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Medical Bulletin

Aviation Safety Through Aerospace Medicine

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

U.S. Department of Transportation
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HEADS UP

Photo by Susan Burlak

Certification Update

Information About Current Issues

By Warren S. Silberman, DO, MPH

Medical Certification Workshop for AMEs

We held our first Medical Certification Workshop for Aviation Medical Examiners in February 2009. The first group of senior aviation medical examiners (AMEs) arrived in Oklahoma City on Sunday and we worked until Thursday afternoon. We worked actual cases from our Medical Review and Appeals Sections, discussed associated topics in medical certification, toured the Aerospace Medical Certification Division, got a feel for the movement of cases, and discussed ways to speed the work from AME offices.

Each attendee received a "peripheral brain," generally reserved for Residents in Aerospace Medicine, and received 20 continuing medical education credits, along with credit for the AME training. All were authorized to work actual cases in the Document Imaging and Workflow System (DIWS).

Upon completion, they were better informed about the medical certification processes, the flow of casework, and the use of the DIWS.

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*QUICK*FIX

By Dick Jones, MD

Transmission Tidbits

PROBLEM

Apparently, the word has not reached all AMEs that they need to electronically transmit examinations, not mail them, to the Aerospace Medical Certification Division (AMCD). We produce a monthly report for each region detailing the timeliness of all examinations done by every AME in their region. This report includes a column specifying if the examination was transmitted or mailed. The regions use this report to counsel AMEs who do not transmit all examinations or who are late in submitting examinations to us.

Occasionally, AMEs express surprise they are required to use the electronic system, particularly Military and International AMEs, despite the warning letters sent to them and the articles in this publication telling them to do so. We actually had a recent case of an AME, whose Annual Performance Report indicated several submission delays, trying to argue that it is our fault there were delays because she had mailed them to us and the delays were caused by the information not being entered quickly enough by us into the system! We established the electronic system precisely to eliminate such delays and because we have better uses for our scarce personnel than doing data entry, like processing cases to reduce delays further.

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Midsection Course Corrections

By Fred Tilton, MD

Hello, everyone. I hope that the arrival of spring has inspired you to "break out" the clubs, or jump onto the treadmill, or walk a couple of extra miles a day, or to do some other type of physical activity that helps to work off the few extra pounds you might have gained during the winter. Of course, you are much better off if you have established an exercise program that you adhere to, regardless of the season.

I have noticed that if I am not careful, my trousers seem to get a little tighter during the winter months. It is very easy to blame the dry cleaner or the launderer, but unfortunately, the scale usually confirms that the problem is the extra piece of bread or an occasional piece of pie, coupled with early darkness and its associated reduction in a desire to get outside and exercise, that has caused my wardrobe changes.

This problem is compounded if you maintain your weight during the summer, and then start the winter cycle without having lost the extra pounds from the previous sedentary season. It seems that before you know it, you have gained 20 to 40 extra pounds, and you are wondering, "How could this have happened to me?"

While watching a recent senior PGA golfing match on TV, I reflected that many of the slim and trim players I used to watch on the pro tour in the '70s and '80s were now many pounds overweight. Some of them looked very uncomfortable, and the extra weight appeared to have a significant negative effect on their performance.

Then again, there is the occasional competitor like **Gary Player**, who just set a record by playing in his 52nd Masters tournament. Gary always had a reputation for maintaining a high level of fitness, and that has enabled him to compete far beyond anyone's expectations.

So you might ask, "What has this got to do with me and my practice as an AME?" First of all, if you are one of those who have allowed their weight to blossom, you are probably wishing you had not done so. If so, it would certainly behoove you to start a program of diet and exercise to help you take off those extra pounds. You will feel better about yourself, you will be much healthier, and you will set an excellent example for your examinees.

But, more importantly, you have the opportunity to directly affect the health and lives of the pilots and air traffic controllers you examine. Unfortunately, as I have remarked in past editorials, you may be the only practitioner they see on a routine basis. When you review their 8500s, be sure to consider all of their vital information. If you see any negative trends or if you notice they have gained a few pounds since their last physical, talk to them about it. Tell them about Gary Player or perhaps someone who has allowed his or her health to degenerate, and remind them about the "ounce of prevention" story.

Even if you are not their primary physician, and you think they need additional care, refer them appropriately. The next time they come to see you, if they have lost the weight or corrected some other deficiency, congratulate them on their efforts. Or, if they have not made the recommended course corrections, tell them the "ounce" story again.

Remember, it only takes a few minutes to accomplish this interaction, and it can make a world of difference.

And, as I always say, thanks for everything you do for us and your airmen.

—Fred

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AME Separations

PROBLEM

As of March 31, 2009, the number of AMEs designated by the FAA has dropped below 4,000 for the first time in our memory to 3,997. So far this fiscal year (October 1, 2008 to March 31, 2009), 55 AMEs have voluntarily left our ranks—33 resigned, 18 retired, and 4 have died. During the same period, the FAA took action to involuntarily separate an additional 94 individuals, 45 for failure to train, 22 because we were unable to locate them, 10 for low examination volume, 6 for transmission delays, 6 for performance issues, 4 due to unapproved or no office, and 1 AME was medically unfit. Although we still have an adequate number of AMEs to perform the volume of work required, I need to make sure we are not inadvertently separating AMEs who would have been able to continue their association with the FAA—if only they were aware of the reasons for separations. I hope by informing you about our separation record, those who wish to maintain their designations will take the necessary steps to avoid termination.

