



Federal Air Surgeon's Medical Bulletin



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Aviation Safety Through Aerospace Medicine
For FAA Aviation Medical Examiners, Office of Aerospace Medicine Personnel,
Flight Standards Inspectors, and Other Aviation Professionals.

U.S. Department of Transportation
Federal Aviation Administration



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WAKE UP!!

Fatigue, Poor Sleep Affect Safety

By Fred Tilton, MD

Hello, everyone, and welcome to summer.

“Wake up!” is not what one wants to hear on the flight deck.

A former airline pilot recently told me this story about one of his missions. He and his crew were completing a round-robin trip with several intermediate stops that had taken up most of their crew duty day. This was the third day in a row that he and his copilot had flown. They had left their home domicile in the late afternoon, so they had been up several hours before their departure.

It was approximately 3:00 a.m., so they were returning at the worst possible time with respect to their circadian rhythm cycle, and they were exhausted. They had configured the airplane for landing. The autopilot was engaged, and they were flying a coupled ILS approach. The pilot told me he woke up when the auto-throttles retarded at the beginning of the final descent to the airport.

He looked over to discover that his copilot was fast asleep.

Fortunately, the story has a happy ending. He yelled at his co-pilot to wake up, and they completed an uneventful landing. Everyone went home safely to their families, and no one outside of the flight deck was ever aware of these events.

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In Memoriam

Dr. **Margaret Dennis Smith**, a dedicated pilot and Aviation Medical Examiner since 1994, tragically passed away in a fatal aircraft accident involving her single-engine Cirrus SR22 on Monday July 5, 2010. She was piloting her plane on a trip from Plattsburgh, N.Y., to her home base in New Jersey, along with two other family members, who also died in the accident.



FAA Photo by Jeff Revock

She was an accomplished rheumatologist, educator, avid flyer and talented AME. Few will impart to others as much as Dr. Margaret Smith. Her devotion to her family, colleagues, patients, and airmen was immense.

Dr. Smith was both a Senior AME and Human Intervention Motivation Study (HIMS) program sponsor for the Federal Aviation Administration. Her love of aviation was deep and committed. Dr. Smith found the time to make flying a significant part of her life. In many ways, she represented the true spirit of American medicine. Her extraordinary kindness and professionalism have been a great benefit to the health and well-being of our pilot community.

Dr. Smith was Senior Associate Dean and Professor of Clinical Medicine at New York Medical College, as well as the Program Director for Internal Medicine at St. Vincent's Hospital in Manhattan, N.Y.

She was a distinguished physician, professor, and program director for residents at St. Vincent's Hospital.

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Obviously, a similar set of circumstances could have ended in disaster. The aviation community is well aware that fatigue can be a major safety issue. The Federal Aviation Administration has drafted a notice of proposed rule-making on pilot flight duty and rest. It has been forwarded to the Department of Transportation for review and clearance, and I expect that it will be published for comment in the Federal Register later this year.

Research is also being done to identify what else can be done to combat fatigue and make flying even safer.

These projects are very important, and I am sure that they will help to enhance the safety of the national airspace in the future.

However, I want to let you know that the Office of Aerospace Medicine is working on a project that I believe will



help to mitigate one cause of fatigue in our pilot population. We are developing initiatives to improve our ability to identify and assure appropriate follow-up for airmen who are suffering from obstructive sleep apnea (OSA).

Obstructive sleep apnea risk varies with respect to gender, age, and body mass index (BMI). It is more common in males, and the more obese an individual is the more likely he or she is to suffer from OSA. The evidence is clear that OSA is markedly under-diagnosed and therefore left untreated.

The National Transportation Safety Board has also cited several incidents where fatigue and OSA were considered to be contributing factors in incidents. A preliminary literature review revealed:

- Some of the high-risk criteria for OSA are: obesity; new onset hypertension or hypertension that is uncontrolled, or that requires two or more medications for control; and type 2 diabetes.
- Loud snoring is an indicator of OSA.
- It is fairly easy to screen for OSA.
- OSA causes fatigue and daytime sleepiness.

Analysis of the Civil Aerospace Medical Institute 2009 medical certification database indicates that 0.39 percent of over age-20 pilots have a diagnosis of OSA. So, it appears that there are a significant number of pilots with unrecognized OSA because the prevalence of OSA in the general population varies from 2.0 to 7.5 percent.

I hope you will agree that fatigue is a safety risk factor and that it is very important to do all we can to mitigate the risk. I hope that you will also agree that untreated OSA is a fatigue risk, and there are probably a significant number of undiagnosed pilots who should be receiving treatment.

Therefore, we have added an OSA lecture to the AME seminar curriculum, and we have developed an OSA brochure (see article, page 8). In the coming months, we will be giving OSA increased emphasis. These are some of the other things you may see:

- Enhanced guidance for pilots, employers, and physicians regarding the identification and treatment of individuals at high risk.
- Modification of the AME Guide to add a BMI calculator and to include questions regarding risk factors and/or a history of OSA.
- Addition of a BMI calculator to the Airman Medical Certification Subsystem.
- Screening requirements for pilots at high risk of OSA.
- Required treatment and follow-up for individuals with OSA.

I believe these initiatives are very important. You can help by taking a couple of extra minutes to assess your pilots' OSA risk. Ask them if they snore or if they experience daytime sleepiness. If they answer *yes* or if they are hypertensive and have a high BMI, it is possible that they are suffering from OSA. Talk to them about OSA and consider recommending that they see a specialist for further evaluation.

If it turns out they have OSA and receive proper treatment, they will most likely come back and thank you because they will feel so much better.

And, who knows? it is possible that these simple measures may help to prevent the next accident.

