



Federal Air Surgeon's Medical Bulletin





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

U.S. Department of Transportation
Federal Aviation Administration

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QUICK FIX

Pilot Feedback on Aviation Medical Examiners

By Richard 'Dick' Jones, MD

PROBLEM

Results of the 2006 FAA Aerospace Medical Services Airman Customer Satisfaction Survey are in! A total of 15,755 surveys were received by airmen and 6,425 were returned, a 41% response rate. There were many interesting findings in these results that we can cover another time in this space, but today I want to focus on only a couple of problem areas.

Fifteen per cent of airmen responded "No" when asked, "Did the aviation medical examiner (AME) with whom you had the appointment review your medical history with you?"; 7% said the history was reviewed by a non-AME physician, 15% by a non-physician, and the remaining 79% said there was no history review. Four per cent of airmen reported their evaluations were not done by the person with whom they had the appointment; of these, 70% were done by non-physicians, 17% by a non-AME physician, and 13% said they were not examined at all.

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AME Independent Medical Sponsors Needed

Training Available for Treating Substance Abuse in Pilots

By Michael A. Berry, MD

The Federal Aviation Administration needs more experienced aviation medical examiners to become trained as Independent Medical Sponsors for the Human Intervention Motivation Study, better known as the HIMS program. There are many portions of the country with few or no such aviation medical examiners. The continued success of this extremely important safety program is dependent on experienced, well-trained AMEs.

Background

HIMS was initiated in the early 1970s in the industrial setting because it is the most effective place to intervene in the addiction process. The program grew out of a study grant from the National Institute for Alcohol Abuse and Alcoholism and the Air Line Pilots Association. The

HIMS concept is based on a cooperative and mutually supportive relationship between pilots, the Federal Aviation Administration, and management to effectively address the problem of substance abuse in pilots. With proper treatment, the rehabilitation of airline pilots with alcohol or substance abuse problems can be successful and cost-effective.

The major components of the FAA program are: diagnosis by a trained addiction professional, treatment, comprehensive continuing care, long-term monitoring, and total abstinence from alcohol. A pilot must be evaluated and monitored by an experienced and specially trained aviation medical examiner who acts as the pilot's sponsor.

Continued on page 3

Xpress Has Departed the Fix

HELLO EVERYONE. We launched the latest release of the Document Imaging and Workflow System (DIWS), FAA MedXPress (Xpress), on the West Coast on April 16.

XPress will be available to the central part of the country in mid-May, and everyone else in mid-June. For those of you who have not heard about XPress, don't be alarmed. You will receive a lot more information about it in the coming weeks. XPress allows pilots to fill out their Application for Airman Medical Certificate, FAA Form 8500-8, online; and then transmit it directly into DIWS. When the airman arrives at your office, you can call up the form in your system and use it to complete the physical.

Paperless Process Planned

Our goal is to eventually have a system that is entirely paperless. In fact, it is already possible to accomplish an exam using without paper if both you and the



airman elect to do so. However, I realize that this is a giant leap, so we are starting slow. Neither you nor the airman is presently required to use XPress.

For the airmen who want to use it, we are recommending that they print a paper copy and bring it with them to your office. If you are prepared to use XPress, you can retrieve the electronic version from our Web site, complete the physical, document your findings, and transmit the completed exam to us without ever touching a piece of paper. If your office is not ready to take the total electronic leap, you can have the airman "do it the old-fashioned way."

Further Refinements Coming

I think you will also be glad to know that we are currently working on another release that will allow you to print certificates. We are very excited about XPress. It will help speed up the physical examination process, reduce transmission errors, and make us all more efficient.

Operation Safe Pilot

In 2004, the Inspectors General from the Department of Transportation and the Social Security Administration jointly initiated an investigation in central and northern California called *Operation Safe Pilot*. Their purpose was to determine if there were people who were fraudulently collecting Social Security benefits for total disability and/or falsifying their FAA medical applications. Indeed, they actually found such individuals, and as a result, federal

criminal charges were filed against 45 airmen for: Social Security fraud, making and delivering a false official writing, and making false statements to a government agency. These pilots had their airman and medical certificates revoked, paid monetary fines, and were placed on probation; a few were convicted of Social Security fraud.

The foundation of the medical certification system is truthfulness. We must be able to rely on the information provided to us by our airmen. I believe that the system is inherently safe because most people are honest. However, at least in California, some people were willing to break the law and risk their flying privileges, their reputations, and possibly their flying careers by falsifying their medical certificate applications. Such falsifications could also have affected the safety of the National Airspace System.

FAA medical certification history shows that we are able to medically qualify most applicants, even those with potentially disqualifying medical conditions. The unfortunate California experience demonstrates that there are significant consequences when an applicant falsifies his or her medical certificate application.

Please discuss this issue with your applicants when they come to your office for their examination. Inform them about these events, and let them know that we will do everything we can to help them become medically certified. You should also let them know that once they have falsified their medical certificate application, there is no way to turn back. In my opinion, the risk is not worth it!

New Regional Flight Surgeon in Southern

On a much more pleasant note, I want to take this opportunity to announce that we have a new Southern Regional Flight Surgeon. **Susan Northrup** took over the reins on April 30 from **David Millett**, who retired in January. Susan is a wonderful addition to our FAA team, and I know you will have fun working with her. You can read all about her on page 3 of this issue.

