



Federal Air Surgeon's Medical Bulletin



Vol. 47, No. 3
2009-3

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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Photo by Eric Simson

NEW!
**AN UPCOMING FEATURE
TO QUICKLY ANSWER YOUR
CERTIFICATION-RELATED
QUESTIONS VIA THE BULLETIN
AND E-MAIL. DETAILS ARE ON
PAGE 8 (SEE HELP WANTED.)**

New Circadian Rhythm Brochure Now Available

Of all the stressors in aviation, jet lag seems to have the greatest impact

By Mike Wayda

*H*omeostasis, suprachiasmatic nuclei, zeitgebers, are all terms covered in the new pilot safety brochure, *Circadian Rhythm Disruption and Flying*. Bottom line: Pilots need to be aware of the factors that affect their sleep patterns, especially when they travel across time zones. That's when jet lag blindsides them with fatigue, insomnia, disorientation, digestive problems, even lightheadedness...stressors that can compromise aviation safety.



The brochure offers several practical tips that will help pilots to minimize the effects of jet lag:

- Adjust your bedtime by an hour a day a few days before your trip. This will adjust your sleep pattern to match the sleep schedule you will keep at your destination.
- Reset your watch to the destination time at the beginning of your flight to help you adjust more quickly to the time zone you will be visiting.
- Drink plenty of water before, during, and after your flight. The air you breathe on airplanes is extremely dry, and some experts

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Multimedia AME Refresher Course

PROBLEM

WHEN THE Multimedia Aviation Medical Examiner Course (MAMERC) was fielded years ago as an alternative to more frequent attendance at seminars, many aviation medical examiners (AMEs) did not have their own computers. The decision was made to print hard copy versions of the test, supplemented by videotape cassettes, for those who preferred this method of learning to computer-based instruction. We have run out of paper copies, necessitating a decision on whether or not to print another batch.

We have come a long way since MAMERC was first fielded. Computer ownership has become our expectation

QUICKFIX



By Dick Jones, MD

of AMEs since institution of the requirement to electronically transmit examinations. When we began to insist the last holdouts, International AMEs,

Continued on page 7

AMCS Security

HELLO, EVERYONE. By now, you should have seen the following message when you signed on to the Aerospace Medical Certification Subsystem (AMCS):

“To ensure continued security and integrity of your aviator’s medical certification information on the FAA AMCS web based system, it is critical that only current authorized users from your office have valid AMCS accounts. It is your responsibility to notify the AMCS Online Support help desk at (405) 954-3238 if staff changes have occurred for individuals with AMCS privileges and their employment status no longer requires AMCS access.”

Federal Air Surgeon’s Medical Bulletin

Library of Congress ISSN 1545-1518

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The Federal Air Surgeon’s Medical Bulletin is published quarterly for aviation medical examiners and others interested in aviation safety and aviation medicine. The Bulletin is prepared by the FAA’s Civil Aerospace Medical Institute, with policy guidance and support from the Office of Aerospace Medicine. An Internet on-line version of the Bulletin is available at: www.faa.gov/library/reports/medical/fasmb/

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The reason for this message is to help protect the security of our medical systems and to assure that only people with a verified need have access.

An electronic query will shortly be transmitted across AMCS that will identify any authorized user who has not accessed the AMCS system within the previous 90 days. We will use this information to determine if there are some accounts that should be disabled. This query will be repeated on a quarterly basis.

In August, you will receive a letter informing you of the requirement to promptly report any change in staff member status to your Regional Flight Surgeon, the AMCS Online Support Help Desk, the manager of the Aerospace Medical Certification Division, AAM-300, and the manager of the Aerospace Medical Education Division, AAM-400.

This letter will include the currently approved users in your office and emphasize that usernames and passwords must not be shared with anyone. The letter will also include a warning that we will take an adverse action against your designation if you fail to comply with this requirement.

In a few months, we will start sending an E-mail message to you on a regular

basis that asks you to verify that everyone on your staff who is using AMCS is authorized to do so. If you don’t respond within 30 days, your account and the accounts of your associates will be disabled.

Your Regional Flight Surgeon will also be conducting random checks to help assure compliance. You may be aware that we have hired some new analysts to help them manage the aviation medical examiner system. The analysts will be visiting your offices and evaluating your programs to include an assessment of AMCS use by you and your staff.

On the bright side, these analysts will also be available to answer questions and lend support to you, should you need help. I hope that you will get to know them and take advantage of their expertise.

I know that these actions appear overbearing and that it sounds like I am threatening you. I wish there were a kinder and gentler way to convey the message. However, we have recently discovered that a few individuals who no longer have a need to access our system might still be able to do so. While we have no evidence this has actually occurred, we must do everything possible to protect the security and integrity of the systems and to assure our constituents’ privacy.

In reality, most of these changes are upgrades to our systems, and they will be transparent to you. They will add very little to your actual workload. All you have to do is keep us informed of any changes in your office staff, and we will do the rest.

Again, like I always say, thanks so much for what you do for us and our airmen. We could not “stay in business” without your help.

—Fred

TurboMedical

I HAVE BEEN ASKED to refresh your memory about how to manage a pilot who asks you to use a completed Aircraft Owners and Pilots' Association's (AOPA's) TurboMedical form in lieu of the Form 8500-8 or FAA MedXPress.

Several years ago, AOPA developed the *TurboMedical*. It allows airmen to complete the medical history side of the FAA Form. The form looks just like our medical form, except that there is no certificate number. AOPA encourages airmen who complete the *TurboMedical* form to take it to their AME. This is where some confusion may occur.