SOLUTION

I will discuss the FAA's reasons for terminating AMEs so that you can judge whether you could be affected.

Failure to train. An AME must be involuntarily terminated if his/her training due date has expired. If the FAA has been trying to urge an AME to train, but it becomes obvious the training cannot be accomplished by the time training is due, the resulting termination is also termed as *involuntary*. It is a simple matter to reinstate a designation if the AME subsequently receives permission to train from the involved region and successfully accomplishes the training. Please understand, though, the region is not obligated to reinstate every AME who has been terminated. Most of the 45 AMEs terminated for training reasons will ultimately be reinstated. There

QUICKFIX

By Dick Jones, MD

is an Integrated Designee Working Group, which plans to seek approval for suspension in lieu of termination when any designee's (Flight Standards and Aircraft Certification Services also have designees) training expires, and the group intends for us to stop giving 6-month extensions for any reason. Obviously, the majority of these training terminations involve AMEs who made the rational decision that it costs too much to attend training, given the number of examinations they do.

Unable to locate. This is an event that primarily affects Military AMEs. Most Military AMEs do not do many examinations, so when they deploy or separate/retire from the service, they fail to tell us of their changed status. We find out that things have changed when mail is returned to us as undeliverable. If we are unable to locate the person, we cannot notify them of their termination, so we just de-designate them in our system. Much later, we may be asked by such ex-AMEs why they can't get into AMCS after returning from a long sabbatical or missionary trip, so they are not all military. Regions sometimes hesitate to re-designate individuals who have not kept us informed of their whereabouts.

Low examination volume. The International Civil Aviation Organization has insisted we establish a threshold for the number of examinations required to maintain proficiency. We have set 10 as the lowest number of examinations we expect an AME to do each year and still maintain a designation. Regional Flight Surgeons have some discretion, depending on geography, the level of AME experience, value to the FAA by reason of position, training, etc., to overlook low volumes, but they must convince auditors that their decision is rational.

Transmission delays. Any examination submitted to us more than 60 days after the examination date automatically flags the responsible AME for a letter warning of possible termination if it happens again. The Regions usually send warning letters for excessive delays for lower magnitudes, but these are more of a counseling nature than termination threats. However, persistent tardiness after a warning or a high percentage of delays may elicit a stronger letter and can result in termination. All AMEs, including all International and Military AMEs, are required to electronically transmit all examinations, but we still receive examinations through the mail.

Those AMEs who send us examinations by mail sometimes argue that it is our fault the examination was not coded into the system within the allowed 14 calendar days. We started the Aerospace Medical Certification Subsystem to speed up the submission process and no longer have a large data entry staff, so any delays are assessed against the AME, and a strong letter will probably also be sent mandating electronic transmission. Refusing to transmit is cause for termination. Of course, we will be reasonable if there are temporary reasons for delays, like natural disasters or outages on our end, but rarely do these explain 60-day or older examinations.

Performance issues. So far this year, we terminated 1 AME for a drug-related cause, 1 for disregard of FAA rules and regulations, 2 for "poor performance," and 2 for improper issuances. Enough said. Don't do these things.

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Certification from page 1

Another course will be scheduled for the July or late August time frame. If you are interested in attending a future medical certification workshop, please contact your Regional Flight Surgeon, as the attendance is first-come, first-served and the class size is limited to ten.

Now, let's practice making good certification decisions by reviewing three hypothetical cases.

1. A 32-year-old male has applied for a second-class medical certificate. He checked "yes" to Items 18.v and 18.w. Recall that 18.v now concerns arrests, convictions, or administrative actions for alcohol or drugs, and 18.w asks about nontraffic convictions. In taking his history, you illicit some candor from this prospective airman when he tells you that he has had two DWI (driving while intoxicated) convictions over a period of 17 years, the first citation was at age 15 for underage drinking. At age 17, he was arrested for robbery, when he and a friend stole a Nintendo game set and television from one of their classmate's homes, and at age 21, he was arrested for writing bogus checks.

The applicant tells you that he knows he does not have to inform you of this, but he has had five speeding tickets over the last five years. Finally, he tells you that, while he did have these "problems" when he was young, he has since matured, and now he really wants to take up flying as a career. Should you issue him a certificate?

Answer. No. The applicant may have a personality disorder manifested by overt acts and should be deferred. The FAA requires a psychiatric and psychological evaluation from such an applicant because we need neuropsychological test results and an evaluation by a psychiatrist to assess the applicant's mental state. We also need court documents from the arrests and a current driving record from all the states in which the applicant is licensed to drive. Finally, we will need a search of the National Driver Registry online records.

Dr. Silberman manages the Aerospace Medical Certification Division.