—Fred

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Susan E. Northrup, MD, MPH

A Biography of the New Southern Regional Flight Surgeon

DR. SUSAN E. NORTHRUP, recently selected by the Federal Air Surgeon as the Southern Regional Flight Surgeon, was born in Dayton, Ohio, and graduated from The Ohio State University in 1985 with a commission via the Air Force Reserve Officer Training Corps. She graduated from The Ohio State University College of Medicine in 1989 and interned in Family Medicine at The Ohio State University Hospital in 1990.

She then entered active duty at Moody AFB, Ga., and earned a Masters of Public Health degree from the University of Texas in 1994, the USAFSAM Residency in Aerospace Medicine in 1995, and the USAFSAM Occupational Medicine Residency in 1996. She obtained the



American Board of Preventive Medicine's certification in both specialties.

A colonel in the U.S. Air Force Reserve, Dr. Northrup has more than 600 hours of flying. Prior assignments include Chief of Operational Medicine for the USAF at Bolling AFB, Chief of Aerospace Medicine at Pope AFB, N.C., and as Flight Surgeon for the 69th Fighter Squadron, Moody AFB, Ga., during and after *Desert Storm*.

She transitioned to the USAF Reserve in 2001 as the Reserve Consultant for the HQ ARFC/SGP. Her civilian position until 2005 was as Delta Air Lines' regional medical director for air crew and passenger health services. Since 2005 she performed Reserve duties as the Chief, Reserve Consultant to the Chief of Clinical Services, Air Force Reserve Command and the Chief of the Reserve Line of Duty Board.

Active in professional organizations, Dr. Northrup is a Fellow of the Aerospace Medical Association, co-chairs their scientific program and registration committees, and a member

of several other committees. She has been elected to the American Board of Preventive Medicine as one of the three aerospace medicine members. She is the president-elect of the Civil Aviation Medical Association and editor of their *FlightPhysician* newsletter.

In addition, she is a member of the International Academy of Air and Space Medicine, the Society of United States Air Force Flight Surgeons, the Reserve Flight Surgeons Association, the Airline Medical Directors Association, the American Medical Association, the American College of Preventive Medicine, the American Legion, and the Reserve Officer Association. From 2002 to 2005, she chaired the medical committee of the Air Transport Association, setting airline industry standards and medical response plans for the U.S. carriers.

A private pilot and the co-owner of a Harvard Mark IV Warbird, Dr. Northrup lives in Peachtree City, Ga., with her husband and their two sons.



QUICK FIX from page 1

RESULT

We have long received anecdotal reports from pilots that we have AMEs in our system who do not perform examinations up to FAA standards. We now have some quantification of the problem. It is particularly disturbing that airmen are having medical examinations and histories done by non-physicians and non-AMEs. This practice is a direct violation of federal regulations, which stipulate that all FAA examinations must be performed by AMEs and that AMEs must be physicians. When it comes to our attention that an examination has been done by someone

other than an AME, the examination must be repeated by another AME and we investigate the AME whose practice was involved for other similar instances of policy violations.

SOLUTION

All AMEs must ensure they personally perform examine all applicants for whom they issue a medical certificate and personally review each medical history with the applicant. Any deviation from this policy will warrant termination of the responsible AME's designation.



Dr. Jones manages the Civil Aerospace Medical Institute's Aerospace Medical Education Division.

AME SPONSORS from page 1

HIMS Training

The next HIMS training seminar will be conducted in Denver, Colo., September 10-12, 2007. If you are interested in attending or would like more information about becoming an AME Independent Medical Sponsor, please contact:

Michael A. Berry, MD
FAA Headquarters, AAM 200
800 Independence Ave., SW
Washington, DC 20591
(202) 267-8035



Dr. Berry manages the Medical Specialties Division at Federal Aviation Administration headquarters in Washington, D.C.



Certification Update

Information About Current Issues

By Warren S. Silberman, DO, MPH

TURBOMEDICAL UPDATE: As you may recall, the Aircraft Owners and Pilot's Association (AOPA) developed the capability for its members called TurboMedical. TurboMedical allows an airman to go into the AOPA Web site and complete the front side of the FAA Form 8500-8 (medical history). Positive responses to questions prompt the airman with educational information on how the FAA wants him or her to respond and links the airman to different places on their Website, such as AOPA's list (not FAA-sanctioned) of acceptable medications.

TurboMedical looks just like the FAA medical form. If an airman presents you with an AOPA TurboMedical form, you may accept it. However, there are then a couple of extra steps you will be required to take. Assure that the airman has signed the TurboMedical form. Then take an official FAA medical exam form (Form 8500-8) and have the airman sign the front side of that form as well. Use the medical certificate from the FAA form to get the "FF" number. Then attach both forms together, and submit them just as if the airman were completing only the official FAA form. If the airman refuses to sign a blank 8500-8, the airman will have to transfer all the information from the TurboMedical to our form.

I understand that some AMEs have confused the TurboMedical form with the new FAAMedXpress that we have talked about in previous bulletins and that Dr. Tilton discusses in his edito-

rial in this issue of the *Bulletin* [see page 2]. Please do not confuse the two forms—they are not the same.

By the way, the *Federal Air Surgeon's Medical Bulletin* covers many different subjects. I strongly suggest that you share it with members of your staff and that you also make it available in your waiting rooms for others to read if they wish.

Finally, in a recent review of issued medical certificates, we found that approximately 90% of AMEs had not included proper restrictions on the medical certificates of airmen who reported taking the acne medication Accutane (Isotretinoin). Accutane may cause a decrease in night vision. Therefore, all airmen taking this medication must have the restriction: NOT VALID FOR NIGHT FLYING. We are sending the affected airmen corrected certificates, and the AMEs who issued the medical certificates will receive an error letter.