Some airmen are under the impression that a completed *TurboMedical* form is all the documentation that is required of them. However, *TurboMedical* by itself does not fulfill our requirements. If an airman asks you to accept the *TurboMedical* form, you can do so if you have them sign the *TurboMedical* form in your presence and also sign a blank Form 8500-8. You should then staple the two forms together and send them to us. Use the certificate number (GG-number) at the top of our form on the airman's medical certificate to transmit the examination data to the AMCD.

If, for some reason, the applicant refuses to sign a blank form, then the applicant must transfer the information from the *TurboMedical* to the actual FAA Form 8500-8. Please make sure you go over the medical history with the airman and personally ensure that all the blocks are completed!

You can avoid all of these hassles by suggesting to your airmen when they phone your office for an appointment to go online and participate in FAAMedX-Press (<https://medxpress.faa.gov>).

Consult When Necessary

Recently, I ran across an interesting case situation I'll share with you. A 50-year-old male airman requested a second-class medical certificate from his AME. During the examination, the AME discovered that the airman

Dr. Silberman manages the Aerospace Medical Certification Division.

Certification Update

Information About Current Issues



By Warren S. Silberman, DO, MPH

had a nodular mass in the cervical area and a possible enlarged cervical node. The AME referred the airman to an otolaryngologist, issued the airman a medical certificate, but did not call the Regional Medical Office or the AMCD for advice. Was this a proper certification action?

NO! The AME should have phoned either the Regional Medical Office or AMCD and asked for advice—or should have deferred the certification of the airman. If the AME had phoned us, we would have told the examiner to defer! As a footnote to this situation, nine months after being certified, the airman requested a special issuance for a diagnosis of squamous cell cancer of the neck with metastasis to the cervical nodes.

Do It Our Way

Another frequent problem is non-compliance with our request for a specific test or a particular way for a test to be performed. When we request a specific test, we want it done for good reasons!

A perfect example is when we request a maximal nuclear stress test. Our consultants prefer this type of test because the inter-hospital variability is predictable, and it is the more sensitive test for ischemia. Instead, when we request this test, we sometimes receive a pharmacologic nuclear stress or a stress echocardiogram.

During the pharmacologic nuclear stress test, the airman rarely reaches maximal exercise, and it is not as sensitive for demonstrating ischemia as the exercise test. Also, we rarely get an explanation as to why, when we asked for a maximal nuclear stress test, we

are provided an alternate. Physicians, nurses, and ancillary help are trained and familiar with the usual nuclear stress test.

Pharmacologic stress protocols are less familiar and more complex. The drug dose is calculated based on weight and must be placed into a pump device, which requires programming, and the procedure is more complicated. More importantly to your airmen, though, is that it is more expensive!¹ If your applicant has some sort of musculoskeletal problem, we may accept this test, but someone needs to inform us of this in writing.

To the FAA, a stress echogram must be performed a particular way when we request one. There is more inter-center variability in the performance of the actual test. Should a private pilot (third-class) have a stress echocardiogram, we will generally accept the results. However, it is our policy that we do not accept this test for first- or second-class airmen, unless our consultants request one.

Neuropsychological Tests

Neuropsychological testing has strict requirements. To make a certification decision, we rely upon specific tests that our consultants have recommended. If these procedures are not followed, the airman will be denied (under Chapter 14 Code of Federal Regulations part 67.113) for failure to provide the FAA the information that was requested.

Bottom Line

When further testing is required for certification, please explain to your airmen that there is a rationale for everything we request. Sending us old testing results, handwritten physician reports, incorrect tests, or even not providing a test because their treating physician did not feel it was necessary, will usually lead to a denial—and long delays for the airman while we correspond back and forth to obtain the correct documentation.



¹ Cerqueira, Manuel D. Pharmacologic stress versus maximal exercise stress test for perfusion imaging: Which, when, and why? *Journal of Nuclear Cardiology*; Vol 3, Supplement 6/November 1996, 1071 – 3581.

Medical Certification of Pilots With Peptic Ulcer Disease

Case Report, by Anita J. Winkler, DO, MPH

Approximately 500,000 persons develop peptic ulcer disease in the United States each year. In 70% of patients, it occurs between the ages of 25 and 64 years. Helicobacter pylori infection and the use of nonsteroidal anti-inflammatory drugs (NSAIDs) are the predominant causes of peptic ulcer disease in the U.S., accounting for 48% and 24% of cases, respectively. This article presents a case report of a pilot who had experienced a bleeding peptic ulcer disease due to a combination of NSAID use and H. pylori infection.

History

A 50-YR-OLD MALE, third-class pilot with more than 10,000 hours of flight time applied for third-class medical recertification six months following treatment for a bleeding peptic ulcer.

The airman was initially seen by his primary care physician seven months prior in follow-up after an urgent care visit for burning abdominal pain, diagnosed as acute gastroenteritis. Despite treatment with fluids and a bland diet, the airman was still experiencing the burning stomach pains that he had been self-treating with over-the-counter (OTC) antacids. His physician noted that the only significant change in the airman's history was that he had recently increased his use of OTC nonsteroidal anti-inflammatory drugs (NSAIDs) used for left knee pain, previously diagnosed as mild arthritis. The airman denied any other associated symptoms such as nausea, vomiting, fatigue, or change in stool or bowel habits.

