

EPILEPSY

CASE REPORT, BY JEFFREY S. WOOLFORD, MD, MPH

Epilepsy is diagnosed after two unprovoked seizures occur greater than 24 hours apart.¹ This condition is wholly incompatible with aviation duties and is one of the 15 disqualifying medical conditions per 14 CFR part 67.² However, under the provisions of Authorization of Special Issuance, the FAA may exercise discretionary authority and issue a third-class airman medical certificate.³

History

A 27-YR-OLD MALE PILOT walks into your clinic with his wife, and drops a loosely assorted pile of papers on your desk, including his second-class medical certificate with your signature on it. He extends his hand to shake yours, and blurts, "I'm going to need some help here!" You open his file and your eyes are immediately drawn to the provisional diagnosis of "seizure" across the top of an emergency room discharge report dated two days prior. You remember issuing him his medical certificate last summer but don't recall any seizure concern listed on his MedXPress FAA Form 8500-8. You ask him to take a seat and, without prompting, he begins to chronicle his recent medical history.

He explains the first time he had a seizure-like experience was Thanksgiving night after enjoying a few pints of beer. Although he doesn't recall the details of the event, his wife explains that she had witnessed what she describes as his "uncontrollable shaking" while she was turning-down the bed. She says his eyes were open, but he was unresponsive to her voice. After several minutes, his tremor stopped, and although he regained his composure, he appeared mildly confused. Due to his complaint of worsening left shoulder pain and noting a small trickle of blood in the corner of his mouth, she insisted on taking him to the hospital.

Following a comprehensive physical and neurological examination, including laboratory studies that revealed a blood alcohol concentration of 0.02 g/dL, the attending physician diagnosed a provoked seizure, likely due to the alcohol. He was discharged home without medication. Assuming it was a one-time event, he thought it unnecessary to inform you, since he hadn't been diagnosed with epilepsy and required no further evaluation. However, two days later, he experienced a similar event, and he hadn't consumed any alcohol beforehand. He was seen in a different emergency department and was started on Keppra (levetiracetam) for seizure prophylaxis. He was discharged with instructions to follow up with his primary care manager with a presumptive diagnosis of epilepsy. As his aeromedical examiner, he now thinks you should know what is happening.

Aeromedical Concerns

Key considerations when addressing any aeromedical neurologic concern includes the degree of incapacitation and the unpredictability of such occurrence. The diagnosis of epilepsy is wholly incompatible with aviation duties in both respects, and most definitely constitutes an unacceptable safety risk. For

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EPILEPSY ETIOLOGY

Seizures are caused by excessive neuronal electrical activity that ensues when a genetically determined threshold is exceeded. Epilepsy is a chronic convulsive disorder characterized by two or more unprovoked seizures occurring greater than 24 hours apart and has a cumulative incidence between 1.3% and 3.1% by age 80.¹ The diagnosis is idiopathic in two-thirds of patients, therefore a neurological history assessment is the primary means of confirming epilepsy.¹ A careful reconstruction of preceding events helps to ascertain whether the seizures were provoked or unprovoked in nature, a critical discriminator. Attention should be focused on assessing sleep status, medication/illicit drug use, and alcohol intake. In combination or singularly, these elements have the potential to lower the seizure threshold.

Necessary studies following a suspected seizure require magnetic resonance imaging of the brain, with and without gadolinium, as well as wake and sleeping sleep-deprived electroencephalogram (EEG) studies.⁴ In the case of an initial focal presentation, it is critical that potential precipitating factors, including a gliotic scar, tumor, or abscess, be identified if present.¹

A generalized tonic-clonic seizure is characterized as an upper-extremity tonic episode lasting 10 to 20 seconds, followed by a brief period of flexion, then muscular rigidity of raised externally rotated arms abducted with partially flexed elbows. Back, neck, arm, and leg extension then follows, accompanied by apnea and cyanosis, with eyes open and deviated upward. In some cases, expired air results in an "epileptic cry" as it passes partially obstructed vocal cords. Tongue biting and urinary incontinence may occur. Finally, a clonic phase follows with characteristic alternating tone and relaxation, declining in frequency until cessation. Additionally, generalized seizures are followed by a postictal state, with subsequent confusion and often amnesia of the event.¹