Issues and Answers—Case Presentations in Malignancies

1 A 50-year-old male airman comes into your office for an FAA second-class medical examination. He reports that he had cancer of the descending colon six months ago, and a resection left him with a permanent colostomy. He provides you with the medical records from his hospitalization: the history and physical examination, discharge summary, operative and pathology reports, and a CEA (carcinoembryonic antigen) level. The pathology report indicates that the tumor did not penetrate the serosa of the bowel. The tumor was low in the colon and required a colostomy. The airman did not receive any treatment other than the surgery, and his current CEA antigen and blood counts are normal. His colostomy has been functioning well, and he is being regularly observed by his physician. If the examination was otherwise unremarkable, would you issue this airman a medical certificate?

Answer: No. Any malignancy is disqualifying. If an airman reports a medically disqualifying condition, you may not issue a certificate without verbal or written permission from either your Regional Medical Office or the Aerospace Medical Certification Division. This is true even if the airman has provided all the documentation that we would require.

In general, the FAA does not grant medical certification to airmen with malignancies until one year after treatment. In this particular case, however, we felt that the airman was sufficiently out from his surgery. He provided all the necessary documents needed to make a decision, and we granted medical certification. The airman was placed on a six-year Authorization for Special Issuance (waiver), requiring yearly current status reports and carcinoembryonic antigen levels.

2 A 45-year-old female airline transport pilot with a first-class medical certificate had infiltrating ductal breast cancer. After an axillary lymph node dissection, her pathology report showed that 11 out of 17 nodes were positive. Her only medication was tamoxifen (Nolvadex). What actions would you take for her medical certification?

Answer: In the past, we would have denied such airmen and required that they be grounded for three years. The only node-positive airmen we allowed to go right back to flying were those with positive nodes in the axillary tail of Spence. However, we now grant certification to individuals with axillary node positive disease upon the conclusion of their treatment. The applicant must have a brain MRI with no evidence of metastasis and a negative chest scan.

Continued on page 5

Dr. Silberman manages the Civil Aerospace Medical Institute's Aerospace Medical Certification Division.

Annual follow-up status reports with either a chest X-ray or CT scan of the chest and an MRI of the brain will be required for five years.

'Any malignancy is disqualifying.'

3 A 50-year-old airman with a third-class medical certificate has chronic myelogenous leukemia, Philadelphia chromosome-positive. The airman is taking Gleevec (imatinib mesylate). He provides you with a favorable medical status report and complete blood count. The white blood cell count and the platelet count are within normal limits. Can this airman gain third-class medical certification?

ANSWER: Yes. Gleevec inhibits Bcr-Abl tyrosine kinase, which is the abnormal tyrosine kinase that the Philadelphia chromosome creates in this form of leukemia (1). We require them to provide a status report and complete blood count every six months.

'In general, the FAA does not grant medical certification to airmen with malignancies until one year after treatment.'

4 A 48-year-old female second-class airman who flies for a small commercial operation presented with a solitary thyroid mass one year ago. A nuclear scan and needle biopsy of the mass demonstrated thyroid cancer, and a total thyroidectomy was performed. The pathology report came back as papillary thyroid cancer with four lymph nodes. She provided the necessary reports, and the AME properly deferred the case. Would you grant this airman a special issuance?

ANSWER: Yes, we frequently grant full privileges to airmen with this malignancy through the special issuance process. Papillary carcinoma is the most common thyroid malignancy, with >70% of thyroid tumors of this type. Cervical metastasis to lymph nodes in the neck is present 50% of the time in small tumors

and 75% in larger ones. The presence of positive cervical nodes means a higher recurrence rate but not a higher mortality rate. The peak ages for this tumor are from 30 to 50. The female-to-male ratio is 3 to 1. Treatment is total thyroidectomy for tumors that have spread to the cervical nodes, and usually I 131. Follow-up for this tumor includes yearly status reports and a serum thyroglobulin level. If the level is elevated, it usually means recurrence (2).

References

1. Harold CE, Priff C (2008). Physician's Drug Handbook, 12th edition; pages 630-1; Philadelphia, PA: Lippincott Williams and Wilkins.
2. Thyroid nodules. EndocrineWeb.com. www.endocrineweb.com/nodule.html. (Accessed 3/10/2007).



Outdated ECG Machines to be Deactivated June 1

ON MAY 26, 2006, the Aerospace Medical Certification Division (AMCD) sent all Senior AMEs a letter advising them that one of the servers receiving transmissions from some ECG machines will be deactivated on June 1, 2007, which requires you to make alternate arrangements for first-class pilot ECG transmissions. The affected ECG machines are:

MANUFACTURER	MODEL NUMBER
GE/Marquette	MAC 6
GE/Marquette	MAC 8
GE/Marquette	MAC 12
GE/Marquette	MAC 15
GE/Marquette	MAC PC
GE/Marquette	MAC VU

If you utilize one of these machines, you will need to acquire equipment compatible with our server capability. For more information, please refer to the document that was attached to the May 26, 2006, letter: "Options for Participation in the FAA ECG Administrative Data System." This document is a guide for making arrangements for transmitting ECGs to the Aerospace Medical Certification Division and includes the name and phone number of several manufacturers of ECG equipment.

