

You're the Flight Surgeon

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You are a flight surgeon at one of the greatest fighter wings in the U.S. Air Force. Your next patient is a 36-yr-old active duty MQ-9 pilot (former F-15C Eagle Driver) who is scheduled for his annual Preventive Health Assessment. As you chit-chat, you find out he plans to return to the F-15 as soon as his "career broadening" remotely piloted aircraft tour concludes. During the examination, he tells you he has noticed some difficulty tracking objects coming at him, specifically mentioning the example of difficulty catching a football while throwing the ball around with his son. However, he informs you this "issue" has not impeded his ability to fly.

1. What do you do at this point?

- Tell him you are already 20 min behind so he will need to follow up at a later time for further evaluation.
- Nothing—tell him he's seeing things since review of his Preventive Health Assessment eye tests showed normal color vision, depth perception, and intraocular pressure and perfect 20/15 vision.
- Further question him regarding his concern and perform a focused eye examination.
- Complete a detailed psychiatric history with plans for immediate mental health referral.

ANSWER/DISCUSSION

1. C. The importance of a good history and physical cannot be overemphasized. It is a critical first step that assists in identifying disease while developing a sense of trust between patient and provider.² Specifically, inquire about the onset and timing of his symptoms, any actions that seem to alleviate or aggravate this tracking sensation, and any other associated symptoms (nausea, headaches, vision difficulties, coordination, weight loss, sensation of spinning, etc.).

Your medical training kicks in and you begin to ask specific, focused questions. He admits to worsening symptoms over a 3- to 4-mo period with intermittent short episodes of dizziness when looking to the left, but denies any other alleviating or aggravating movements. He denies all other symptoms, including vision difficulty, diplopia, speech difficulty, coordination, headache, or weakness. During your physical examination, you are shocked when you discover a

left lateral jerk nystagmus with extreme left gaze. He states that during your examination, while looking left, he experienced a short 2-s dizzy spell.

2. What's the next step?

- Proceed with full neurological examination.
- Order a magnetic resonance imaging (MRI) of the brain.
- Explain he will be placed on duties not to include flying until you have everything sorted out.
- All of the above.

ANSWER/DISCUSSION

2. D. Gaze-evoked nystagmus has two main etiologies: drug-induced or posterior fossa disease.¹ Medications that may induce nystagmus include anticonvulsants such as phenytoin or phenobarbital, sedatives, and tranquilizers.⁶ Diseases affecting the posterior fossa include neoplasms, trauma, vascular infarction, or demyelinating disorders.⁶ Completion of a full neurological examination will help determine if there are other subtle findings that may help delineate the etiology. An MRI will provide structural visualization and establish if a mass is present (MRI provides greater anatomical detail than computed tomography scan for intracranial lesions). Finally, this aviator should be placed in duties not to include flying status until further workup is complete.

Other than the discovered left lateral gaze nystagmus, the patient's full physical examination was unremarkable. He denies medication or supplement use and has no family history of demyelinating disease, cerebrovascular disease, or tumors. You obtain an MRI of the head, which shows a posterior fossa mass with mass effect on the spinal cord.

3. What do you do next?

- Leave the radiology report on your desk—you'll get to it next week.
- Call the patient and have him stop by the clinic as soon as he can to review and discuss his MRI result.

DOI: <https://doi.org/10.3357/AMHP.4825.2017>

- C. Call the nearest neurosurgeon, discuss the case, and request an urgent consult.
- D. B and C.

ANSWER/DISCUSSION

3. D. You are the flight surgeon, and informing your aviators and patients of critical laboratory and radiological values is your responsibility. By speaking with the pilot face-to-face, you build trust with him and, ultimately, the local flying community. Discussing your patient's case with the neurosurgeon beforehand will ensure you have the correct treatment options available to review with your patient when he presents to your clinic. Additionally, it ensures a smooth hand-off between the flight and operational medicine clinic and the neurosurgical staff.

Due to the mass effect on the spinal cord, the neurosurgeon counsels you to immediately send the pilot to the nearest medical center for hospital admission. The patient shows up to your office at 16:00 and you inform him of both the MRI results and the recommendation by the neurosurgeon for hospital admission. He follows your advice, is admitted to the hospital, and receives 1 wk of Decadron prior to undergoing surgical resection of the tumor via a suboccipital craniectomy and laminectomy. His tumor is histopathologically found to be a subependymoma.

4. What is a subependymoma?

- A. Malignant tumor with high likelihood of metastasis.
- B. Slow-growing, benign brain tumor.
- C. Secondary metastasis likely from bone or spinal cord.
- D. None of the above.

ANSWER/DISCUSSION

4. B. Subependymomas are rare, slow-growing benign brain tumors that generally produce symptoms from local mass effect or hydrocephalus such as headaches, vision changes, or difficulties with balance.^{4,10} Less commonly, they may present with seizures or focal neurological deficits.¹¹ Although histologically benign, subependymomas can at times secondarily seed to the cervical spinal cord.⁴ They account for approximately 0.5–1% of all intracranial neoplasms and most commonly arise in the fourth ventricle (50–60%), although the primary lesion can also be found in the lateral and third ventricles (30%) or spinal cord.^{10,12} Subependymomas are often found incidentally on autopsy or during brain imaging for other medical reasons.⁷ Symptoms may develop at any age and, if they appear, tend to be found in middle age or elderly patients after many years of slow growth.¹¹ Additionally, males are affected more often than females.⁵ Histologically, they are considered World Health Organization grade I tumors, signifying their benign nature and often long-term survival rate.⁸ Surgical resection is often curative and follow-up radiosurgery may be effective in managing local recurrences, which often are due to incomplete excision.¹¹

Your pilot does extremely well postoperatively with no complications. The neurosurgeon plans to follow him with examinations and MRIs every 6 mo for his first 2 yr. Assuming there are no issues or

recurrence, he then plans to move to annual follow-up examinations. The pilot returns to the flight and operational medicine clinic 6 wk postop to discuss his possibility of returning to flying status.