Thanks for "listening," and thanks again for all you do for us and your airmen.

—Fred

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Policies and Unacceptable Medications

Since the most common error that an aviation medical examiner makes is placing an airman on a medication that is unacceptable, I thought I would spend the next several columns going over “policies” and specific medications that are unacceptable to the FAA.

Those of you who have heard me speak at seminars know that when you want to decide whether a medication is acceptable or not, you should first consider the medical condition that caused the need for it. For example, if an airman has osteoarthritic knees and the treating physician places the airman on Ultram (tramadol), this would not be acceptable. However, if the physician prescribed the non-steroidal anti-inflammatory Naprosyn (naproxen), that would be fine. My concern as an AME would be: Does the airman have the range of motion and strength to manipulate the rudder controls?

Another guideline you should consider is that, unless the medication is in a category of medications that we already accept, a medication in a new category or even a medication that has a slightly different mechanism of action that has some different side effects will not be considered by the FAA until one year after Food and Drug Administration approval. So, for example, consider beta-blockers. If a new one were approved by the FDA, more than likely it would be acceptable and allowed upon release. We want to see what the effects of a medication are on the general population before considering it for approval.

The FAA will not approve a medication just at the request of a pharmaceutical company. We will consider a new medication if we start seeing its use in our aviators or if one of the pilot advocacy organizations requests our review because some of their clients

Certification Update

Information About Current Issues



By Warren S. Silberman, DO, MPH

have asked about the medication or treatment.

If we discover side effects that are incompatible with aviation duties after we accept a medication, we will re-review our policy, check the computer database to see how many airmen of each class reported taking the medication, and perhaps even change the drug's acceptance. A recent example is the medication Chantix (varenicline), the non-nicotine drug used for smoking cessation. When the news broke that some Chantix users had demonstrated undesirable behavioral changes—hostility, agitation, depressed mood, suicidal thoughts or actions—while using the medication to help them quit smoking and that some people had these symptoms when they began taking Chantix, and others developed them after several weeks of treatment or after stopping Chantix, we convened our Pharmacy and Therapeutics Committee. The group agreed that these effects were not compatible with the safety of flight and notified all the airmen that were taking Chantix to cease its use or not fly while they were undergoing withdrawal.

Dosing Interval

One last policy point. Up until the past year, if an airman had taken an unacceptable medication, we recommended waiting for two dosage intervals before flying. We are now reviewing our policy. Our exceptional

Bioaeronautical Sciences Research Laboratory at the Civil Aerospace Medical Institute, under the leadership of Dr. **Dennis Canfield**, is performing research to see if they can determine the most appropriate dosing interval. In the meantime, we have changed this to five dosage intervals. In other words, if the directions on the label say to take the medication every six hours, the pilot should wait at least 30 hours after taking the last dose to fly.

Specific Medications

Antihistamines. Let's begin our discussion of medications with the antihistamines. The FAA does not accept the use of sedating antihistamines. We do not accept the use of Benadryl (diphenhydramine) and Zyrtec (cetirizine), which are two of the more commonly prescribed drugs. We also do not accept Astelin (azelastine), which is a nasal spray and interestingly, a sedating antihistamine. We do accept the use of Claritin (loratadine) and Clarinex (desloratadine), which are non-sedating. Even though we realize that informing the airman not to take his/her sedating antihistamine for five dosing intervals (to be legally able to fly) may be the improper treatment for a particular condition, we would accept this statement in block #60 of the FAA medical exam. That is, if we see that the airman is taking an unacceptable medication but the AME noted in Block 60 of our exam form that the airman was informed not to take the medication for let's say 48 hours prior to flight, we would not deny the airman for taking an unacceptable medication. *This disclaimer only applies to antihistamines.*

Selective serotonin reuptake inhibitors. I hope everyone has become familiar with our new policy on antidepressant medications (www.faa.gov/licenses_certificates/medical_certification/specialissuance/antidepressants/). We currently only will allow the long-term use of four SSRI medications. They are Prozac (fluoxetine), Zoloft (sertraline), Celexa

Continued on page 4

Dr. Silberman manages the Aerospace Medical Certification Division.

Certification Update from page 3

(citalopram), and Lexapro (escitalopram). The airman will have to request special issuance and provide the FAA with a workup, as described at our Web site (above). An airman may still be able to fly 90 days after discontinuing the use of any antidepressant, once we have a chance to review the medical history and a detailed, current status report provided by the treating physician. Recall that it is the medical condition first, not the treatment, when making a determination about a therapy!

Antiepileptics. We do not accept the use of antiepileptic (antiseizure) medications as treatment for any medical condition. These medications have side-effects that are incompatible with flying. An example here might be the use of Neurontin (gabapentin) in the treatment of a neuropathy. We do not accept these medications because a seizure or epilepsy is obviously a condition that is not acceptable for flight. These medications also have side effects that are incompatible with flying.

Antispasmodics. The use of antispasmodics for diarrhea, abdominal cramping, etc. are not acceptable. Some examples of such medications are Bentyl (dicyclomine), Levsin (hyoscyamine), Librax (chlordiazepoxide and clidinium), and

Lomotil (diphenoxylate and atropine). The medication Imodium (loperamide) is acceptable, but please inform us why the medication is being used, especially if the airman is taking more than two tablets a day. This would be another example of the condition making the determination.

Antihypertensives. Antihypertensive medications are seen regularly by us, as they are the most common medical condition we accept. There are more than 37,000 hypertensive airmen flying that are being treated with medications. Currently, there are six medications we do not accept: reserpine, alpha methyl dopa, guanadrel, guanethidine, guanabenz, and clonidine.