NOTE: If you are purchasing equipment, it is imperative that you first consult with the FAA Technical

Support Line at (800) 681-8687. They are able to answer compatibility questions and guide you in setting up test transmissions, etc.

You must notify the AMCD regarding arrangements you have made regarding this matter.

Thank you for your attention to this important matter.

Warren S. Silberman, DO, MPH
Manager, AMCD
Civil Aerospace Medical Institute



Medical Specialties Division Manager Selected

By R. Mark Adams

MICHAEL A. BERRY, MD, is the new manager of the Medical Specialties Division in the Office of Aerospace Medicine. He began his position in the Federal Aviation Administration headquarters office on November 1, 2006.

Dr. Berry is responsible for developing aerospace medicine policies and procedures, administering the medical appellate process, providing oversight of employee drug and alcohol testing, managing and administering psychiatric and medical review officer functions, and providing aerospace medicine expertise and advice to the Federal Air Surgeon.

A widely known and highly respected physician with more than 30 years of professional experience in aerospace medicine, Dr. Berry gained this experience practicing as a flight surgeon in the United States Air Force (USAF), with the National Aeronautics and Space Administration (NASA), and as an FAA senior aviation medical examiner in private clinical practice. Dr. Berry was also a designated Civil Aviation Medical Examiner for Canada and is board-certified in aerospace medicine. He is a distinguished speaker and has authored many aerospace medicine publications, including peer reviewed journal articles and chapters in textbooks.

His professional career began with service in the USAF from 1971 to 1976. Next, he was the Chief of Flight Medicine at the NASA Johnson Space Center in Houston, Texas, from 1978 to 1981. He was a partner and vice-president of Preventive and

OAM NEWS

Office of Aerospace Medicine



Aerospace Medicine Consultants (PAMC) from 1982 until his appointment with the FAA. At PAMC, Dr. Berry gave airmen medical certification examinations to a large pilot patient base and was a consultant to NASA, Krug Life Sciences, Delta Airlines, Southwest Airlines, Continental Airlines, ExpressJet Airlines, and others.

Dr. Berry earned a B.S. degree from Texas Christian University and a medical degree from the University of Texas Southwestern Medical School. He completed the primary course in Aerospace Medicine at the School of Aerospace Medicine, Brooks AFB, San Antonio, Texas, and then earned an M.S. in preventive medicine from The Ohio State University. He completed his residency in aerospace medicine in 1978.

He has been an active member and held leadership positions in many professional organizations, including the American Medical Association, the Civil Aerospace Medical Association, the Aerospace Medical Association, and the International Academy of Aviation and Space Medicine. Dr. Berry has received numerous awards from these organizations for his contributions.

Remarking on Dr. Berry's selection, Federal Air Surgeon **Fred Tilton, MD**, said, "We are very fortunate to be able to attract a physician of Mike Berry's stature and abilities to our organization. His management experience and exceptional knowledge of aerospace medicine will be very valuable assets to the FAA and the Office of Aerospace Medicine management team."

Mr. Adams manages the Program Management Division at FAA Headquarters in Washington, D.C.

2006 Aerospace Medicine Awards for Excellence and Achievement Presented

FEDERAL AIR SURGEON FRED TILTON, MD, presented the 2006 Aerospace Medicine Awards for Excellence and Achievement and highlighted each individual's and team's contributions to the success of the organization. In addition, a "Friend of AAM" award was given to an individual outside of AAM who provides excellent support to AAM's work and mission. The 2006 winners are:

OUTSTANDING MANAGER

Carol A. Kelly, Program Management Division, Headquarters

OUTSTANDING LEADERSHIP

Charles A. DeJohn, DO, CAMI

OUTSTANDING INNOVATOR

Richard L. Butler, CAMI

OUTSTANDING TEAM

ISO-9001:2000 Team, Headquarters

ADMINISTRATIVE EXCELLENCE (4-WAY TIE)

Lisa M. McWhinney, CAMI

Denise D. Patterson, CAMI

Lori J. Stormo, Drug Abatement Division, Headquarters

Helen Hnarakis, Program Management Division, Headquarters

THE WILLIAM E. COLLINS PUBLICATION AWARDS

Cristy A. Detwiler, CAMI

Jing Xing, PhD, CAMI

AAM MISSION SUPPORT

Noal D. May, PhD, CAMI

OUTSTANDING CUSTOMER SERVICE

Kathy E. Murby, New England Region

FRIEND OF AAM

Charles A. Davis, Office of Quality, Integration, & Executive Serv.

FLIGHT SURGEON OF THE YEAR

Warren S. Silberman, DO, CAMI

INSPECTOR OF THE YEAR

Ronald C. Katana, Drug Abatement Division, Headquarters

REGIONAL EMPLOYEE OF THE YEAR (TIE)

Jeanne Rafferty, RN, Eastern Region

Kara M. Semer, Northwest Mountain Region

AAM OFFICE OF THE YEAR

Program Management Division, Headquarters



Metastatic Hurthle Cell Carcinoma and Medical Certification

Case Report, by Michael McGinnis, MD, MPH

Thyroid carcinoma is the most common malignancy of the endocrine system. Thyroid cancers generally have a favorable prognosis but require ongoing follow-up. Surgery is the treatment of choice. Thyroglobulin can be useful tumor marker for disease surveillance. Disease impact on safety of flight is the primary aeromedical concern.

Background

A 65-year-old female with a history of Hurthle cell carcinoma (HCC) of her thyroid presented to her aviation medical examiner (AME) for renewal of her time-limited special issuance for her second-class medical certificate.