Blood and stool tests were performed, and the results were only significant for a positive *Helicobacter pylori* infection. The airman was told to stop all NSAID use and was placed on an appropriate *H. pylori* eradication protocol. He was also referred to a gastroenterologist for further evaluation and treatment.

The airman completed his *H. pylori* protocol treatment and remains off

NSAIDs. His follow-up endoscopy revealed a well-healing peptic ulcer. The airman was symptom-free, and he remains on a prophylactic proton pump inhibitor (PPI), which he tolerates well.

Aeromedical Issues

The primary aeromedical concern relating to peptic ulcer disease is the potential for sudden incapacitation due to perforation or hemorrhage. Ulcer pain may be distracting and interfere with performance during critical phases of flight.

Also a concern is that chronic blood loss from may lead to anemia, which can lead to hypoxia and its sequela.¹

In addition to addressing the functional impairment from peptic ulcer disease, an aviation medical examiner (AME) should also consider the underlying disease that resulted in a bleeding ulcer. In this example, the applicant's history of NSAID use for chronic knee pain, coupled with his *H. pylori*, should be addressed.

Remember that all medications used for prophylactic treatment of this condition should be free of side effects that would impair the applicant's ability to safely operate an aircraft.²

Role of the AME

The general medical standards for medical certificates annotated in Title 14 of the Code of Federal Regulations parts 67.113, 67.213, and 67.313 include no functional or

PEPTIC ULCER DISEASE

Peptic ulcer disease is a problem of the gastrointestinal tract, characterized by mucosal damage secondary to pepsin and gastric acid secretion. It usually occurs in the stomach and proximal duodenum; less commonly, it occurs in the lower esophagus, the distal duodenum, or the jejunum, as in unopposed hypersecretory states such as Zollinger-Ellison syndrome, in hiatal hernias (Cameron ulcers), or in ectopic gastric mucosa (e.g., in Meckel's diverticulum).⁵ Approximately 500,000 Americans develop peptic ulcer disease each year.⁶ In 70% of patients, it occurs between the ages of 25 and 64 years.⁷ The incidence of peptic ulcers is declining, possibly as a result of the increasing use of proton pump inhibitors and decreasing rates of *H. pylori* infection.⁸ *H. pylori* infection and the use of NSAIDs are the predominant causes of peptic ulcer disease in the U.S., accounting for 48 and 24% of cases, respectively.⁹

structural disease, defect, or limitation that makes the person unable to safely perform the duties or exercise the privileges of an airman.³ AMEs are authorized to examine airmen to determine whether or not they meet the standards.

The *Guide for Aviation Medical Examiners* outlines the standard examination procedures that should be used to evaluate the applicant's abdomen and viscera.⁴ In general, AMEs should observe and note any unusual shape or contour, skin color, moisture, temperature, and presence of scars. Hernias, hemorrhoids, and fissures should be noted and recorded. The AME should also palpate for and note enlargement of organs, unexplained masses, tenderness, guarding, and rigidity. If the applicant has a recent history of bleeding ulcers or hemorrhagic colitis, the AME should not issue a medical certificate.

Continued →

The disposition guidance in the *Guide for AMEs* indicates that, for all classes of medical certificates, AMEs should submit a current status report for applicants with a history of an active ulcer within the past three months or a bleeding ulcer within the past six months, along with evidence that the ulcer is healed.² Evidence of healing must be verified by a report from the attending physician, including: 1. Confirmation that the applicant is free of symptoms; 2. Radiographic or endoscopic evidence that the ulcer has healed; 3. The name and dosage medication(s) used for treatment and/or prevention, along with a statement describing side effects or removal.

This information should be submitted to the FAA Aerospace Medical Certification Division (AMCD). Under favorable circumstances, the FAA may issue a certificate with special requirements. For example, an applicant with a history of bleeding ulcer may be required to have the physician submit follow-up reports every six months for one year following initial certification.

The prophylactic use of medications including simple antacids, H-2 inhibitors or blockers, proton pump inhibitors, and/or sucralfates may not be disqualifying if free from side effects. An applicant with a history of gastric resection for ulcer may be favorably considered if free of sequela.

Outcome

Based upon the airman's history and complete treatment documentation per FAA peptic ulcer disease protocol, the airman was authorized by the AMCD a two-year, third-class medical certificate. The fact that the airman had a specific, avoidable cause for his condition, as well as documentation of *H. pylori* eradication with prophylactic use of a symptom-free medication, strengthened this applicant's cause.

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About the Author

Lt. Col. (Dr.) Anita J. Winkler is the Chief of Aerospace Medicine at 62nd Medical Squadron, McChord AFB, WA. She was a resident in the USAF Aerospace Medicine Program when she wrote this report while on rotation at the FAA Civil Aerospace Medical Institute.

Brochure from page 1

believe that dehydration is a leading cause of jet lag. Virtually everyone agrees that dehydration can make jet lag worse.

- Avoid drinking alcohol or anything with caffeine in it during your flight (includes many soft drinks, coffee, and tea.) Both alcohol and caffeine increase dehydration.
- Eat lightly but strategically. What you eat can have a direct influence on your wake/sleep cycle. Remember that high-protein meals are likely to keep you awake, while foods high in carbohydrates can promote sleep, and fatty foods may make you feel sluggish.
- Relax on the first day at your destination. If you have the luxury of arriving at your destination a day or two before you have to engage in important activities that require a lot of energy or sharp intellectual focus, give yourself a break and let your body adjust to the time change a little more gradually.