Medical Certification Workshop attendees (L-R): Daniel Dietrich, MD (Omaha, Neb.), Wayne Barksdale, MD (Shreveport, La.), Richard Garrison, MD (Wright State University, Dayton, Ohio), Greg Ostrom (Elgin, Ill.), Robert Sancetta, MD (Boulder, Colo.) Peter Lambrou, MD (Pittsburgh, Pa.), Warren Silberman, DO (CAMI), Graeme Mclarn (Australia), and Clayton Cowl, MD (Mayo Clinic, Rochester, Minn.).

2. A 45-year-old male airman with 126 flight hours requests a renewal of his current third-class medical certificate. He reported having a DUI (driving under the influence) offense in 1982 when he was 18 and again in 1984. He attributed this to being young and careless and before he became an airman. He also now reports a DUI in 2008 and informs you that he did notify the FAA Security Division in Oklahoma City of the offenses. Under 14 Code of Federal Regulations Part 61.15(e), an airman must report within 60 days an "arrest," "conviction," or "administrative action" involving the use of alcohol or drugs. He even brought you the court documents from the recent offense. You note that his highest blood alcohol level was 0.18. Since the earlier offenses occurred more than 20 years ago, you issue him a clear third-class medical certificate. Was this issuance appropriate?

Answer: No. The FAA's policy is that three DUI offenses in a "lifetime" are grounds for deferral. This airman is considered to be alcohol-dependent until proven otherwise. He has probably driven an automobile while being impaired several times but has not gotten caught doing so. In cases such as this, an applicant should be denied. To gain medical certification, an applicant must obtain all the court documents for each offense, if possible, describe the circumstances of each offense, provide current driving records, and obtain a substance abuse neuropsychological evaluation and psychiatric evaluation. It is important for an applicant to clearly explain to the evaluators why the FAA insists on an evaluation; it is not sufficient just to say that "the FAA wants an evaluation."

3. A 61-year-old male airman applies for a medical certificate, and during the history portion of the examination, you note that he had checked "yes" to block 18.w. Again, recall from the above that this is the question that concerns "nontraffic convictions." In

Continued ⟶

the space above block 19, the applicant wrote that he was once in prison for "murder." You take a good history and learn that at the age of 30 he had robbed a jewelry store. In the robbery, the airman struggled with the jeweler, and his gun discharged, killing the merchant. The applicant was incarcerated for the crime, released at age 51, was paroled, and spent a year in a halfway house. He has been employed since being released from a halfway house. While in prison, he says he had read many books about flying and now wants to become a commercial pilot.

Rightfully so, you defer the issuance, telling the applicant that he will need to submit copies of the court documents, the results of any prison psychological evaluations, a letter of support from his parole officer, and perhaps one from his current supervisor. If the psychological evaluations do not demonstrate any psychological issues, he can gain medical certification.

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Transmission from page 1

SOLUTION: All AMEs (including International and Military AMEs) **are required to electronically transmit examinations to the FAA, and these must be available for our review by 14 days after they are begun!**

Our most recent transmission delay report found that 1.2% of all examinations submitted were older than 60 days when entered into our system. Although this is a marked improvement from when this number was as high as 5.4% in 2003, *we have to get this number to zero* to be in compliance with 14 CFR, Part 67 and with International Civil Aviation Organization guidance. The Regional Offices will continue to use performance evaluation tools to detect AMEs needing counseling about transmitting and delays. Please, we need your cooperation.

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Dr. Jones manages the FAA's Aerospace Medical Education Division.

Adult Idiopathic Thrombocytopenic Purpura

Case Report, by Alan John S. Delos Santos, MD

Idiopathic thrombocytopenic purpura (ITP) is a common bleeding disorder that is characterized by an autoimmune destruction of platelets (4). Its clinical course is variable but may cause a potentially life-threatening bleeding episode, leading to sudden incapacitation and adversely impacting aviation safety.

History

In her medical certification application, a 28-year-old female pilot gave a history of an acute onset of gum bleeding after brushing her teeth and a petechial rash that had started the previous day. A week earlier, she had an episode of flu-like symptoms. Concerned, she presented to her primary care provider to be checked. On physical examination, she had petechial rash over the lower extremities and a bruise over the right forearm; she did not have any lymphadenopathy or splenomegaly. There was no active bleeding in her oral mucosa. Laboratory work-up was significant only for a low platelet count of 30,000 x 10^9/ L. Review of systems was remarkable only for fatigue and menorrhagia during her last period. The applicant did not report any family history of a hematological disorder, and she denied taking any medications.

Aeromedical Concerns

The major aeromedical concern of ITP is the rare but potential episode of sudden incapacitation, possibly from an intracranial hemorrhage, in those patients with persistently low platelet counts. This risk is the greatest among patients over 60 years old and those with platelet levels of less than10 x10^9/L.

Outcome

The applicant was treated as an outpatient with a short course of high-dose steroids. She responded well to the treatment. After recovery, she applied again for a medical certificate. The applicant was advised to provide medical records from her doctor to the FAA for consideration regarding her ITP. She was granted an Authorization for Special Issuance of a third-class medical certification for ITP, which was time-limited for 12 months. For renewal, the airman must provide a current status report from her physician and a CBC and platelet count. She was warned not to fly when her platelet count was below 40,000 and was advised to immediately report any changes in her condition to the FAA.