The pilot reported that she had been doing well. Her cancer was originally diagnosed ten years ago after she noted a lump at the base of her neck. Fine needle aspiration (FNA) was positive for Hurthle cells. Laboratory evaluation revealed markedly elevated thyroglobulin levels without significant levels of anti-thyroglobulin antibodies. She received a total thyroidectomy, which revealed foci of capsular invasion. Two regional lymph nodes were positive for HCC. The pilot received adjuvant radioiodine remnant ablation and suppressive doses of thyroid hormone replacement (goal TSH < 0.1 µIU/ml).

Unfortunately, this pilot suffered multiple clinical recurrences of her thyroid cancer over the following ten years. She received two courses of radioactive I131, as well as a course of whole-body irradiation in unsuccessful attempts to eradicate her disease. Of note, her thyroglobulin level has remained detectable throughout.

A recent CT scan of her neck and chest revealed low-grade lymphadenopathy of her cervical, lung, and mediastinal lymph nodes. These CT results were not significantly different from a CT performed six months earlier. The pilot's specialist noted that her thyroglobulin level remained markedly elevated at 420 ng/ml (normal range for the lab, 2.0-35.0 ng/ml), consistent with the continued presence of her thyroid cancer. She did not have significant levels of anti-thyroglobulin antibodies. Her specialist noted the slow clinical course of her disease and gave her an "excellent" prognosis. The specialist stated that the chance of the pilot having an event that

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HURTHLE CELL CARCINOMA: ETIOLOGY

Thyroid cancer can be classified as the following (with relative frequency):

- Differentiated (85%)
 - Papillary (majority of cases)
 - Follicular
 - Hurthle cell
- Medullary (8%)
- Undifferentiated/anaplastic (5%)
- Other – lymphoma, metastatic

Risk factors for thyroid cancer include external radiation to the neck and familial syndromes. The general lag time from radiation exposure to manifestation of disease ranges from 10 to 20 years (1).

A FNA should be performed on any suspicious thyroid mass, as most cases of thyroid cancer can be diagnosed by FNA. Benign thyroid masses on FNA that are < 1cm in size have a low risk for future malignancy and may be followed without treatment. Aspiration carries a 1-5% false negative rate; clinical suspicion guides the need to further pursue negative or non-diagnostic biopsies. Diagnostic work-up should also include laboratory testing (TSH, serum calcium, thyroglobulin level) as well as imaging (ultrasound, CT) of the neck.

Surgery is the initial management strategy for almost all patients with thyroid cancer. Common adjuvant therapy includes radioiodine remnant ablation to eliminate any residual thyroid tissue and administration of suprathreshold doses of thyroid hormone to suppress TSH (2). Post-operative chemotherapy is infrequently indicated.

Hurthle cell carcinoma is considered a variant of follicular carcinoma and has unique features. HCC typically does not take up iodine and is not TSH growth-dependent, thus decreasing the efficacy of radioiodine ablation as well as TSH suppression.

Disease surveillance includes radionuclide imaging (whole body-scanning for areas of iodine uptake) and assessment of thyroid-specific tumor markers (thyroglobulin).

Thyroglobulin is synthesized from thyroid tissue only. Most differentiated tumors of the thyroid synthesize thyroglobulin; however, medullary and undifferentiated thyroid tumors rarely produce thyroglobulin (3). Post total thyroidectomy, thyroglobulin can be a sensitive marker for the continued presence of thyroidal tissue. Anti-thyroglobulin antibodies interfere with the accurate measurement of thyroglobulin and are present in up to 20% of patients with thyroid cancer. The presence of anti-thyroglobulin should be assessed when initially measuring thyroglobulin levels.

The overall thyroid cancer death rate is <10%. There are multiple prognostic scoring systems for thyroid cancer. All weigh the presence of extrathyroid involvement and distant metastases; most include patient age and tumor size (2). Patients <45 years of age with tumor size less than 2cm have the most favorable prognosis.

Complex Partial Seizures

Case Report

By Kathleen Jones, MD, MPH

Complex partial seizures arise from a single focus in the brain and cause an impaired level of consciousness. Although these seizures can occur at any age, they are more common in adults.¹ The true incidence of complex partial seizures is difficult to determine. In this article, a case of complex partial seizure disorder is reported in an airline transport pilot, along with a discussion of the seizure disorder and its aeromedical implications.

HISTORY. A 37-year-old male airline transport pilot arrived for duty, appearing to be in his usual state of good health. He met his crew at the airport, walked through the airport terminal with his copilot, boarded the aircraft, and started pre-flight checks. Several minutes into his checks, he recalls feeling a sense of “the picture changing.” He became confused as everything felt unfamiliar to him; he was in a place and time he didn’t recognize. He recalls nothing else until he “awoke” feeling fatigued, disoriented, and confused. His copilot told him that he had been staring ahead “blankly” for the past minute. The copilot shook the airman, but he did not respond but just kept picking at the leg of his pants. The pilot then pulled himself off the flight and went home.

Two days later, he presented himself to the university hospital, where he was seen by a consulting neurologist. The airman confessed that this was not the first such incident. He had experienced at least 3 other such incidents, but none had been while at work. These occurrences had been happening for the past 3 months without regularity or predictability. He recalls one occurring while sitting in his backyard watching his children play in the pool. He felt

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COMPLEX PARTIAL SEIZURES

Complex partial seizures, while perhaps the most common form of epilepsy, remain an interesting diagnostic dilemma. Although they can arise from any cortical region, complex partial seizures typically arise from the temporal lobe. The temporal lobe is the seat of auditory, olfactory, higher visual, emotional, memory, and social functioning. It serves partly as a link for sensory and emotional experiences between the past and present.¹ It is the temporal lobe location and resultant symptomatology that can make diagnosis a challenge.