As a Passenger:

- Sleep on the plane if it is nighttime at your destination. Use earplugs, headphones, eye masks, or other sleep aids to help block out noise and light, and fluff up a travel pillow to make you more comfortable so you can sleep.
- Stay awake during your flight if it is daytime at your destination. Read, talk with other passengers, watch the movie, or walk the aisles to avoid sleeping at the wrong time.

Circadian Rhythm Disruption and Flying is available, and you may order a quantity for your pilots by contacting the Aerospace Medical Education Division shipping clerk:

E-mail: Gary.Sprouse@faa.gov
Phone: (405) 954-4831



Chiari I Malformation

Case Report

By Nicole Powell-Dunford, MD, MC FS

History

A 51-YEAR-OLD, third-class airman with 50 flight hours developed a “new onset” headache and neck strain with exercise. His headaches were frontal in nature and increased in severity with core body training exercises such as push ups and sit-ups, which the aviator performed while training for a “half-iron” triathlon. The airman also reported mild neck discomfort and occasional photophobia.

On further questioning, he admitted to mild headache symptoms for years, which he had ignored until recently, when exercise caused the symptoms to worsen. Most recently, the airman had experienced exceptionally severe bilateral retro orbital pain, which was associated with marked photophobia, prompting him to seek medical attention.

Neurological examination was normal. An MRI revealed a 1.4 cm tonsillar herniation consistent with a Chiari I malformation. There was no associated syrinx or myelomenigeoceles.

This aviator underwent uncomplicated surgical decompression in June 2008 with C1 laminectomy and duraplasty. He had an uncomplicated post-operative recovery with full resolution of headaches and normal post-operative neurological examinations.

Aeromedical Concerns

Pre-operatively, the aeromedical concerns of a Chiari I malformation stem from symptomatic compression. Headache, photophobia, urinary frequency, lower extremity spasticity, and neck pain are typical Chiari I symptoms.¹

Pain from headaches can significantly distract from performance of flight duties. Photophobia interferes with adequate visual scan and collision

Chiari I malformations are congenital craniocervical junction defects characterized by tonsillar herniation and compressive symptoms. Classically associated with headaches, neck pain, urinary frequency, lower extremity spasticity, and hypoventilation syndromes that present during adulthood, these defects may also be found incidentally on radiographic evaluation. This article presents a third-class pilot seeking medical recertification following the diagnosis of a Chiari I malformation.

avoidance. Neck pain leads to a reduction in visual scan range, as well as distraction from flight duties.

Although not experienced by our airman, sleep interference symptoms secondary to either pain symptoms or central sleep apnea can contribute to daytime somnolence. Although less common than other symptoms, severe sleep apnea symptoms are experienced by nearly a quarter of adult Chiari malformation.²

Urinary frequency is a common symptom of Chiari I malformation and can be very distracting, especially when leading to a requirement for in-flight symptom relief in a confined area. Lower extremity spasticity can adversely affect pedal inputs to the rudder system, causing unpredictable flight.

To address in-flight impairment in an aviator with mild symptoms who has declined surgery, the aviation medical examiner (AME) must consider the potential for symptom exacerbation with physical exertion. These exacerbations may be more likely to occur with stressful events such as in-flight emergencies, leading to potentially catastrophic outcomes.

Syncope and cardiac arrest attributable to Chiari I malformations have also been occasionally reported in the medical literature¹, both of which conditions have significant flight safety implications.

Aeromedical concerns following neurosurgical intervention include the potential for focal neurological deficits from parenchymal trauma, deep venous thrombosis, pulmonary embolism, atelectasis, infection, and seizure.

Rare complications include pneumocephalus and CSF fistula.³ The risk for sudden incapacitation while at the flight controls with any of these post-operative complications is obvious. Relative hypoxia at altitude may further exacerbate post-operative complications such as pulmonary embolism, pneumonia and/or atelectasis, while gas expansion with altitude can cause sudden deterioration of an unrecognized pneumocephalus.

Role of the AME

AMEs are charged to determine whether airmen meet physical standards for aviation duties, as annotated in Title 14 of the Code of Federal Regulations (CFR) part 67.⁴ The ability of airmen to satisfactorily perform duties is paramount to aviation safety. The *Guide for Aviation Medical Examiners*⁵ outlines the standard examination procedures that should be used to evaluate the applicant's neurological system.

A neurologic evaluation should consist of a thorough review of the applicant's history prior to the actual neurological examination. The AME should specifically inquire concerning a history of weakness or paralysis, disturbance of sensation, loss of coordination, or loss of bowel or bladder control.

Certain laboratory studies, such as scans and imaging procedures of the head or spine, electroencephalograms, or spinal paracentesis, may suggest significant medical history.⁶ These studies are not generally requested by the AME.

Continued on page 12

Ulcerative Colitis

Case Report, by David Cole, MD, MPH, SFS

Sudden incapacitation is a serious consideration for pilots, especially when operating single-pilot aircraft. Illness from diseases can detract from operational efficiency and from the pilot's availability for critical crew coordination and communication with surrounding aircraft and air traffic controllers. The medication used in treatment of certain diseases can also be a factor in safe flight. This is the case of an airline transport pilot with ulcerative colitis.