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Colorectal Cancer

Case Report, by Duncan G. Hughes, MD, MPH

Colorectal cancer is the fourth most common cancer in the United States and is the second leading cause of cancer related deaths (8). In 2008, an estimated 148,810 Americans would be diagnosed with it (9). While these data reflect its continued status as a leading cause of cancer mortality, the strategies available for its prevention and treatment continue to expand and improve. The following case report summarizes colorectal cancer and highlights the aeromedical concerns for aviation medical examiners.

History. The airman was a 50-year-old male with almost 900 flight hours. Upon presentation to his aviation medical examiner (AME) for renewal of his third-class medical certificate, the airman was deferred due to a history of ongoing treatment for colon cancer. In 2006, he was diagnosed with Dukes Stage D colon cancer metastatic to the liver, and he was classified as T3N2M1 with 5/20 lymph nodes positive and had a CEA of 33. At that time, he underwent partial colectomy and an aggressive regimen of chemotherapy. In early 2007, he received microwave ablation to six hepatic lesions and initiated ongoing oral chemotherapy with Xeloda.

Following receipt of a general denial from the FAA Aerospace Medical Certification Division, the airman submitted an appeal to the Federal Air Surgeon. Included with the appeal request were the following updates: negative brain MRI, PET scan from skull base to mid-thigh with no evidence of tumor, recent exploratory laparotomy (accomplished during herniorraphy) without evidence of disease, improved CEA levels (now 9), and a note from his treating oncologist attesting that serial 3-month surveillance has been reassuring, physical exams with no evidence of disease, energy level and work productivity remain high, and a concluding statement that the oncologist believes this airman carries "no risk of sudden incapacitation due to his colon cancer diagnosis or treatment." This airman's PMH was only significant for gout and hypertension, for which he takes Colchicine, Allopurinol, and Cozaar. He said he "feels great," is without evidence of disease, and ready to return to flying.

Aeromedical Issues. The aeromedical issues surrounding colon cancer are primarily twofold. First, anemia due to occult blood loss is a hallmark of this disease (5). While healthy individuals can usually tolerate the mildly hypoxic environment presented by flight in a "pressurized" cabin (6,000-8,000 ft), those with reduced blood oxygen-carrying capacity may develop hypoxic symptoms in this environment (5). However, the second, overriding, aeromedical concern is the extent of metastatic spread. While colon cancer does not typically metastasize to the brain, disease spread to liver, lung, and/or bone can increase the risk of sudden incapacitation (5). Further, the potential side effects of chemotherapeutic agents, especially the newer oral agents, are not well established. The impact on mental acuity and/or the critical decision-making skills needed to perform aviation activities has not been documented. Thus, in-depth neuropsychological evaluation following such treatment is likely to be required (5).

Disposition. At the time of this writing, this airman's outcome remains undetermined. His appeal to the Federal Air Surgeon resulted in his case being forwarded to the FAA oncology consultant for review. However, his 5-yr survival is only 5%, based on the currently published data (6). The final recommendation is pending. However, in most colon cancer cases, the following dispositions will apply:

1) Dukes A & B diagnoses: Certification may be considered as soon as the individual has been released to routine activity by the treating physician,
2) Dukes C diagnoses: requires a 1-year recovery before certification will be considered, and
3) Dukes D: will not be considered without a minimum interval of at least 3 years following completion of treatment (2).

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About the Author

Lt Col Duncan Hughes was a resident in Aerospace Medicine at the USAF School of Aerospace Medicine at Brooks City-Base, Texas. He based this article on review of cases evaluated while rotating with Dr. Warren Silberman at the Aerospace Medical Certification Division at the Civil Aerospace Medical Institute. Dr. Hughes wishes to thank Dr. Silberman and Mr. Michael Wayda for their assistance in preparing this manuscript.

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Colorectal Cancer

Epidemiology. The lifetime risk of acquiring colorectal cancer (CRC) is approximately 5% in the absence of a family history (8). However, a positive family history of CRC increases that lifetime risk as much as threefold (8).

Etiology. Excepting the rare, hereditary CRC syndromes (e.g., familial adenomatous polyposis and hereditary nonpolyposis colon cancer), which account for only 5-10% of all CRCs, the remaining 90-95% are of unclear etiology (8). Between 70 and 90% of CRCs arise from adenomatous polyps, while 10-30% arise from sessile adenomas (8). The larger the polyp, the greater the chance for malignant transformation. It is estimated that almost one-third of the population will ultimately develop colonic polyps, and approximately one-third of these polyps will occur proximal to the splenic flexure. The average time from onset of a polyp to onset of carcinoma, termed the "dwell time," is 10 to 15 years (8).

Diagnosis/Presentation. Presenting symptoms in CRC can be highly variable. Lesions in the sigmoid colon and rectum may present with hematochezia, while lesions in the proximal colon may not cause any symptoms at all until there is anemia secondary to occult blood loss. A change in bowel habits is another common presentation. Since lesions of the descending colon tend to present with this symptomatic hematochezia, 90% of them are detected at a very early stage (8). On the other hand, fewer than 25% of ascending colon lesions are found at this early stage. This also explains why only one-third of all polyps (i.e., those proximal to the splenic flexure) are responsible for one-half of all CRCs (8).