Complex partial seizures of the temporal lobe can be tentatively localized based on medical history and symptomatology.¹ Medial syndromes tend to have a long interval between the original insult and the onset of seizures. The aura is more likely to be characterized by a distinct rising abdominal sensation or a feeling of fear. They often arise in individuals with a history of febrile seizures during childhood, meningitis, or mesial temporal sclerosis. Lateral syndromes have a shorter latent period and are rarely attributed to a childhood febrile seizure. The aura is more typically one of déjà vu, jamais vu, depersonalization, or vertigo. They occur in individuals with head trauma, brain tumors, or cortical dysplasia. With regard to hemispheric location, right-sided seizures tend to result in distortions of visual, spatial, and geographic orientation. Left-sided seizures tend to impact verbal memory.

A complex partial seizure typically starts with a sensation of fear, a distinct rising sensation in the abdomen, or a feeling of unreality.² The sensation of unreality is often one of jamais vu, the contrary of déjà vu, in which the individual feels he is experiencing familiar people, places, and events as if for the first time. The patient will be noted by others to have a blank stare and be unarousable. Although not universal, most patients will also have an oral or motor automatism, such as lip smacking, licking lips, hand patting, or picking at something repetitively. The seizure will last anywhere between 30 and 180 seconds.³ Immediately postictal, the patient will often experience lethargy, confusion, and some degree of amnesia; will know that the perceptions occurred and were not real but may be unaware of the passage of time and the extent of the misperceptions.

Two complications that concern. First, complex partial seizures may generalize, and status epilepticus can be manifested by prolonged episodes of waxing and waning consciousness. Second, up to one-third of patients diagnosed with temporal lobe epilepsy suffer from interictal depression.² The rate of suicide in individuals with this disorder is 10 times higher than that of the general population.² Because the temporal is the most common lobe involved in complex partial seizures, depression is a major concern in these patients.

Diagnostic dilemma. Essentially, this is a condition in which the symptoms, although characteristic, are often overlooked or confused with other conditions. Among the differential diagnoses to consider are migraine headaches and hypoglycemia. However, psychiatric conditions comprise a greater part of the differential list. Schizophrenia, panic disorder, and stress reactions can mimic complex partial seizures. Complicating this picture is that multiple interictal EEGs may be normal and the MRI negative. In fact, up to 10% of patients with complex partial seizures may never have an EEG correlation.¹ Although 24-hour EEG monitoring may assist in reducing this number, this is only true if a seizure can be induced. There are cases scattered throughout psychiatric literature documenting patients treated for psychiatric disorders that actually had a complex partial seizure disorder. The key to diagnosis of complex partial seizures is, as with most of medicine, contained in the history of the patient and any witnessed accounts.

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the scene shift into something he didn't recognize, that he was surrounded by unfamiliar people in an unfamiliar location. He has no idea how long that incident lasted, but nobody else noticed it. He remembers feeling very lethargic, uncoordinated, and dizzy after he "awoke."

His medical and family histories were negative for seizures, migraines, and psychiatric illnesses. He did fall once 18 months earlier during motocross racing and suffered head trauma, but states that he "probably" didn't have any loss of consciousness. He was on no medications, drank alcohol socially, and denied any illicit substance use. He smoked 1 to 2 packs of cigarettes daily. He was in the midst of a divorce and child custody battle. He admitted to poor sleep, perhaps getting only 2 to 4 hours each night for the previous several months. He also said that he engaged in "drive-through cooking" when his children were not visiting and he had been skipping meals.

Head CT, brain MRI, and EEG were normal, as was a physical exam with a fully documented neurological exam showing no deficits. His laboratory tests were normal, including glucose. His toxicology screen was negative. He was diagnosed with probable complex partial seizures.

AEROMEDICAL DISPOSITION. The FAA has determined that epilepsy and other seizure disorders are disqualifying. They may be considered for special issuance once the airman has been seizure-free and off medications for 10 years. A full neurologic evaluation with a follow-up EEG is required. The potential for sudden incapacitation with complex partial seizures cannot be overstated. The sense of depersonalization and derealization, as well as the impairment of consciousness, presents a serious threat to safety. Complicating this picture is that many patients (usually men) choose not to report ongoing seizures so they can maintain driving privileges. Obviously, it is imperative that the physician

thoroughly educates the patient on the consequences of such actions for both driving and flying. It is incumbent on the AME to carefully question patients with this diagnosis about any continuation of symptoms.

CASE OUTCOME. The airman in this case reported his condition after experiencing a probable seizure in the cockpit. He was diagnosed with complex partial seizures and started on Depakote (divalproex sodium). He continued the medication for 2 months but then stopped due to side effects. Around this time, he proceeded to seek out the opinions of other neurologists. All told, he consulted 5 separate neurology practices until the last physician concluded there was no evidence of a seizure disorder. Once he had the results of that consultation, the airman attempted to secure the return of his medical certification. However, review of that consultation revealed the airman had been disingenuous with the consultant and that the consultant had not received any records of the initial consultation. The airman had given the physician no information other than "decreased concentration" for a few seconds. He withheld information on a witness to his seizure in the cockpit. He also withheld any information relating to his sense of derealization, the hand automatism, and the postictal fatigue and confusion. After review of his case, the airman was denied his medical certification until he meets the 10-year seizure-free standard.