5. What do you do?

- A. Tell him to forget about it. He had a brain tumor and will never fly again.
- B. Review the neurosurgeon report and complete a full physical examination. You agree with the neurosurgical assessment, so you tell him he's good to go and return him to flight status.
- C. Inform him there is a possibility he could return to flying, but he had a significant medical diagnosis that requires observation to determine stability of his condition and reduce the risk of an adverse event.
- D. None of the above.

ANSWER/DISCUSSION

5. C. Normal neurological function is critical to aviation safety. Fine motor function, vision, and cognitive skills are only a few of the many activities expected of aviators. Not only can brain tumors decrease function, but they also carry the risk for recurrence as well as sudden incapacitation. Additionally, brain tumors and their various treatments carry an additional risk of seizure and disability. Per the Air Force Medical Standards Directory, any history or presence of malignant tumor, cyst, or cancer is considered disqualifying for aviation and special duties, as well as for retention.^{*} Before an individual is permitted to request a waiver to return to flight status, a Medical Evaluation Board must be completed to determine one's retention status as a member of the U.S. Air Force. If the member is returned to duty, a waiver may be considered to return to flying status if he or she has no identifiable, aeromedically significant side effects from the disease process and the treatment modality.¹⁴ All cases must be submitted to the U.S. Air Force Aeromedical Consult Service for review prior to waiver action, and the U.S. Air Force will not consider waivers for any tumor within 6 mo from ceasing definitive therapy.¹⁴ The U.S. Army and Navy do not grant waivers to individuals with a brain tumor, irrespective of therapeutic outcome.^{9,13} The Federal Aviation Administration will consider benign, supratentorial tumors for waiver after a minimum of 1 yr.³

In this case, a Medical Evaluation Board was completed and the patient was approved for continued retention in the U.S. Air Force. The individual was evaluated by the Aeromedical Consult Service 2 yr postoperatively. Complete neuropsychological testing was accomplished in addition to evaluation by neurology with review from ophthalmology. Given the benign nature of the tumor, his continued excellent recovery without recurrence, and the low risk of sudden, severe symptom development, he was granted a short-term waiver permitting return to remotely piloted aircraft with plans for follow-up in 1 yr.

^{*} U.S. Air Force. Section O: tumors and malignancies, USAF medical standards, O6. In: Medical standards directory; 2016:52. [Accessed 29 Oct. 2016]. Available from <https://kx2.afms.mil/kj/kx4/FlightMedicine/Pages/AFMSA%20Flight%20Medicine%20Branch%20Directory.aspx> to those with access.

Brough B. *You're the flight surgeon: subependymoma.* *Aerosp Med Hum Perform.* 2017; 88(8):794–796.

ACKNOWLEDGMENTS

The author would like to thank Colonel Roger Hesselbrock, Neurology Consultant, U.S. Air Force School of Aerospace Medicine, Aeromedical Consult Service, for his excellent teaching and professional 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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A 32-yr-old African-American male active duty Air Force air traffic controller (ATC), with no significant past medical history, presents to the Flight and Operational Medicine Clinic (FOMC) with 4–5 d of nonproductive cough, subjective fever, malaise, and fatigue. He was evaluated in FOMC by the on-duty flight surgeon. On interview, his history of this clinical episode is rather benign, with symptoms gradually worsening over the past 5 d and with no reported exposures or contacts other than his 2-yr-old daughter, who attends the Child Development Center and has occasional upper respiratory infections. He is originally from Georgia, but transferred to an Air Force base in the U.S. southwest region last year where he and his family purchased a new home in a growing housing development. He denies recent travel history. He describes his past medical history as only a few upper respiratory infections, with the last occurrence 1 yr ago, and some minor musculoskeletal back pain that resolved 4 yr ago. Past surgical history, family history, and social history are noncontributory. He takes a daily multivitamin and fish oil, but no prescribed medications, and reports no known drug allergies. On review of systems, the ATC reports the aforementioned complaints, along with a few minor headaches that accompany his fever for the past few days, and decreased appetite, but denies rashes, gastrointestinal symptoms, or genitourinary symptoms. On clinical exam, the ATC is found to be afebrile, with normal vital signs, normal lung exam, and

a benign remainder of the clinical exam. Conservative treatment is prescribed, with ibuprofen for pain and guaifenesin for cough, and the patient is placed on duties not including controlling (DNIC) status for 5 d. The patient is instructed to return to the FOMC for any worsening symptoms or within the 5-d interval for return to status when symptoms are improved. However, after 3 d, the patient returns to the clinic complaining of continued symptoms and describes no relief from the prescribed medication therapy.

1. Given this patient's clinical presentation and history, what is the next appropriate course of action?

- A. Reassure the patient that this is likely a viral etiology and may take more time to improve.
- B. Repeat the patient's history and clinical exam, repeat vital signs, and investigate further any sick contacts or exposures not previously reported.
- C. Redirect the patient immediately to the Radiology Clinic for a contrasted chest computed tomography (CT) scan.
- D. Explain to the patient that he will be rechecked upon follow-up tomorrow morning during the clinic's sick-call hours.

DOI: <https://doi.org/10.3357/AMHP.4837.2017>