History

BEGINNING AROUND 2006, a 36-year-old male, airline transport pilot first noticed mild symptoms of occasional diarrhea and abdominal pain. He was seen by his primary care physician and diagnosed with gastroenteritis. These symptoms became more frequent, and

on his next physical exam in 2007, it was noted that he had a 20-pound weight loss, a new lab finding of mild anemia, and a hemocult-positive stool. He was sent to a gastroenterologist to be evaluated for colon cancer. The pilot underwent an esophagogastroduodenoscopy (EGD),

Continued on page 11

ULCERATIVE COLITIS

Ulcerative colitis, or UC, affects 250,000 to 500,000 persons in the United States, with an annual incidence of two to seven per 100,000 persons (1). The overall incidence of the disease has remained constant over the past five decades (1). The onset is most common between 15 and 40 years of age, with a second peak in incidence between 50 and 80 years (2). The disease affects men and women at similar rates. The precise etiology of UC is not well understood (2). It is characterized by recurring episodes of inflammation, limited to the mucosal layer of the colon, with its hallmark clinical symptoms of intermittent bloody diarrhea, rectal urgency, and tenesmus (3). It almost invariably involves the rectum and may extend in a proximal and continuous fashion to involve other portions of the colon (4). The reported frequency of extraintestinal manifestations in patients with UC is 6 to 47% (5). Patients with UC can have a wide, variable presentation, generally grouped as mild, moderate, or severe. The severity of the symptomatology often correlates with the anatomic extent of disease, another parameter that will guide therapy (6). Mild disease is defined in patients whose disease is confined to the rectum. It often presents insidiously with intermittent rectal bleeding associated with the passage of mucus and diarrhea, with fewer than four small loose stools per day. Moderate disease is defined in patients whose disease shows involvement of more than the distal colon up to at least the splenic flexure. The clinical picture is characterized by frequent loose, bloody stools (up to 10 per day), mild anemia not requiring blood transfusions, moderate abdominal pain, and low-grade fever. Patients with severe disease usually have extensive colonic involvement often, but not always, extending to the cecum (pancolitis). These patients typically have frequent loose stools (greater than 10 per day), severe cramps, fever up to 39.5°C, and bleeding, often necessitating blood transfusion (7).

Management of ulcerative colitis involves medical therapy, as well as surgical treatment. In general, the therapeutic approach is determined by the severity of the symptoms and the degree of colonic involvement (8). The goals are to control inflammation, correct nutritional deficiencies, and relieve symptoms. Approximately 66% of patients will achieve clinical remission with medical therapy, and 80% of treatment-compliant patients maintain remission (9).

Complications of ulcerative colitis are both local and extraintestinal. Most (80%) UC patients have a disease course characterized by intermittent flares, interposed between variable periods of remission (10). The relapse-free periods tend to vary greatly from patient to patient (10). More than 50% present with mild disease at their first attack, and 6% to 19% have severe disease at presentation (11). Following the initial flare, 40% to 65% of patients have an intermittent course, and 5% to 10% have a chronic, continuous course (13). Up to 10% have a severe first attack ultimately requiring colectomy (11). Twenty-five years after the diagnosis of UC, 90% of patients still have a relapsing course (14). The probability of remaining in remission for 1 year after a relapse has been estimated at 30% (15).

QuickFix from page 1

also transmit, no AME should be able to argue they do not have a computer available. In fact, many of our International AMEs are better connected than those in the United States. We prefer computer-savvy AMEs.

SOLUTION

The expense of printing a new batch of MAMERC texts and mailing them can no longer be justified. We will not reprint them. In the future, all AMEs seeking a distance-learning alternative to a seminar when they reach the three-year point after a seminar must do the training online.

Remember, if you pass MAMERC within the six months before training is due, you will not be penalized for early completion – your new training due date will be the last day of the month six years after your last seminar was taken. If you finish MAMERC sooner than that six-month window, you will be penalized for early completion, and your new seminar due date will be the last day of the month three years later. Our system, by design, will not permit us to extend your training due date if you are eligible for the MAMERC Refresher Course, because it was felt no latitude should be given since you had the preceding six months to complete the requirement.

Reminder: Clinical Aviation Physiology Review for AMEs (CAPAME) is no longer an acceptable alternative to a seminar or MAMERC.



Dr. Jones manages the Aerospace Medical Education Division.

Need Forms?

Try our on-line site for ordering medical forms and stationary. You will slash several days off the delivery time and not have to fill out and mail requisition cards. Go to this Web site, and speed up your forms acquisition:
http://ame.cami.jccbi.gov/form_

HELP WANTED!

Dear Editor:

I enjoy reading the *Bulletin* but would suggest a column called "ASK." A location that AME's could submit questions. While we do have an opportunity to ask questions at the seminars many times on the way home you say, "Why didn't I ask that [question]?" Or changes come about and where do you go to find out the answers?

Thanks,
Mort Gubin, MD
Palm Springs, Calif.

Dear Dr. Gubin:

Thank you for the excellent suggestion. Aviation medical examiners may send their questions and comments regarding all aspects of medical certification, and I will ASK the appropriate certification expert.

All questions and replies will be printed in the *Bulletin*. If resources permit, E-mail responses will be part of the deal. Send your questions to:

Mike.Wayda@faa.gov
or

FAA Civil Aerospace Medical Institute
FASMB, AAM-400
P.O. Box 25082
Oklahoma City, OK 73125

P.S. Have you tried the online *Frequently Asked Questions* on the AMCS login page? This provides solutions to several common technical issues that may be useful to you. There are also some useful Quick Tips that you may have noticed. Another good source of information is the online *Guide for Aviation Medical Examiners*.