While a definitive diagnosis of generalized seizure can be made with a positive EEG demonstrating epileptiform discharges, negative (normal) readings do not rule out such a diagnosis, as nearly 40% of individuals with confirmed epilepsy demonstrate normal EEG studies throughout their lives. It is important to remember that a single seizure episode does not establish the diagnosis of epilepsy. A definitive diagnosis requires two or more unprovoked events. However, it is worth noting that recurrence risk from unprovoked seizures ranges from 26% to 33% over 5 years.¹

aeromedical purposes, any seizure type that results in serial events is adequate for the diagnosis of epilepsy; whether they are general, simple-partial, or complex-partial in etiology.¹

As his aeromedical examiner, you know epilepsy is cause for denial as one of the 15 disqualifying medical conditions, and you are responsible for informing him of his permanent disqualification from flying duties. However, you might want to share with him that under the provisions of Authorization of Special Issuance, the FAA may exercise discretionary authority and issue a third-class airman medical certificate—if the airman remains seizure-free for 10 years and does not require anticonvulsant medication for at least three years before being considered for medical re-certification.³ Of note, the FAA will not permit the use of antiseizure medications to treat any medical condition, as their potential side-effects are incompatible with flying.⁵

Outcome

Epilepsy is a disqualifying medical condition, and you can expect it will be a difficult discussion. After explaining the reason for his disqualification, you should retain the airman's now invalid medical certificate, and notify the Civil Aerospace Medical Institute of his epilepsy diagnosis requiring medication prophylaxis. Make certain to include relevant medical records pertaining to history and treatment, and a current status report. Finally, encourage the applicant to return when he is eligible for waiver consideration under the provisions of Authorization of Special Issuance.

This case report is based on an article Dr. Wolford prepared for the Aerospace Medical Association publication, Aerospace Medical Performance.⁶—Ed.

References

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About the Author

Jeffrey S. Woolford, MD, MPH, MAJ, USAF, MC, was a resident in aerospace medicine when he wrote this case report at the Civil Aerospace Medical Institute.

FEDERAL AIR SURGEON'S MEDICAL BULLETIN EDITOR RETIRES

By MELCHOR J. ANTUÑANO, MD, MS

I had the pleasure of meeting **Mike Wayda** when I was hired as Manager of the Aerospace Medical Education Division of the FAA Civil Aerospace Medical Institute (CAMI) in July of 1992. Since then, it has been a great opportunity to work with Mike, who is a detail-oriented individual and very passionate about his job as Writer/Editor.

Mike has been responsible for coordinating the development and publication of the quarterly *Federal Air Surgeon's Medical Bulletin*, Office of Aerospace Medicine research technical reports, educational aeromedical safety brochures, and other educational materials used to disseminate medical information to promote aerospace safety. Mike has used his skills to make sure all CAMI publications have a great style, a highly professional appearance, and an appropriate knowledge level for the target populations. He ensures the information provided (in many cases, very technical in nature) is accurate, concise, and understandable.

Over the years, hundreds of thousands of copies of these publications and educational materials have been distributed among personnel in the aerospace community both nationally and internationally. In addition to his duties as writer/editor, Mike has also assisted in other tasks utilizing his skills in photography and artistic composition.

Mike has also been involved in the review and editing of technical and professional articles submitted by CAMI researchers, scientists, and other subject-matter experts for publication in the peer-reviewed literature or for public presentation at multiple scientific venues. He has always strived for high quality in everything he works on and this has been publicly recognized with multiple awards.

Thanks to Mike's hard work, attention to detail, commitment to excellence, team work, and passion for his job, the Civil Aerospace Medical Institute, the FAA Office of Aerospace Medicine, and the FAA as a whole have been the beneficiaries of a positive public image based on the high quality of the publications he has edited and produced.

Mike has decided that, after 26 years as editor, it is time to retire. He will be greatly missed by the many of us who benefited from his expertise as a writer and editor. On behalf of everybody at CAMI, I express to Mike our most sincere and heartfelt appreciation for his many years of dedication in support of our programs. We wish him the best in his retirement!



Dr. Antuñano is the Director, FAA Civil Aerospace Medical Institute.