiting in the clinic. You decide to admit him to the inpatient ward for observation given the acute and severe nature of his symptoms. After writing admission orders, you brief the hospital staff to notify you immediately of any new symptoms, including headache, fever, numbness, tingling, weakness, or dysarthria. You and the pilot both agree that the incapacitating nature of his symptoms precludes him from flying. Over the next several days, he continues to require fluids for hydration and antiemetics to control the nausea and vomiting. By hospital day five, the nausea and vomiting have ceased but he still complains of vertigo. He is tolerating fluids and medication orally and is stable enough to discharge. He asks you about his aeromedical disposition.

5. What do you tell him?

- A. Tell him he must be evaluated by a neurologist before he is cleared to fly.

- 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.⁸ 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.¹³ 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.¹⁰ The U.S. Army Aeromedical Policy Letters allow for waiver consideration of vertigo not caused by Ménière's disease.¹⁴ 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.⁴

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.

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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

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