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would impair her ability to fly an aircraft as being extremely remote.

Given the evidence of metastatic disease, her AME deferred her case to the Aerospace Medical Certification Division (AMCD) for evaluation.

Aeromedical Concerns. Safety of flight is the primary concern. Individuals with medical conditions that place them at risk for sudden incapacitation will not receive certification to fly.

This pilot has lymphadenopathy of her neck and chest consistent with metastatic thyroid cancer. The elevated thyroglobulin level supports this diagnosis.

The AME deferred this pilot for certification under Title 14 of the Code of Federal Regulations (CFR), revised Part 67, under Section 213 (b)(c). The Aerospace Medical Certification Division found the pilot to be ineligible for routine medical certification under these regulations.

Outcome. The AMCD requires one year of recovery after treatment for metastatic cancer prior to consideration for special issuance. The pilot's slow progression of HCC metastatic disease, the low likelihood of sudden incapacitation, and the favorable prognosis from the consulting physician all resulted in a favorable AMCD assessment.

This airman was eventually granted a special issuance by the AMCD because her medical condition was stable, despite being potentially progressive. An authorization letter for time-limited special issuance was granted by the Federal Air Surgeon via the AMCD under 14 CFR §67.401. Reports of pertinent laboratory tests (thyroid function, CBC, thyroglobulin and liver associated enzymes), detailed specialist evaluation, and interval CTs of her neck and chest will be required for future special issuance renewal.

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Medical Certification of Pilots With Lower-Extremity Amputations

Case Report, by William E. Nelson MD, MPH

More than 1.2 million Americans live with absence of a limb. Modern prosthetic limbs, talented prosthetists, and enthusiastic therapists enable many motivated individuals with absent limbs to pursue very active lifestyles. This article presents a case report of a first-class pilot who had experienced a traumatic above-knee amputation and includes a brief review of recent U.S. limb loss and amputation data, as well as aeromedical issues associated with amputation.

HISTORY. A 46-year-old male first-class pilot with over 12,000 hours of flight time applied for first-class medical recertification 14 months following a motorcycle accident that resulted in an above-knee amputation. He held Airline Transport and Commercial Airman Certificates.

The airman was ejected from his motorcycle as it collided with a car. The impact resulted in a proximal traumatic left below-knee amputation, an open femur fracture, and a proximal left thigh wound. He underwent emergent irrigation and debridement of the traumatic amputation, with revision to an above-knee amputation. He returned to the operating room 3 days following injury for repeat irrigation and debridement of the amputation and wound closure. The airman was fitted with a prosthetic limb and underwent 6 months of physical therapy and gait training.

One year following the traumatic amputation, the airman was able to ambulate 1200 feet without an assistive device during a 6-minute walk test. (A normal distance is greater than 1000 feet.) The airman scored 53/56 on a Berg balance test. His score was less than perfect only because he could not maintain single-leg stance for 10 seconds when standing on the prosthesis. (A score less than 45 is significant for an increased risk of falls.) The airman was able to complete a 360-degree turn test of balance within the normal time of 4 seconds and with the normal number of less than 8 steps. He was able to successfully negotiate stairs, ramps, and grassy slopes. He was also able to perform agility drills and changes in direction without losing his balance.

AEROMEDICAL ISSUES. The primary aeromedical concern following amputation is the airman's ability to safely operate an aircraft; another concern is the airman's ability to egress an aircraft in the event of a mishap. Pain from a less than optimally fitted prosthetic socket or phantom limb pain might distract an airman. Diminished sensibility, loss of joint proprioception, lessened coordination, altered range of motion, and decreased extremity strength may interfere with the operation of rudder pedals and brakes (in the case of lower-extremity amputation) or with the use of switches, dials, throttles and the yoke (in the case of upper-extremity amputation.)

In addition to addressing functional impairment from an amputation, an aviation medical examiner (AME) should consider the underlying disease that resulted in the limb loss in a case of non-traumatic amputation. For example, applicants with a history of primary bone cancer or soft tissue sarcoma require a period of observation following completion of treatment, based upon the type of malignancy, as well as evaluation to exclude detectable metastasis. Applicants with a history of diabetes require evaluation, as outlined in the Diabetes Mellitus I and II Protocols included within the *Guide for Aviation Medical Examiners*.⁸ Applicants with a history of peripheral vascular disease require a cardiovascular evaluation, as outlined in the Vascular System Examination Techniques section of the AME Guide,⁹ since cardiovascular disease is the leading cause of death in

Amputations and Limb Deficiencies

More than 1.2 million Americans live with loss or absence of a limb. Over 1,000 children are born with limb deficiencies each year.¹ The rate of trauma-related amputations in the U.S. during the mid-1990s was 5.86 per 100,000 persons.² Thus, based on current population data, approximately 17,000 trauma-related amputations are performed annually.³ Work-related amputations are a subset of amputations associated with trauma. During the 1990s, there were more than 11,000 non-fatal work-related amputations annually.⁴ The number of work-related amputations has declined since the Occupational Safety and Health Administration introduced a program to reduce amputations in 1997, but more than 8,000 industrial amputations still occur each year.^{5,6} A large percentage (98%) of these work-related amputations affect the upper extremity.⁶ However, 86% of all amputations in the United States involve the lower limb, and 93% of these are related to peripheral vascular disease.² Approximately 115,000 lower-extremity amputations are performed each year for end-stage peripheral vascular disease.⁷ Based on the rate of cancer-related lower-limb amputations (0.24 per 100,000 people), approximately 710 cancer-related lower-extremity amputations are performed annually.²

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individuals who die during the first year following amputation for peripheral vascular disease.⁷

ROLE OF THE AME. The general medical standards for medical certificates annotated in Title 14 of the Code of Federal Regulations (CFR) Parts 67.113, 67.213 and 67.313 include no functional or structural disease, defect, or limitation that makes the person unable to safely perform the duties or exercise the privileges of an airman.¹⁰ AMEs are authorized to examine airmen to determine whether or not they meet the standards.