Staging and Survival. The modified Dukes classification system is the classic means for staging CRC and remains the most useful. The Dukes system has four stages labeled A-D or, alternatively, I-IV. Each subsequent stage description (Table 1) is followed by its percent mean 5-yr survival estimate (8).

Prevention and Screening Methods. While ecological studies suggest that a high-fat, low-fiber diet predisposes one to CRC, randomized controlled trials have not conclusively supported this assertion (3). Thus, there is no definitive evidence that a low-fat, high-fiber diet will prevent CRC. The mainstay of CRC prevention remains preemptive removal of colon polyps. Aggressive screening and polypectomy can reduce the rate of CRC development by 80% (8). Recent national survey results noted that of persons over age 50, only 20.6% had current fecal occult blood testing (FOBT), and only 33.6% had current endoscopy of any sort (10).

Thus, while the array of screening techniques available is expansive, including newer technologies such as virtual colonography and stool DNA tests, the primary consideration should be a compromise between the effectiveness of the screening test and ongoing compliance with screening. While a colonoscopy has become the gold standard, the cost, invasiveness, risk, and non-compliance rates of screening all tend to vary in direct proportion to the sensitivity and specificity of the test.

Treatment. Treatment of colon cancer is almost universally surgical excision of the primary lesion to prevent progression to Stage D disease. Both chemotherapy and radiation therapy are used adjunctively in more advanced stages of the disease. Additionally, newer oral agents are now available that target the proliferation of cancer cells (e.g., angiogenesis) and may minimize or prevent recurrence.

Table 1. Stages of Colorectal Cancer (Modified Dukes Staging)

Stage	Description of Cancer	5-yr Survival
A	Limited to the muscular mucosa and submucosa	90%,
B1	Extends into but not through the muscular mucosa	60-75%,
B2	Extends through the muscle but does not involve lymph nodes	60-75%,
C1	Contained within the bowel wall, involves lymph nodes	All stage C: 1 lymph node = 69%
C2	Extends through the bowel wall and involves lymph nodes	6 or more = 27%,
D	Metastasized to the liver, bone, or lung	5%

Rhabdomyolysis

Case Report, by CPT Jon R. Gray, MD, MPH, FS

The aviation environment presents several unique occupational hazards to aviators: increased ambient temperature, load-bearing activity, and dehydration. When coupled with certain personal habits and behaviors such as extreme physical activity, the occurrence of muscle breakdown and rhabdomyolysis increases dramatically. While most cases of rhabdomyolysis are sub-clinical and merely result in renal insufficiency, repeated episodes over many years increase the incidence of chronic renal disease.

History

In January of 2008, a 39-year-old male, Airline Transport Pilot presented to his primary care physician complaining of fatigue. The pilot revealed a decreased energy level, despite adequate sleep and nutrition, that had progressively worsened over the past 2 months. Upon further questioning, the pilot endorsed some episodes of nausea, as well as headaches that were temporally related to each other but not related to other activities, time of day, or meals. There was no history of hospital stays, emergency room visits, other illness, or health changes. The pilot stated he felt "in the best shape ever" and didn't understand why his energy levels had decreased over the past several months, given his "intense training regimen" for an upcoming triathlon. The physical exam was unremarkable.

The physician ordered a standard laboratory panel for fatigue, to include complete blood count (CBC), comprehensive metabolic panel (CMP), thyroid functions tests (TFT), iron studies, erythrocyte sedimentation rate (ESR), liver function tests (LFT), and C-reactive protein (CRP). Pending lab results, the patient was diagnosed with generalized fatigue, not otherwise specified, and instructed to get more rest, decrease his physical activity to allow for nervous system rest and recuperation, and to begin taking a multivitamin.

Laboratory results were remarkable for a hematocrit of 55%, blood urea nitrogen of 12.1, creatine level of 2.6, plasma sodium of 147, and moderate increases in both ESR and CRP levels. The pilot was contacted and urged to return to the hospital for admission and treatment of acute renal failure.

Further inquiry revealed that the pilot had been training for a triathlon swimming event in a local lake because he preferred swimming "out and back," instead of "a million laps" at an indoor pool. The average temperature of this lake during January was 54°C. The pilot admitted having muscular soreness for approximately 5-6 days following training sessions. This prompted the physician to order fractioned serum creatine phosphokinase levels, which came back at >9000 units. The patient was further diagnosed with rhabdomyolysis and dehydration, both causal factors for renal failure.

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Rhabdomyolysis

Rhabdomyolysis is a syndrome characterized by muscle necrosis and the release of intracellular muscle constituents into the circulation. The disease process can range from asymptomatic, mild enzyme elevations to life-threatening cases involving cardiac arrhythmias, acute renal failure, and death (2). Rhabdomyolysis is a rare condition in the general population. Many authors contend, however, that it is highly underreported because of a lack of symptoms or the presence of mild, vague symptoms with less severe cases. Olerud et al. found that during the early training phase, 40% of 337 military recruits had myoglobin in their urine, which is direct evidence of rhabdomyolysis (5). Despite these laboratory values, a majority of these recruits did not seek medical care and those that did complained mostly of diffuse muscle soreness, not uncommon in any form of extreme exertion. The classic presentation of rhabdomyolysis includes myalgias and myoglobinuria, causing reddish to brown urine, and elevated serum muscle enzymes. Diagnosis is based upon fractionated serum skeletal muscle creatine kinase levels, which may exceed 100,000 IU/L, and appropriate clinically correlated history (2, 3). While no specific cut-off for creatine kinase level is used to diagnose rhabdomyolysis, a serum level 5 times greater than baseline is the generally accepted level (3).