Alpha-blockers. In the past year, we have been reconsidering the use of alpha-blocking medications and are currently not accepting the use of Catapres (clonidine). We are still discussing the other alpha-blockers and have not made a final determination. Those that are being used to promote urine flow in men with prostatism are still acceptable. Examples are Cardura (doxazosin), Hytrin (terazosin), and Flomax (tamsulosin).

That is all for now. Be sure to read the next issue for a continuation of this series on medications. →

Three AAM Staff Receive Industry Awards

The Aerospace Medical Association (AsMA), representing physicians and medical professionals with knowledge of the flight environment, presented its annual awards on May 13 in Phoenix, Ariz.

“This year our FAA folks cleaned up,” said Dr. **James Fraser**, Deputy Federal Air Surgeon.

Winners are: Dr. **Melchor Antuñano**, who received the Louis H. Bauer Founders Award for his internationally recognized expertise in aerospace medicine. Dr. Antuñano, director of the FAA’s Civil Aerospace Medical Institute, has led teams of aeromedical specialists in the generation, administration, and promulgation of both national and international aeromedical planning and policy, and he holds senior leadership positions with numerous international aeromedical organizations.



Dr. **Warren Silberman** received the Theodore C. Lyster Award for his “outstanding achievement in the general field of aerospace medicine.” He was cited for having “significantly improved civil aeromedical certification policies and practices for pilots of all classes through his medical training and administrative skills.”



Dr. **G.J. Salazar** received the John A. Tamisiea Award for his “outstanding contributions to aviation medicine in its application to the general aviation field.” Dr. Salazar is the Southwest Regional Flight Surgeon and is also responsible for the development of the night vision goggle orientation facility at the Civil Aerospace Medical Institute.

CAMI Video Wins Telly Award

The Civil Aerospace Medical Institute earned the television industry’s equivalent of an Academy Award for its “Stress in Aviation” video. CAMI’s Airman Education Team’s video won a bronze award in the Employee Communication category from the 31st Annual Telly Awards. A collaboration with the FAA’s Media Solutions team, the video describes the causes of stress in the human body, the aviation environment, and how to better cope with these stresses.

The high-definition video is the third in a planned ten-part series on human factors. The fourth video, “Risk Management in Aviation,” was just released.

“Our mission is ‘safety through education,’ and the videos reinforce what we teach in our Crew Resource Management Program,” said team member **J.R. Brown**. “We’ve already made 32 videos with Media Solutions, and we give away over 5,000 free DVDs each year, or anyone can download them from our Web site.” To view the videos, go to www.faa.gov/library/online%5Flibraries/aerospace%5Fmedicine/aircrew/hf%5Fvideos/.

Vision Standards

Dear Editor,

The [online] AME Guide [www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/app_process/exam_tech/item51/et/] says: “Near visual acuity and intermediate visual acuity, if the latter is required, are determined for each eye separately and for both eyes together. Test values are recorded both with and without corrective glasses/lenses when either are worn or required to meet the standards. If the applicant is unable to meet the intermediate acuity standard unaided, then he/she is tested using each of the corrective lenses or glasses otherwise needed by that person to meet distant and/or near visual acuity standards. If the aided acuity meets the standard using any of the lenses or glasses, the findings are recorded, and the certificate appropriately limited. If an applicant has no lenses that bring intermediate and/or near visual acuity to the required standards, or better, in each eye, no certificate may be issued, and the applicant is referred to an eye specialist for appropriate visual evaluation and correction.”

I thought things changed so that you do not have to check vision with and without corrective lenses. Do we really have to remove the corrective lenses (contacts) when checking vision?

Thanks,

Joseph Kearns, MD
Moses Lake, Washington

Dear Dr. Kearns,

You do not need to check your pilots without correction for any of the visual acuities, but we must have the values for each eye separately and bilaterally. If they do not meet standards in either eye, have the airman complete a Form 8500-7. If he/she still does not meet standards, you will need to call us, as we will have to give the airman a request for a medical flight test. Generally, we have the AME issue a medical certificate with the restriction VALID FOR STUDENT PILOT PURPOSES ONLY. That allows them to practice until they can take a medical flight test for a SODA. If the airman has a great deal of flight experience and the visual acuity is not way out of standards, we may even issue a SODA based on operational experience.

Warren S. Silberman, DO
Manager, Aerospace Medical Certification Division



Medications List Needed

Dear Editor,

I have been an AME since 1996. I take this position very seriously and take some pride in that I try to do a very good job in doing it and not have casual sloppy work done. I would think this attitude is both good for our pilots and AMCD [Aerospace Medical Certification Division]. It is very hard to keep up with all the medications that can affect our pilot's medicals. I admit I have made errors in not seeing some medications that were not approved for some of my pilots then requiring more work for AMCD, the pilots, and myself. I recently spoke to my Regional Flight Surgeon's office re a medication status for flying when [name in the] Great Lakes Office had a reference for meds and was able to assist me. My question is then, why can there not be a medications directory/list of unapproved medications accessible to us as AMEs to assist us via computer while we are doing the airman exams? Once the directory is started it wouldn't be that difficult to update periodically as time and new drugs came along. A directory easily accessible would in the long run save a lot of time for everyone. I always feel like a failure when I do not appreciate an unacceptable medication, and I do not like feeling as though my AME work is less than perfect.