—Editor

RHABDOMYOLYSIS CASE REPORT RESPONSE TO COMMENTS

The following is in response to several who have written in response to the Rhabdomyolysis case report in the last issue of the Federal Air Surgeon's Medical Bulletin (Vol. 47, no. 2, p. 8). —Ed.

In the Rhabdomyolysis case report article, there were two errors that need to be corrected. The first error appears on page 8 of the FAS *Bulletin* under the "History" section. The word *creatinine* needs to be replaced with *creatinine* in regards to renal function.

The second error was in the reporting of the lake temperature on page 8 under the "History" section and page 9 under the "Aeromedical Concerns" section. The temperature was 54 degrees Fahrenheit and NOT 54 degrees Celsius, which would



actually be quite warm. Interestingly, either extreme of temperature could predispose the discussed patient to an episode of rhabdomyolysis, as the cold water would induce shivering, and the warm water would serve to increase the patient's body temperature.

As noted in the initial article, rhabdomyolysis is a medical process that is exceedingly variegated in terms of predisposing and causal factors, as well as patient morbidity and outcomes. The patient presented was noted to train for a triathlon swimming event in a local lake. This activity exposed him to several risk factors for developing rhabdomyolysis, including the extreme temperature of the lake as well as the intense level and duration of the physical exercise being undertaken. While these remain a major concern, the fact that the patient was swimming in a fresh water lake should have prompted the treating health care providers to consider an infectious cause for his indistinct symptoms, most notably leptospirosis. The vague nature of the patient's initial presentation and chief complaint also underscore this line of diagnostic methodology.

Leptospirosis is an infection caused by the spirochete, *Leptospira interrogans*, which normally manifests itself in other mammals, including rodents, dogs, swine, cattle, goats, sheep, and horses. Human are incidental hosts, typically infected after exposure to animal urine or contaminated soil and flesh. While most clinical cases occur in the tropics, leptospirosis is distributed worldwide except for the polar regions. Recreational activities, including but not limited to freshwater swimming, are a risk factor for developing the disease. Leptospirosis is linked with a capricious clinical course, ranging from a subclinical illness to multi-organ failure and death. Common symptoms include fevers, myalgias, malaise, and headache, while less common symptoms include arthralgias, bone pain, and abdominal pain. While most cases are mild to moderate, severe complications, including renal failure and rhabdomyolysis, do occur. Finally, a high level of clinical suspicion must be maintained since the presenting signs and symptoms and associated laboratory findings are vague and non-specific.

As medical science continues to progress and advance, our patient population is undergoing its own changes. This has taken the form of aviators whose average age has increased markedly over the past several decades, as well as aviators flying with ongoing medical issues that would likely not have been allowed even 30 years ago. While the military has certainly also seen a slight increase in the age of its aviators, this trend pertains much more so to the civilian pilot and aircrew population. The introduction of HMG CoA reductase inhibitors, more commonly known as statins, has heralded a new error in the treatment of hypercholesterolemia. These agents are competitive inhibitors of HMG CoA reductase, the rate-limiting step in cholesterol biosynthesis. They occupy a portion of the binding site of HMG CoA, blocking access of this substrate to the active site on the enzyme. Despite tremendous success in the treatment of blood lipid perturbations, these highly active pharmacological agents are not without risk to patients. One of the major side effects of statins is myopathy, which is stated in the literature to occur infrequently, but more is common in anecdotal reports from experienced clinical practitioners. Muscle toxicity is also a concern with statin use, and although rare, several cases of overt rhabdomyolysis have occurred.

This is particularly germane to aviation because of the negative synergistic effects of the aviation environment and statin use. Additionally, statins have become the gold standard of pharmacological treatment of dyslipidemia and are exceedingly popular choices among clinicians. It should not be overlooked, however, that muscle injury is uncommon with statin therapy alone. This includes a frequency of 2 to 11 percent for myalgias, 0.5 percent for myositis, and less than 0.1 percent for rhabdomyolysis.

While clinical decision-making involving associated comorbid conditions cannot be replaced with statistical inference, pravastatin and fluvastatin appear to have the least intrinsic muscle toxicity. Other medications associated with rhabdomyolysis and that may be utilized more commonly by older aviators include NSAIDs, glucocorticoids, colchicine, opiates, and diuretics. As the age and associated comorbidities of our flyers continues to rise, physicians must remain diligent and aware of the side effects of such popular medications and how these agents interact in a milieu of overlapping disease processes and a setting of altered aerospace physiology.

—Jon R. Gray, MD, MPH



Acoustic Neuroma

Case Study

By Rich J Serkowski, DO, MPH

Acoustic neuroma is a significant aeromedical condition because cochlear and vestibular symptoms are of obvious importance in the aviator. Hearing loss and tinnitus impact communications, while vertigo and disequilibrium may affect control of the aircraft. Because of the wide range of progressive and sometimes abrupt symptomatology, conservative therapy is not consistent with the safe performance of cockpit duties. Over the past 15 years, advances in imaging and surgical management of this condition has significantly expanded treatment options, leading to increased hearing preservation and reduced complications. Yet, there is considerable variability from case to case, making the AME's function in medical certification challenging.

History

A 48-YEAR-OLD U.S. Air Force Reserve F-16 pilot also flew for a commercial airline and as a test pilot. One weekend while on active duty, he presented to the flight surgeon (also his aviation medical examiner) complaining of sudden, high-pitched, continuous tinnitus and decreased hearing in his left ear. He was flight lead for a three-ship of F-16s that day but had to cancel due to the onset of these symptoms. The flight surgeon probed further into his history, which revealed questionable left hearing loss and periods of transient "dizziness" well before this presenting event.