Germane to the aviation environment is that rhabdomyolysis affects patients with a 3:1 male-to-female preponderance and is exacerbated by extreme heat and load-bearing activity, both of which persist as constant environmental hazards in aviation (7). Additional predisposing conditions and causal factors include protracted unconsciousness, resulting in prolonged dorsal muscle compression, struggling against restraints, episodes of near-drowning, burns, sepsis, torture, high-voltage electrical injuries, compartment syndrome, hyperthermia, hypothermia (including prolonged cold water immersion despite activity level), prolonged tourniquet application, seizures, sporadic extreme physical exertion (i.e., ultra-marathoners), dehydration, inappropriate nutritional supplement use, and pre-existing electrolyte abnormalities (1, 2).

Prognosis is generally positive, provided a pre-existing and correctable deficiency or action that caused the episode is identified and provided that the case does not progress to acute renal failure requiring hemodialysis. However, concern is advised that multiple sub-clinical episodes of rhabdomyolysis and acute renal insufficiency may predispose patients to early-onset chronic renal failure later in life (4). Finally, while any single predisposing or contributing factor may not lead to rhabdomyolysis by itself, these factors are not only additive but synergistic, greatly increasing risk when factors are grouped.

He continued treatment with intravenous fluid replacement therapy, alkalinization of urine with bicarbonate, and furosemide, to ensure adequate urine production. He did not require hemodialysis, and compartment pressures were within normal limits. After correction of his acute electrolyte and metabolic abnormalities, the patient was instructed to decrease his extensive physical activity, especially in very cold water, maintain adequate hydration, and to ensure proper caloric intake during times of extreme physical activity.

Aeromedical Concerns

Present in the aviation environment are many predisposing factors and conditions that contribute to rhabdomyolysis. When combined with an extensive physical training program, the occurrence of both subclinical and frank rhabdomyolysis should be a major concern. Without habit or lifestyle modification, even cases that do not progress to full renal failure provide a lifetime of repeated asymptomatic insults to the kidney, drastically increasing the risk of long-term renal complications earlier than would otherwise be expected (4). During flight, symptoms stemming from acute renal failure and rhabdomyolysis create a substantial risk because of the pilot's inability to effectively aviate and communicate. These symptoms include, but are not limited to, fatigue, nausea, vomiting, edema, extreme thirst, tachycardia, dizziness, confusion, anxiety, restlessness, CVA tenderness, numbness and tingling of digits, loss of motor control, generalized weakness, and diffuse muscular pain (2).

This pilot was faced with the common aviation hazards of increased ambient temperature and intentional dehydration prior to flight to avoid having to urinate during his aviation duties. Additionally, he was an extreme athlete whose intensive training regimen caused multiple episodes of muscular breakdown. Furthermore, the component of protracted submersion in water with temperatures below 60°C further increased his risk of rhabdomyolysis (1). The lack of a temporal relationship between vague symptoms of acute kidney failure and rhabdomyolysis in a hard-training athlete poses further hazard to duties involving flight. As evidenced by this case, muscle soreness (following exertion), headaches, nausea, and fatigue are indistinct and may be dismissed as a mild viral illness, simple dehydration, or delayed-onset muscle soreness as a result of intense physical training. Less likely, but relevant to aviation, is that progression of acute renal failure, development of compartment syndrome, or other complications of rhabdomyolysis present immediate danger in flight due to the possibility of sudden incapacitation (6).

Outcome

Following resolution of his immediate electrolyte and metabolic abnormalities, the patient was discharged and counseled extensively on reducing the intensity and duration of his training program, moving any swimming exercises indoors or restricting them to warmer months, maintaining adequate hydration and caloric intake, and avoiding excessive caffeine consumption. On follow up, the patient was symptom-free, and his laboratory results revealed complete resolution of his kidney failure, with no evidence of residual renal damage. The pseudohypernatremia, increased hematocrit, and inflammatory markers had also corrected and were within normal limits.

The pilot was initially denied medical certification after the acute episode of renal failure and rhabdomyolysis. After remaining asymptomatic for 6 months and getting documentation of normalized lab results, he applied for reconsideration of his medical denial. The case was deferred by the aviation medical examiner to the FAA Aerospace Medical Certification Division. They determined that the applicant was currently in accordance with FAA medical standards and granted him a first-class medical certificate.

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About the Author

Captain Jon Gray is a U.S. Army Resident in Aerospace Medicine serving at the Naval Aerospace Medicine Institute, Naval Air Station Pensacola, Fla. He authored this case report while training at the Civil Aerospace Medicine Institute.