Gary Swann, DO
Maumee, Ohio

Dear Dr. Swann,

Aeromedical guidance about specific medications or classes of medications can be found in the Pharmaceuticals section of the AME Guide (www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/pharm/). Unacceptable medications can be found within the hyperlinks in this section. To make this information easier to find, we are adding a new item to the Pharmaceuticals section – tentatively titled “Disqualifying Medications.” This will summarize the medications for which you must defer. Look for it in the AME Guide in the coming month. In the meantime, please see Dr. Silberman's “Certification Update” column in this issue of the *Federal Air Surgeon's Medical Bulletin* [page 3], “Policies and Unacceptable Medications.”

Arleen Saenger, MD
Manager, Aeromedical Standards and Policy Branch

Medical Certification for Pilots With Cystic Fibrosis

Case Report, by Raymond J. Clydesdale, DO, MPH

The average life expectancy for cystic fibrosis patients has gone up dramatically over the last few decades. As such, cystic fibrosis patients are exploring opportunities once unimaginable. Therefore, it is reasonable to expect an increasing number of cystic fibrosis patients to seek FAA medical certificates. The AME must carefully weigh the aeromedical risks for this unique population. This article presents one such young applicant seeking a third-class student pilot's medical certificate.

History

In the summer of 2009, an 18-year-old male applied for a third-class medical certificate at his local aviation medical examiner's office. The young man's clinical history revealed the chronic and normally deteriorating condition of cystic fibrosis. The applicant was accompanied by his mother who emphatically stated to the AME that she fully supported her son's endeavors and that cystic fibrosis had not restricted any of his physical activities (to include long-distance running on the high school track team).

The astute AME completed the unremarkable physical exam and dutifully annotated the applicant's medication history: Flonase, two sprays daily; Miralax, one capful daily, Albuterol nebulizer, three times a day; ADEKS, two pills daily; five Pancrecarb MS-16 with meals and three with snacks; Ursodiol, 300mg each morning and 600mg each evening, MVI daily; and Dornase Alfa (Pulmozyme) daily. The applicant was then instructed to provide further pertinent medical information in the form of a narrative from his treating pulmonologist. The narrative was to include a complete medical history (hospitalizations, procedures, chest X-ray, and an evaluation of pulmonary function tests). An overall characterization of his lung function and prognosis for the near future would complete the exam.

The Class-3 applicant completed the requirements with a favorable letter from his treating pulmonologist, who described the young man's cystic fibrosis as "mild." His chest X-ray revealed no

significant bronchiectasis. Pulmonary function tests (PFTs) were conducted pre- and post-bronchodilator. FEV1 and FVC/FEV1 were all approximately 110% of predicted.

Aeromedical Concerns

The Cystic Fibrosis Foundation (CFF) warns cystic fibrosis patients that unless they have no lung disease at all, they should "avoid jobs or activities that expose you to changing atmospheric conditions (e.g., flying airplanes, scuba diving)." The CFF specifically warns patients about hypoxia and the dangers of blebs (citing pneumothorax as a concern) (1). Intuitively, the risk of sudden incapacitation from a ruptured bleb would be foremost on an aviation medical examiner's mind. A close second would be the risk of a more subtle, hypoxia-induced incapacitation from remodeled pulmonary airways.

Spontaneous pneumothorax is common for cystic fibrosis patients, occurring in one of 167 patients per year. It typically occurs in older patients and those with more severe airway disease (2). Several studies performed in the 1960s were designed to evaluate the behavior of blebs and bullae when exposed to rapid atmospheric changes. Only one bleb was noted to increase in size, and none of the 19 patients experienced a pneumothorax (3). However, the studies were limited by the technology of the day, and there are clinical data that suggest the risk is real. In a review of spontaneous pneumothoraces in Air Force aviators, there was a clear predilection for occurrence during altitude chamber training, with nearly all happening just after rapid decompression

CYSTIC FIBROSIS

Cystic fibrosis is a life-threatening, hereditary disease that affects approximately 30,000 Americans. The disease is characterized by a build up of mucus in the body's organs, most notably the lungs and pancreas.

As mucus continues to accumulate in the lungs, clearance becomes extremely difficult. Airways can become inflamed and infected, leading to distorted airways, poor air exchange, and ultimately, premature death.

The common defect is in the functional capacity of cystic fibrosis transmembrane conductance regulator (CFTR) protein. The CFTR protein acts as a channel connecting cellular cytoplasm to the surrounding extracellular fluid. A thicker mucus is left to accumulate, as chloride ions are unable to traverse the CFTR channel. The ciliated cells of the bronchial epithelium are unable to move freely in this more viscous environment, causing cystic fibrosis patients to feel like they are "trying to cough up paint."

Several genetic mutations have been found to cause a defective CFTR protein. The good news is that cystic fibrosis patients are living longer. Part of the outlook improvement may be due to genetic testing, allowing us to identify more mild cases that would not have been identified a few decades ago. In the 1950s, a cystic fibrosis patient was not expected to live long enough to attend grade school.

Fifty years later, the median predicted age of survival was 32. By 2008, the median predicted age of survival rose to 37.4 years (10). It is possible that the milder genetic variants are over-represented among FAA applicants.

Continued →

(4). For cystic fibrosis, the likely culprit of spontaneous pneumothorax is air trapping caused by mucus plugging and inflammatory changes. The resultant increase in volume and pressure in the alveoli can lead to pressure differentials at the parietal pleura and, ultimately, rupture (5).

An AME would not find cystic fibrosis listed under Disease/Condition for Item 35 (LUNGS & CHEST) in the AME Guide. Instead, there are several categories that cystic fibrosis could fall under, to include: 1) Chronic bronchitis, emphysema, or COPD; 2) pulmonary fibrosis; 3) spontaneous pneumothorax; 4) bronchiectasis; and 5) other diseases or defects of the lungs or chest wall that require use of medication or that could adversely affect flying or endanger the applicant's well-being if permitted to fly. The most appropriate category is #5, although work-up requirements from the other categories are useful in determining this applicant's fitness to fly. These include current PFTs, a chest X-ray, all pertinent medical history and information, a recent evaluation by a pulmonologist with a statement regarding symptomology/associated illnesses/name and doses of medications with comment regarding side-effects, and a clear statement regarding any history of pneumothorax.