The AME Guide outlines the standard examination procedures that should be used to evaluate the applicant's musculoskeletal system.¹¹ In general, AMEs should note any deformity, pain, weakness, loss of motion, or lack of coordination. AMEs should specifically note any amputation and comment on the amputation level, stump healing, and phantom pain. Additionally, AMEs should note the comfort of a prostheses and the applicant's ability to use the prosthetic limb. While amputations generally are static medical defects, AMEs should be aware that late complications can occur, and therefore should be considered when an applicant with a history of amputation requests a medical certificate. These complications include pain, skin ulceration, infection, and rashes, most of which can be resolved by adjustment of the prosthesis.¹²

The disposition guidance in the *Guide for Aviation Medical Examiners* indicates that, for all classes of medical certificates, AMEs should submit a current status report for applicants with amputation addressing functional status and noting the degree of impairment, as measured by strength, range of motion, and pain.¹³ The report should also indicate any medications the applicant is taking and any associated side effects. All pertinent medical reports should also be submitted.

If the applicant has a Statement of Demonstrated Ability (SODA) issued on the basis of the amputation, then the AME should issue the medical certificate if there has been no change in the conditions since the SODA was granted. If the applicant does not have a SODA, the issuance requires an FAA Decision. After reviewing all medical data, the FAA may authorize a Medical Flight Test (MFT). If the airman passes the MFT, a SODA may be issued because an amputation is a medical defect that is expected to be static, or nonprogressive, in nature.

OUTCOME. Based upon the airman's history and physical examination, 15 months following the amputation the airman was authorized by the FAA Aerospace Medical Certification Division (AMCD) to take a first-class medical flight test. Requirements for conducting a MFT for an applicant with the absence of extremities are included in FAA Order 8700.1, General Aviation Operations Inspector's Handbook, Volume II, Chapter 27, Section 2, Paragraph 3, Item E (3). The requirements include assessing the applicant's ability to reach and operate controls and to perform emergency procedures.

Additionally, the examiner determines whether the applicant should be restricted to a specific make or model of aircraft or an aircraft with special equipment or control arrangements. The MFT for the pilot described in this case report was conducted in a Level D simulator and tested the airman's ability to operate rudder and toe brakes with the prosthetic leg. The simulator check ride included successful demonstration of taxiing, braking, take off, ILS and missed approaches with crosswinds requiring braking and asymmetric thrust, as well as aborted takeoff requiring maximum braking. The airman successfully completed the MFT 16 months following the amputation and was issued a SODA.

Analysis of AMCD data indicates that during the past 3 years, 613 active airmen (50 first-class certificates,

117 second-class, 236 third-class) with lower-extremity amputations have been issued medical certificates. Only 1 airman was denied a certificate during the past 3 years: An AME deferred a third-class certificate renewal for a 50-year-old airman with a right below-knee amputation, the result of peripheral vascular disease. The airman had a 20-year history of Type I diabetes mellitus treated with insulin, diabetic retinopathy, hypertension, and a history of a transient ischemic attack and a myocardial infarction. The Regional Flight Surgeon subsequently denied the certificate.

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QUICK FIX

PROBLEM. Some aviation medical examiners are hand-printing the medical certificate, Form 8500-9.

RESULT. Recall that you must type your certificates not hand write them for reasons of legibility and to satisfy legal requirements. FAA inspectors who ramp-check airmen may question the authenticity of a hand-written medical certificate.

SOLUTION. Complete the airman medical certificate using either a typewriter/office computer or use the certificate printing template from our Web site. This is a modifiable template for use with MS Word and your printer as an alternative to typing certificates with a typewriter. The template provides you with a table (or chart) in which the airman's information is entered. Then you are able to feed the actual certificate into your printer so the information is printed directly onto the certificate. Remember to use the detachable Form 8500-9—**not plain paper**. We are working on an application that will allow you to print these certificates from your office or home computer. But for now, we suggest that you download the template from our Web site (along with complete instructions): www.faa.gov/other_visit/aviation_industry/designees_delegations/designee_types/ame/amcs/template/

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2007 Aviation Medical Examiner Seminar Schedule

July 13 – 15	Oklahoma City, Okla.	NPN (2)
August 17 – 19	Washington, D.C.	OOE (2)
August 27 – 31	Oklahoma City, Okla.	Basic (1)
September 14 – 16	Savannah, Ga.	CARDIO (2)
December 10 -14	Oklahoma City, Okla.	Basic (1)

CODES

AP/HF Aviation Physiology/Human Factors Theme

CARDIO Cardiology Theme

OOE Ophthalmology - Otolaryngology - Endocrinology Theme

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

(1) A 4½-day basic AME seminar focused on preparing physicians to be designated as aviation medical examiners. Call your regional flight surgeon.

(2) 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.

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