Adult ITP from page 5

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About the Author

Major (Dr.) Alan John S. Delos Santos was a resident in Aerospace Medicine at the USAF School of Aerospace Medicine at Brooks City-Base, Texas. He based his article on cases he reviewed while on clinical rotation at the Aerospace Medical Certification Division at the Civil Aerospace Medical Institute. Dr. Alan Delos Santos would like to thank Dr. Silberman, Dr. Bisson, and Mr. Michael Wayda for their invaluable assistance in preparing this case report.

USAF Disclaimer

Idiopathic Thrombocytopenic Purpura

Incidence. The annual incidence of adult ITP is 0.6 to 6.6% per 100,000. The female incidence is almost twice that of males, but this difference is not seen in the older population (9). The median age of presentation is 38 to 49 years old, and the incidence rate is directly proportional to age (8).

Etiology. Idiopathic thrombocytopenic purpura is an antibody-mediated disorder that is not fully understood, and the widely accepted etiology is phagocystosis of platelets by macrophages in the reticuloendothelial system (3, 4). Other possible pathophysiology that may complicate the disorder are platelet lysis, platelet consumption in the vascular system, platelet dysfunction (4), and decreased platelet production (4, 8).

Presentation. The presenting signs are bruising, purpura, petechiae, epitaxsis, gastrointestinal (e.g., gingival bleeding) and genitourinary mucosal (e.g., hematuria) bleeding, intracranial hemorrhage, and menorrhagia in females (9).

Diagnosis. The diagnosis of ITP can be made when platelet counts are less than 150 x 10^9/L for at least 6 months and other causes of low peripheral platelets have been ruled out (3, 4, 6). Around 21% of ITP patients are symptom-free at the time of diagnosis (8).

Treatment. The management objective of ITP is to prevent further decline in platelet counts to prevent the risk of major bleeding. Treatment is indicated in a symptomatic patient with low platelet counts (5). Around 20 to 30% of patients are refractory to any form of treatment (3). First-line treatment of ITP patients includes steroids, high-dose immunoglobulin, and anti-D immunoglobulin. Second-line treatment is splenectomy, which can achieve partial or complete remission in 60% to 86% of patients (8) and is indicated for patients that do not achieve complete or partial remission, have platelet counts below 10 to 20 x 10^9/ L after 6 months, and are steroid-dependent (8). Splenectomy is considered the most effective and long-lasting treatment modality. Accessory spleen should be looked for and removed if there is no response to splenectomy (5, 8). Third-line therapy for refractory ITP patients includes: danazole, vincristine, vinblastine, cyclophosphamide, cyclosporine, azathioprine, CHOP, and autologous peripheral blood stem cell transplantation. Experimental treatments includes rituximab, mycophenolate mofetil, dapsone, *H. pylori* eradication, and combination therapy (7, 8). Other drug regimens include interferon, colchicine, etanercept, and campth-1H (5).

Prognosis. Adult ITP is a chronic disease that rarely leads to spontaneous remission. The clinical course is unpredictable and is non-fatal with appropriate treatment (9). The risk for a fatal bleed in the setting of low platelet counts is very low, less than 5% (3, 5, 7). Patients with platelet counts of less than 30 x 10^9/L are at increased risk of significant bleeding, usually from an intracranial source. Patients with platelet counts between 40 to 60 x10^9/L are prone to post-traumatic bleeding. The risk for bleeding is increased in the elderly and in those who present with bleeding at diagnosis and very low platelet counts. The 5-year mortality rate for patients 40 years old or less is 2.2%, while for those older than 60 it is 47.8% (1). The other significant cause of death in ITP patients is infection due to weakened body resistance as a result of treatment (6).

The Survey Says...

Here's what you had to say about the Medical Bulletin

By Mike Wayda

With the ongoing use of surveys, we put our heads on the chopping block each time we ask your opinion about what you like or dislike about the articles we publish in the *Federal Air Surgeon's Medical Bulletin*. Fortunately, though, you have been kind and heads are still attached to necks; life goes on. While there has been some blood loss, no major surgery has been required.

Each time aviation medical examiners attend an FAA recurrent seminar, their opinions are solicited about key items of concern, as a serious desire to understand their needs. We do this to ensure that you are getting the best information we can give you and in the most useful design.

We also like to keep a finger on the pulse of our readership to test your acceptance of what we pump at you each quarter, so this is feedback about what you told us during the past two years of collecting data from recertification seminars. If you are among those who responded to the surveys, thank you for sharing your opinions.

Now, here's the scoop. You liked the aerospace medical certification articles best, while you liked the Office of Aerospace Medicine news items least (see Figure 1). In between those are Dr. **Warren Silberman's** Issues and Answers (2), aerospace medical case reports (3), Dr. **Fred Tilton's** editorials (4), Best Practices (articles about mature AMEs who are exemplary in their practices (5), Dr. **Dick Jones**' Quick Fix articles (6), and AME contributions, which have been sparse, generally in the form of letters to the editor (7).

Bottom Line. You'll notice there is not much of a spread between the most popular (or most often read) article and the least popular: only about 17 points, so we know from your responses that you read most of the articles, only some were read first and others later—usually.