The most predictive tests for spontaneous pneumothorax risk in cystic fibrosis patients are PFTs, specifically predicted values for FEV1 or FEV1/FVC (2). Chest X-rays and CT scans have not been reliably predictive for pneumothorax (6,7). When FEV1 is <50% of predicted or FEV1/FVC is <50% (the FAA uses the value of <70% as discriminators of lung function in other conditions), cystic fibrosis patients have a marked increase in their risk for spontaneous pneumothorax. Secondary spontaneous pneumothorax (i.e., due to underlying lung disease) is associated with a much greater risk than that seen with the primary form. For those with a history of pneumothorax, the aeromedical concerns are a high recurrence rate

and a high morbidity/mortality in the two years following a pneumothorax. Even when comparing cystic fibrosis patients of similar pulmonary function impairment, patients with a history of pneumothorax have a much higher relative risk of dying (2). It may be prudent to consider not granting an FAA medical certificate to any applicant with cystic fibrosis that has a history of spontaneous pneumothorax.

The other aeromedical concern is hypoxia. Although PFT studies have been inconsistent at high altitude, hypoxia studies have consistently revealed the degree of hypoxemia is directly related to the severity of the disease. Despite the impaired oxygenation, test subjects revealed no clinical symptoms and are, perhaps, already acclimated to low oxygen conditions (8,9).

Outcome

The AME deferred issuance of a third-class medical certificate to the FAA. Based upon the airman's history and complete documentation, the airman was granted an Authorization for Special Issuance, which would expire after one year. The airman was to furnish a current status report from his attending physician to include interim history, prognosis, follow-up plan, type, dosage, frequency of use, side effects of current medications, results of a current PFT, a chest X-ray, and any current studies deemed appropriate. The treating physician was to forward these items to the Aerospace Medical Certification Division about two months prior to the expiration of the Special Issuance. Monitoring this patient's PFTs is currently the best means of routine evaluation. The airman must understand unequivocally that if he suffers a spontaneous pneumothorax, he must immediately report this change in condition to the FAA and cease all flying activities. As treatments improve and the life expectancy for cystic fibrosis patients gets longer, more cystic fibrosis patients will seek opportunities like flying. There are currently 113 third-class medical certificate holders with cystic fibrosis.

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Ray "Doogie" Clydesdale is currently a third-year Resident in Aerospace Medicine completing his occupational medicine year at the USAF School of Aerospace Medicine.



Sleep Apnea Brochure Published

By Mike Wayda

THE OBSTRUCTIVE SLEEP APNEA brochure, announced in the 2010-1 issue of the *Bulletin*, has been printed and is available to you for distribution to airmen.

The issue of sleep apnea surfaced two years ago when a commercial aircraft with three crewmembers and 40 passengers overshot its landing destination as both pilots slumbered and the aircraft flew along on autopilot. The pilots awoke and landed the aircraft uneventfully—but with major questions to answer about being late at the gate. The National Transportation Safety Board determined that contributing factors to the incident were the captain's undiagnosed obstructive sleep apnea and the flight crew's exhausting work schedule, which included several consecutive early-start mornings.

The implications for pilots and crewmembers are significant. It has been suggested that people with mild-to-moderate obstructive sleep apnea (OSA) can show performance degradation equivalent to 0.06 to 0.08 blood alcohol levels, which is the measure of legal intoxication in most states. Most pilots will not fly intoxicated, but sleep deprivation may be causing the equivalent effects.

Typical symptoms of OSA include difficulty in concentrating, thinking, or remembering; daytime sleepiness, fatigue, and the need to take frequent naps; headaches, irritability, and short attention span.

If OSA is suspected, the only way it can be accurately diagnosed is with a sleep study. If confirmed, the brochure lists several methods for treatment: behavioral changes, dental appliances, continuous positive airway pressure therapy, medications, and surgery.



Medications and Flying Brochure Revised

New Information Requires Update



THE FEDERAL AVIATION ADMINISTRATION recently revised the dosing interval standard to reflect a longer waiting time between taking medicine with known side effects until going flying. The new standard was increased from two to five dosing intervals. For example, if the directions on the bottle say to take every six hours, wait until at least 30 hours after the last dose to fly. The previous standard required two dosing intervals, or in this (six-hour) example, 12 hours after the last dose to fly.

The specific paragraph modified now reads, "If the label warns of significant side effects, do not fly after taking the medication until at least *five* maximal dosing intervals have passed. For example, if the directions say to take every 4-6 hours, wait until at least *30* hours after the last dose to fly."