A physical exam was performed, along with an audiogram. A significant acute change in his left hearing acuity was noted on audiographic analysis, compared to 11 months previous.

He was taken off flying status and urgently referred for an audiology evaluation, an ENT evaluation, and an MRI of his head. A left acoustic neuroma was found. The pilot was presented with several treatment options for medical management, and after a

EPIDEMIOLOGY, ETIOLOGY, SYMPTOMS, AND DIAGNOSIS

Acoustic neuroma, also known as acoustic schwannoma, acoustic neurinomas, vestibular schwannoma, and vestibular neurilemmomas, are benign Schwann cell-derived tumors commonly arising from the vestibular portion of the eighth cranial nerve. They account for approximately 8% of intracranial tumors in adults and 80 to 90% of all cerebellopontine angle tumors. Typically symptoms of an acoustic neuroma evolve over months to years. However, studies over the past 40 years report a 3-15% incidence of sudden hearing loss in patients with acoustic neuroma (1,2). The overall incidence of symptomatic acoustic neuroma is about one per 100,000 person-years, and appears to be increasing, possibly due to the incidental diagnosis of asymptomatic lesions with the widespread use of magnetic resonance imaging (MRI) and computed tomography (1, 3). The possibility that exposure to radiofrequency energy by use of a handheld cellular telephone increases the risk of acoustic neuroma remains controversial with some studies supporting an increased risk following long term use (4-6).

Symptoms associated with acoustic neuroma are in some ways typically due to cranial nerve involvement, cerebellar compression, and tumor progression. In a series of 1,000 acoustic neuroma patients treated at a single institution, the acoustic nerve was involved in almost all cases, followed by the vestibular, trigeminal, and facial nerves (7).

Several risk factors are associated with the development of acoustic neuroma: 1) Exposure to loud noise, either in the workplace or from loud music, has been associated with an increased risk of acoustic neuroma in two case-control studies (8,9); 2) Approximately 10% of patients with neurofibromatosis Type 2 have schwannomas, typically bilateral; 3) Antecedent childhood exposure to low-dose radiation for benign conditions of the head and neck has been associated with an increased risk of acoustic neuroma (10,11); 4) Patients with a history of parathyroid adenoma may have an increased risk for developing acoustic neuroma (12).

Acoustic neuromas have a variable natural history, as illustrated by serial imaging studies. The average growth rate is 2 mm/year (13), but rates as high as 25 mm/year have been described in a few patients (14). However, up to 40% of all tumors and a higher percentage of small tumors show no growth or even shrinkage on serial imaging studies (15, 16). There is no predictive relationship between growth rate and tumor size at presentation.

lengthy discussion with the physicians involved in his care, he elected to receive radiation therapy, as this would afford him the best outcome probabilities and flexibility for his flying career.

He received 36 applications of fractionated stereotactic radiation (gamma knife) treatments to the lesion and was left with persistent hearing loss in the left ear, requiring the use of a hearing aid.

In the peri-operative period, he experienced a single episode of mild ataxia that resolved completely. Follow up studies showed no change or recurrence of the tumor.

Treatment Options

The three major treatment options are surgery, radiation therapy, and observation. Chemotherapy has yet to be proven beneficial. With technologic

advances, operative mortality has been reduced to virtually zero for this benign but potentially fatal tumor. Complete tumor removal is accomplished in almost all patients, and there is little, if any, recurrence (17-21). The likelihood of surgical morbidity, which includes hearing loss, facial weakness, and vestibular disturbances, depends upon tumor size. Facial nerve functions can be preserved in most patients, even with large tumors (18-20), and serviceable hearing can be preserved in many patients. However, only rarely does hearing improve after acoustic tumor surgery.

Stereotactic radiosurgery improves patient outcomes. This is a technique that utilizes multiple convergent beams to deliver a high, single dose of radiation

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to a radiographically discrete treatment volume, thereby minimizing injury to adjacent structures. This can be accomplished with either the gamma knife or a linear accelerator. Radiosurgery is a viable treatment option for selected patients with smaller tumors (<3 cm) or for enlarging tumors in patients that are not candidates for surgery. Proton beam therapy may provide maximal local tumor control while minimizing cranial nerve injuries, permitting the delivery of high doses to the target volume while limiting the "scatter" dose received by surrounding tissues (21).

The outlook for this modality is encouraging. In one report of 88 patients treated with fractionated proton beam therapy, the two- and five-year local control rates were 95 and 94%, respectively (21).

Aeromedical Disposition

All cases of acoustic neuroma must be deferred to the FAA. The AME may submit a request to the FAA after successful treatment and a full recovery. Complete ENT evaluation with all supporting documents must be submitted for any class of certificate to be considered. If any neurologic deficit is noted (e.g., vertigo), a complete evaluation by a neurologist is advisable with submission of a written report. The Aerospace Medical Certification Division generally requires the medical records that relate how the tumor was discovered, the treatment method, and current status, once sufficient post-operative time has passed. If hearing loss is noted, it is advisable to have an audiogram performed. The airman may be given an authorization for special issuance with a requirement for yearly current status reports and, if there is residual tumor, a yearly MRI of the brain.