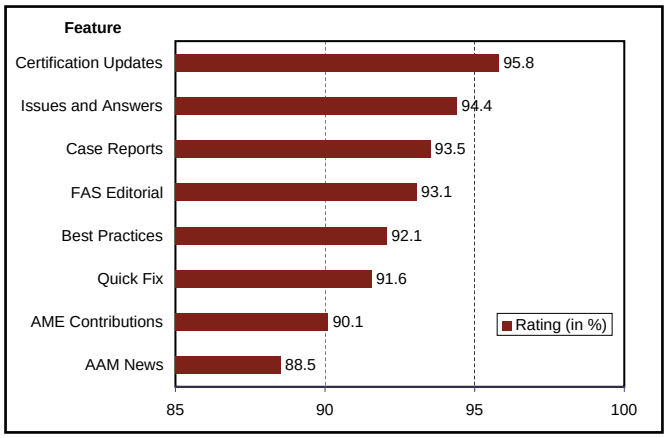

Figure 1. Readership survey results from AME Seminar participants, 2007-2008.

We know that you are busy practitioners, so we try not to clutter with "fluff," and we really do listen to your evaluation of what you read in the *Bulletin*.

A few years ago, someone wrote in that he was "sick and tired of seeing pictures of smiling feds shaking hands with smiling feds!" so from that day on, we made sure no one in the photos was smiling.

Seriously, though, we did cut back on the award photos and now try to limit such instances of "smiling feds" to those feds you should know because you may come in contact with them—like new Regional and Assistant Regional Flight Surgeons—and if you haven't met them, wouldn't it be nice to know what they look like the next time you call with a question or problem?

If there are items about the newsletter you like or dislike, don't wait for your next recurrent seminar to inform us. As the saying goes, "keep those cards and letters coming," only now it's simple enough to dash off an E-mail and communicate. Let someone know while whatever it is still is on your mind. The most available target is your editor, so here's that address to remember:

Mike.Wayda@faa.gov.

Safety Brochures. We also know that you use the pilot safety brochures that are both online and available through the AAM-400 shipping clerk. Last fiscal year, more than 79,000 brochures were distributed on 20 topics, and about 68% of AMEs said they distributed them among their pilots.

After all, that's the whole purpose behind pilot safety brochures (the *Medical Facts For Pilots* series): aviation safety through aeromedical education. Strive to get vital information about physiological aspects of the aviation environment into the hands of those who can benefit from such information. In so doing, we can reduce the number of aviation accidents and deaths.

New Brochure. Dr. **Dick Jones**, manager of the Aerospace Medical Education Division, announces the publication of *Fit for Flight,* a new brochure about the benefits of physical conditioning.

To order a supply for your pilots, contact:

Gary.Sprouse@faa.gov

(405) 954-4831

And, while we are at it, thank you for your efforts on behalf of aviation safety. We really appreciate you!

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Aviation Medical Examiner Seminar Schedule

2009		
June 5 – 7	San Antonio, Texas	CAR (1)
July 20 – 24	Oklahoma City, Okla.	Basic (2)
October 14 –17	Rochester, Minn.	CAMA (3)
November 2 –6	Oklahoma City, Okla.	Basic (2)
November 20 – 22	Seattle, Wash.	OOE (1)
2010 (Tentative)		
January 22 – 24	Atlanta, Ga.	CAR (1)
March 1 – 5	Oklahoma City, Okla.	Basic (2)
April 8 – 11	Salt Lake City, Utah	N/NP/P (2)
May 8 – 13	Phoenix, Ariz.	AsMA (4)
July 12 – 16	Oklahoma City, Okla.	Basic (2)
August 5 – 7	Washington, D.C.	OOE (2)
October 6 – 9	Orlando, Fla.	CAMA (3)
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) A 4½-day basic AME seminar focused on preparing physicians to be designated as aviation medical examiners. Call your Regional Flight Surgeon.

(3) 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.

(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.

Separations from page 3

Unapproved or no office. At the urging of Congress, we are making more frequent visits to AME offices. We are trying to visit all new AME offices and those AMEs about whom we have suspicions based on pilot complaints, but we are also evaluating other AME offices in the vicinity of one being visited for a reason. A few were found to not have proper offices.

Medically unfit. I was unsure whether to code this as an involuntary or voluntary separation, but the region called it involuntary, so I did not second guess. There was no clarifying note to explain if we discovered the inability to do examinations or if the AME told us without prompting. Now that we are doing site visits, I expect to see more cases where the observer determines the AME has a physical disability that prevents adequate examination of pilots.

I hope this discussion prevents unnecessary termination. At the very least, you all deserve to know what we are doing. You will note very few of the terminations were for true performance problems but are mainly administrative or inattention to detail.

I am very proud of the quality of our AME team and appreciate all that you do for pilots!

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Dr. Jones manages the Aerospace Medical Education Division.

Correction

In the last issue, we incorrectly listed Ms. **Janet Wright's** E-mail address (*Who You Gonna Call?* Vol. 47, No. 1, p. 10). Please note the correct listing: **Janet.E.Wright@faa.gov.**

As Team Leader for the Aviation Medical Examiner Program, Ms. Wright manages the seminars, develops training materials, and is responsible for the Continuing Medical Education accreditation processes.