Also, revised is "Never fly after taking a new medication for the first time *until at least five maximal dosing intervals have passed and no side effects are noted.*"

Aviation medical examiners are asked to discard all *Medications and Flying* pilot safety brochures currently in stock and have them replaced with a new version. To order a new supply of this informative brochure (ordering no. OK-05-0005), and to order any of the brochures listed in the sidebar, contact:

FAA Civil Aerospace Medical Institute
Shipping Clerk, AAM-400
P.O. Box 25082
Oklahoma City, OK 73125
(405) 954-4831
E-mail: Gary.Sprouse@faa.gov

MEDICAL FACTS FOR PILOTS

brochures

- AM-400-09/3 Acceleration in Aviation: G Force
- AM-400(rev.6/97) Alcohol and Flying
- AM-400-95/2 Altitude Decompression Sickness
- AM-400-09/1 Aviation Safety Courses
- OK-05-0270 Carbon Monoxide
- AM-400-09/3 Circadian Rhythm
- AM-400-04/1 Civil Aerospace Medical Institute
- AM-400-03/2 Deep Vein Thrombosis
- OK-07-193 Fatigue
- AM-400-09/2 Fit for Flight
- AM-400-98/23 Hearing and Noise
- AM-400-91/1 Hypoxia
- OK-06-148 Laser Eye Surgery
- AM-400-10/3 *COMING SOON:* Laser Hazards in Navigable Airspace
- AM-400-10/2 List of FAA Pilot Physiology Brochures
- OK-05-0005 Medications and Flying
- AM-400-10/1 Obstructive Sleep Apnea
- OK-08-639 Oxygen Equipment
- OK-06-002 Pilot Medical Certification
- AM-400-98/2 Pilot Vision
- AM-400-91/2 Seat Belts and Shoulder Harnesses
- AM-400-95/1 Smoke!
- AM-400-03/1 Spatial Disorientation: Seat of Your Pants
- AM-400-00/1 Spatial Disorientation: Visual Illusions
- AM-400-05/1 Sunglasses for Pilots
- AM-400-01/2 Your Pilot Medical Application

Optic Neuritis

Case Report,

by Anthony W. Waldroup, MD, MPH

Optic neuritis is an acute, inflammatory, demyelinating condition that typically results in unilateral visual loss, disturbance of color vision, and eye pain. The manifestations of optic neuritis are not conducive to safe operation of an aircraft as pilot-in-command. However, with resolution of a single episode of optic neuritis, a request for return to pilot-in-command duty may be considered.

History

A 26-year-old female third-class airman with 78 hours of flight time applied for medical recertification 12 months following an episode of acute optic neuritis.

The airman reported visual disturbances described as spherically-shaped “floaters” in her left eye that moved from the top to the bottom of her visual field, lasting for minutes to hours several times a day. Symptoms were most notable in the early morning and evening hours. The symptoms resolved within one month. The following month, the airman presented to her ophthalmologist with concern regarding a “spot” in her visual field affecting the left-lower quadrant of the left eye. She reported flashing lights in her visual fields when looking into headlights or at street lights at night. A dilated retinal exam revealed normal-appearing retina and edema of the left optic disc; but no afferent pupillary defect or eye pain. A neurology consult and MRI of the brain were obtained. The MRI with gadolinium contrast demonstrated enhancement of the left optic nerve without evidence of other CNS lesions. No other neurologic deficits were noted on exam by the neurologist. The airman was diagnosed with acute optic neuritis, and she chose not to be treated with intravenous corticosteroids. She has

since fully recovered with 20/20 visual acuity in each eye, normal visual fields, and normal color vision testing.

Aeromedical Concerns

The airman did not meet third-class medical requirements per 14 CFR 67.303(d) (2,5) due to the diagnosis of optic neuritis; and the aeromedical concerns for an airman with a history of optic neuritis include reoccurring visual disturbances that may go unrecognized by the airman that may include reduced visual acuity, visual field defects, and color vision anomalies. These symptoms may be exacerbated by hypoxia, dehydration, fatigue, and increased body temperature (e.g., Uhthoff’s phenomenon). Additionally, the Optic Neuritis Treatment Trial demonstrated an increased risk of developing multiple sclerosis after recovery from acute inflammatory demyelinating optic neuritis.

Outcome

Based on the available scientific resources, the risk of this airman developing multiple sclerosis in the five years following recovery from an initial episode of optic neuritis without demyelinating CNS lesions is 16% and may be considerably less if there is significant peripapillary hemorrhages, macular exudates, lack of eye pain, or light perception in the acutely affected eye (4).

With the full recovery of symptoms and the low risk of sudden incapacitation during flight, the airman was given special-issuance medical certification through the Aerospace Medical Certification Division after ophthalmologic evaluation and completion of a Form 8500-7. Annual follow-up requirements for continued authorization for special issuance include visual acuity, visual field, and color vision testing that meet the current standards for the requested class of medical certification.

Other causes of optic neuropathy include ischemic, infectious, systemic auto-immune, toxic, metabolic, and neoplasm (7).

ETIOLOGY OF DISEASE

Optic neuritis is an acute inflammatory demyelinating condition of the optic nerve of uncertain etiology, in most cases, but is thought to be immune-mediated (6). There may be genetic susceptibility among some individuals and is more common in females (2-3:1), Caucasians, and northern latitudes, similar to multiple sclerosis (6).

The reported incidence in the United States is 5/100,000 and prevalence 115/100,000 (3). Typically, patients present with acute vision loss, dyschromatopsia, and eye pain. In most cases, the symptoms are limited to one eye, but a minority of cases may include bilateral symptoms. Optic neuritis of the inflammatory demyelinating type has been associated with an increased risk of multiple sclerosis and is regarded by many to be an initial manifestation of multiple sclerosis in 15-20% of cases (1, 6). The Optic Neuritis Treatment Trial showed a 25% (95% confidence interval [CI] 18%-32%) 15-year risk of developing multiple sclerosis, given a first episode of optic neuritis without MRI findings of demyelination in the CNS, and 72% (95% CI 63%-81%) when CNS lesions were present (4).

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Continued on page 11

Transient Global Amnesia in an Airline Pilot

Case Report, by Lloyd W. Sloan, MD, MPH

Transient global amnesia in a pilot would have obvious and immediate consequences: Inability to remember the current situation, upcoming required procedures, how to operate the aircraft—even one's identity—would be catastrophic for flight safety, especially in the airline transport context. Depending on the etiology, this could result in sudden incapacitation of the pilot and put at risk the lives of all on the aircraft.