If an applicant has any hearing loss, it should be noted. For the FAA, an airman must only pass one of three hearing tests. The usual hearing test is the Conversational Voice Test; the other choices are the standard audiogram and the speech discrimination test. If the airman meets standards with a hearing aid, a certificate can be issued with corresponding hearing amplification restriction on the medical

certificate. If the airman cannot meet hearing standards with hearing aids, but can with a headset, the airman should be given a Medical Flight Test using the headset. If successful, a Statement of Demonstrated Ability may be issued.

Outcome

After adequate follow up and assessment, he retained a stable left hearing loss that was correctable with a hearing aid. No other clinically or aeromedically significant sequelae persisted or developed. Six months later, the Air Force considered him for a waiver and granted him a Flying Class IIC waiver, restricting his flying to only multi-place aircraft. His aviation medical examiner deferred his case to the FAA where he later received a special issuance for a first-class certificate with a time-limit of 1 year. He will continue to have regular follow-ups and imaging, as dictated by the unique characteristics of his condition.

The airman had a good outcome from the gamma knife procedure that treated his acoustic neuroma. After two months, he only had residual left hearing loss that was correctable with a hearing aid. He had no new or residual neurological deficits. He subsequently requested and was granted a first-class certificate.

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Ulcerative Colitis from page 7

colonoscopy, and additional blood work, which was negative for cancer markers. The EGD showed gastritis, duodenitis, and a few small superficial ulcers. The colonoscopy showed colonic inflammation involving the rectum and sigmoid colon. A biopsy taken of the area of inflammation showed crypt abscesses and chronic changes, including branching of crypts, atrophy of glands, and loss of mucin in goblet cells. A diagnosis of ulcerative colitis was made, and the pilot began treatment with 5-aminosalicylic acid (5-ASA). The pilot obtained a complete clinical remission. His physical exam was normal, and he began to gain weight. His lab values normalized, hemocult was negative, and his anemia improved and ultimately resolved.

Outcome

This pilot was followed by his aviation medical examiner throughout his treatment course and has remained asymptomatic on his current medication. His case documentation was referred to the FAA Aerospace Medical Certification Division, where his case will likely have a favorable outcome under the Special Issuance process.

Aeromedical Concerns

The risk of in-flight incapacitation in ulcerative colitis is small but real. Significant hemorrhage and even bowel perforation are possible complications of severe disease. There is also a risk of discomfort, anemia, feeling unwell, and chronic fatigue between episodes, which can detract from operational efficiency and availability for crew coordination. Other UC complications (iritis, joint arthritis, toxic megacolon, colon cancer) can also be factors when flying, as can medication used in treatment. Side effects of the most common medical therapy (Sulfasalazine) are rare and infrequent but can include headache and nausea, oligospermia, skin rashes, agranulocytosis, interference with folate absorption, alopecia, hemolytic anemia,

and, occasionally, hepatitis (10). About 15% of patients cannot tolerate this class of drugs.

Airmen with a diagnosis of UC must obtain their medical certification under the Special Issuance process. AMEs may not issue a certificate, but 14 CFR part 67.401 provides authority for special issuance of the certificate (15). Disease controlled with medication or cases of full recovery 6 months after a colectomy with an ileostomy or a colostomy are a minimum to receive FAA consideration. For favorable consideration, a full gastrointestinal evaluation should be submitted to confirm that the disease is under control and is completely asymptomatic.

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Aviation Medical Examiner Seminar Schedule

2009		
August 7 – 9	Washington, D.C.	N/NP/P (1)
October 14 –17	Rochester, Minn.	CAMA (2)
November 2 –6	Oklahoma City, Okla.	Basic (3)
November 20 – 22	Seattle, Wash.	OOE (1)
2010		
January 22 – 24	Atlanta, Ga.	CAR (1)
March 1 – 5	Oklahoma City, Okla.	Basic (3)
April 8 – 11	Salt Lake City, Utah	N/NP/P (1)
May 8 – 13	Phoenix, Ariz.	AsMA (4)
July 12 – 16	Oklahoma City, Okla.	Basic (3)
August 6 – 8	Washington, D.C.	OOE (1)
October 6 – 9	Pensacola, Fla.	CAMA (2)
November 1 – 5	Oklahoma City, Okla.	Basic (2)

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) 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) 954-4830, or -4258.

(2) This seminar is being 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 3½-day theme AME seminar held in conjunction with the Aerospace Medical Association (AsMA). Registration must be made through AsMA at (703) 739-2240. A registration fee will be charged by AsMA to cover their overhead costs. Registrants have full access to the AsMA meeting. CME credit for the FAA seminar is free.

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

Chiari I from page 6

Recall from your AME seminar legal lectures that there is no physician-patient relationship between an AME and the airman applicant; however, requesting tests and/or prescribing treatment could change that relationship. You must note (in Item 60 of FAA Form 8500-8) any condition found in the course of the examination: facts—dates, frequency, and severity of occurrence, along with any established diagnosis.⁵

Until this case, no previous applicant with Chiari syndrome had ever presented to an AME for certification or recertification, and Chiari malformations are not specifically referenced within the *AME Guide*. However, the *Guide* does state that “a history or the presence of any neurological condition or disease that potentially may incapacitate an individual” should be regarded as disqualifying.⁶

Outcome

Due to the unique nature of his condition, this airman’s case underwent a formal review by the Federal Aviation Administration’s neurology consultant. Based upon an uncomplicated recovery, full resolution of symptoms, and a normal neurological examination, he was recertified for full flight duties following surgical decompression after 90 post-operative days.

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