History

A 53-year-old male airline pilot experienced what was described as an episode of amnesia while driving to catch a flight as a passenger. He stated, "My body knew where to go but I felt strange, an out-of-body feeling" while driving from his new home to the airport. He made it to a Starbucks en-route but "couldn't back-track for a while." He "saw a green light but barely missed hitting a car," and felt he was "watching a movie" while walking to the terminal. Without being sure how he did it, he parked in employee parking, boarded the correct bus, walked to the correct terminal and gate for his flight but still could not remember or connect events to that point. He called his wife and told her he didn't know where he was.

On her urging, he contacted an agent for his airline medical department and asked him to arrange for transportation to an Emergency Room for evaluation. He approached two police officers who contacted paramedics. The latter found his blood pressure and blood glucose to be normal. There was no loss of consciousness during the entire period and during his ER evaluation. At the time, he had no recall of events of that day, from departing his home that morning to his being in the ER. He was admitted at noon that day for three days and underwent an extensive workup.

His memory returned to him on the evening of the first day of admission, for a total of about six hours of amnesia. His head CT, MRI, MRA, EEG, EKG and lab values were normal, except that he

was found to have an elevated ammonia level (43 micromoles per liter, normal being 11-35) and elevated blood pressure in the hospital. His toxicology screen was negative, and he denied alcohol consumption. During his admission, he was seen by a neurologist, a cardiologist, and a gastroenterologist, but none could find a specific cause for his episode.

His medical history was significant for spinal meningitis as a child, hospital admission for campylobacter gastroenteritis at age 10, and sinusitis in his 40s. He had sinus surgery and uvulopalatopharyngoplasty for difficulty sleeping. He stated he had no specific diagnosis of sleep apnea and no sleep study to date. He also had a herniated cervical disk associated with an injury. The Federal Aviation Administration's neurology consultant diagnosed the pilot with transient global amnesia.

Subsequent neuropsychological testing found no abnormalities in cognition or memory. A psychiatric evaluation found him without psychiatric diagnoses, but both the neurologist and psychiatrist were concerned that his episode may have been caused or influenced by significant stressors in his life. He stated these began after the attacks of September 11, 2001. Rather than the events of the attack, he was impacted by the decline of the airline industry and the economy: His pay was reduced, and his airline declared bankruptcy in 2005. He had also lost three months of flight time due to the neck injury. On the advice of the union flight surgeon, he voluntarily refrained from flight duties.

Aeromedical Concerns

Transient global amnesia (TGA) in any pilot would have obvious and immediate consequences. Inability to remember current situation, upcoming required procedures, how to operate the aircraft or execute emergency procedures, not to mention one's identity, would be disastrous for crew resource

DIAGNOSTIC CRITERIA FOR DEFINITE TGA

- Attacks must be witnessed and information available from a capable observer who was present for most of the attack.
- There must be clear-cut anterograde amnesia during the attack.
- Clouding of consciousness and loss of personal identity must be absent, and the cognitive impairment limited to amnesia (that is, no aphasia, apraxia, etc).
- There should be no accompanying focal neurological symptoms during the attack and no significant neurological signs afterwards.
- Epileptic features must be absent.
- Attacks must resolve within 24 hours.
- Patients with recent head injury or active epilepsy (that is, remaining on medication or one seizure in the past two years) are excluded (Hodges and Warlow, pp. 834 – 5.)

In a review, including multivariate analysis of 143 cases, Quinette et al. (2006) noted no correlation between TGA and vascular risk factors. They also stated that, "In women, episodes are mainly associated with an emotional precipitating event, a history of anxiety and a pathological personality. In men, they occur more frequently after a physical precipitating event. In younger patients, a history of headaches may constitute an important risk factor."

Continued—→

management and flight safety, especially in the airline transport context. Depending on the etiology, this could result in sudden incapacitation of the pilot and put at risk the lives of all on the aircraft.

According to Hodges and Warlow (1990), TGA does not have a single definitive etiology. General categories of etiologies associated with TGA include thromboembolic cerebrovascular events, epilepsy, migraine, cerebral angiography, cerebral tumors and cerebral hemorrhage. Occult alcohol dependence has also been implicated. The FAA neurology consultant noted that TGA is often associated with emotional stress and hypertension. He also stated there is a 3% annual risk of recurrence of TGA. He noted that the current practice of one year of grounding for non-transient amnesia is due to the risk of recurrence, which is higher than the risk for TGA.

Role of the AME

According to the *Guide for Aviation Medical Examiners* (FAA, 2009), medical certificates must not be issued to an applicant with medical conditions that require deferral or for any condition not listed in the table that may result in sudden or subtle incapacitation without consulting the Aerospace Medical Certification Division or the Regional Flight Surgeon. Medical documentation must be submitted for any condition to support an issuance of an airman medical certificate.

Transient global amnesia falls under the category of “Transient loss of nervous system function(s) without satisfactory medical explanation of the cause” and requires disposition by the FAA Regional Flight Surgeon or Aerospace Medical Certification Division (FAA, 2008, p. 200). The patient complied with all requests for reports of all tests and consultation, as well as correspondence with the FAA.

Outcome

There was no specific etiology identified by the aforementioned consultants. The FAA neurology consultant noted that the case met every criterion for TGA (see sidebar). He also noted that with adequate control of the patient’s hypertension and better management of stressors, the patient was at very low risk for recurrence. Given that his episode lasted less than 24 hours, and that his cognition, memory, and neurological exam remained completely normal after resolution, the neurology consultant recommended issuing a Class-1 Special Issuance medical certification for return to full flight status. Therefore, he was given a time-limited authorization up to the end of the next fiscal year, provided he met periodicity requirements for his annual examinations and a condition update from the attending physician and all consultants regarding hypertension, stressors, and mental and neurological status.

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About the Author

CDR Lloyd W. Sloan, MD, MPH, was a Resident in Aerospace Medicine on rotation at the Civil Aerospace Medical Institute when he wrote this case report.



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About the Author

Lieutenant Colonel Anthony Waldroup is a resident in the USAF Residency in Aerospace Medicine serving at the USAF School of Aerospace Medicine, Brooks City-Base, Texas. He authored this case report while training at the Civil Aerospace Medical Institute. The opinions expressed in this case report are those of the author and do not necessarily reflect the position or official policy of the USAF or USAF School of Aerospace Medicine.



DR. SMITH from page 1

Her hard work and intelligence represented the interests of physicians throughout New York. “Maggie” was an effective advocate and a good listener, able to reach consensus and build unity. As a program director at St. Vincent’s during its recent closing, she took personal charge of getting every one of her residents placed in other training programs. Maggie personally lobbied her fellow program directors at other hospitals to train her residents. She was not done until everyone found a new home.

Our deepest sympathies go out to Maggie’s husband, **Matthew Ferguson**, MD, and the rest of the family. The FAA mourns the tragic loss of Dr. Margaret Smith. Her expertise and service will be greatly missed by all of us.

—Harriet Lester, MD, Eastern RFS
—Ray Basri, MD, Senior AME, Colleague
—Mindy Zalcman

A Note From "The New Doc"

By Brian Pinkston, MD

GREETINGS! After a whirlwind arrival, I am happily settled in the Aerospace Medical Education Division at CAMI, the Civil Aerospace Medical Institute. As an early perk of the job, I attended the Basic AME seminar held in Oklahoma City 12-16 July. Although I had been to CAMI previously for AME training, I was awestruck with the high quality of presentations given by the specialty consultants and lecturers and the seminar's professional execution.

The CAMI altitude chamber and spatial disorientation demonstrators brought back some memories but also made me excited for the future. For example, CAMI has been conducting cutting-edge research in hypoxia training with a partial-pressure oxygen delivery alternative to the altitude chamber. This device, the Portable Reduced Oxygen Training Enclosure, may one day push the boundaries of training for airmen who are unable to visit an altitude chamber.

Additionally, the Division is looking at new IT enhancements to assist with AME tracking and training. Around every corner I see innovation and an eye on improving products for AMEs and airmen.

The next time you are in Oklahoma City, please look us up so we can show you what we are working on to better serve you! And don't hesitate to contact me for AME training or other general AMED questions at brian.pinkston@faa.gov.

Dr. Pinkston is the new manager of the AMED.

Ordering Forms and Supplies Made Easy

By Gary Sprouse

Please requisition your supplies —GG forms, envelopes, and so on—from our ordering Web site. Thanks to those of you who have made use of this Web site, we have achieved a 200% increase from two years ago.

The benefit of ordering online is two-fold. First, your request is received within moments. Second, time not utilized answering phone-in requests is focused at filling requests, greatly reducing your delivery time.

Additionally, many of your needed forms are available for print directly from this Web site. Please **DO NOT** use the AC Form 8500-33 Requisition Card. This card utilizes an obsolete USPS permit number and will likely result in your request not being received.

The Web site address is as follows: http://ame.cami.jcabi.gov/form_and_brochure/medicalform.asp.

Are you interested in obtaining informational brochures for your airmen? Look no further, we have more than 20 titles, ranging from *Acceleration* to *Sunglasses*. Best yet, these informative pilot safety brochures are free of charge. To request, print the order form from the Web site mentioned above and fax to 405-954-8016.

Gary Sprouse is the AMED shipping clerk.

Aviation Medical Examiner Seminar Schedule 2010

August 26 – 29	Wiesbaden, Germany	GAATM (1)
October 7 – 9	Pensacola, Florida	CAMA (2)
November 1 – 5	Oklahoma City, Oklahoma	Basic (3)
November 19 – 21	Kansas City, Missouri	Cardio (4)

2011 Basic Seminar Schedule

February 28 – March 4	Oklahoma City, Oklahoma	Basic (3)
June 13 – 17	Oklahoma City, Oklahoma	Basic (3)
October 31 – November 4	Oklahoma City, Oklahoma	Basic (3)

CODES

AP/HF Aviation Physiology/Human Factors Theme

CAR Cardiology Theme

N/NP/P Neurology/Neuro-Psychology/Psychiatry Theme

OOE Ophthalmology-Otolaryngology-Endocrinology Theme

(1) This seminar is sponsored by the German Academy of Aviation and Travel Medicine and is sanctioned by the FAA as fulfilling the FAA recertification training requirement. For more information, see the Academy Web site: www.flugmed.org. Click on EUSAM, then click on Refresher FAA/JAA (from the top menu).

(2) This seminar is sponsored by the Civil Aviation Medical Association (CAMA) and is sanctioned by the FAA as fulfilling the FAA recertification training requirement. Registration will be through the CAMA Web site: www.civilavmed.com.

(3) A 4½-day basic AME seminar focused on preparing physicians to be designated as aviation medical examiners. Call your Regional Flight Surgeon.

(4) A 2½-day theme AME seminar consisting of 12 hours of aviation medical examiner-specific subjects plus 8 hours of subjects related to a designated theme. Registration must be made through the Oklahoma City AME Programs staff, (405) 954-4258 or -4830.

The Civil Aerospace Medical Institute is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians.