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From the Federal Air Surgeon's perspective...

What We Know About the New Law and Why We Still Need You

BY JAMES R. FRASER, MD, MPH

As many of you know, on July 15, 2016, President Obama signed a bill to extend FAA Reauthorization until September 30, 2017. The actual law is entitled "FAA Extension, Safety, and Security Act of 2016," which can be found at <https://www.congress.gov/bill/114th-congress/house-bill/636/text?q=%7B%22search%22%3A%5B%22636%22%5D%7D&resultIndex=1>. The bill is a comprehensive law that covers many aspects of FAA operations, but the section that is commonly referred to as the "Pilots Bill of Rights 2" is contained within Section 2307, "Medical Certification of Certain Small Aircraft Pilots." In this bill, Congress included language about an alternative to the requirement for a third-class medical.

Unfortunately, subsequent to passage of this new law, we have had several AMEs resign believing that the FAA would no longer be in need of AMEs to provide third-class medicals. Therefore, the purpose of this article is two-fold. First, I will tell you what we know about the new law. Second, and more important, I will tell you why it is premature to think there will be no need for AMEs to provide third-class medicals. Although you may have been told there will soon be no need for AMEs to provide third-class medicals, nothing could be further from the truth.

First of all, nothing changes immediately. The Agency has one year from signing, or by July 15, 2017, to finalize the rulemaking. If the rulemaking is not completed within one year, the FAA will not be able to bring enforcement actions against pilots who make a good faith effort to comply with the reforms. Therefore, AAM is working very hard as a part of the rulemaking team to make sure the mitigating strategies are in place before the deadline.

To comply with the congressional language, the rule that we will draft will allow pilots to fly without a third-class medical certificate under the following conditions:

- They must hold a valid U.S. driver's license.
- They must have held a valid FAA medical certificate within ten years prior to July



15, 2016.

- If the airman has never held a medical certificate, then the airman will need to get an FAA medical certificate from an AME (one time only.)
- If an airman's regular or special-issuance medical certificate lapsed more than 10 years ago before July 15, 2016, then the airman will need to get an FAA medical certificate from an AME (one time only).
- If an airman develops certain cardiac, neurological, or mental health conditions, then the airman will need a one-time only special issuance for each condition.
- Pilots whose most recent medical certificate has been revoked, suspended, withdrawn, or denied will need to obtain a new medical certificate before they can operate under the new reforms.

The new reforms apply to pilots operating aircraft that weigh up to 6,000 pounds, have up to five passenger seats, and fly up to an altitude of 18,000 feet. Pilots flying under the new law cannot operate for compensation or hire. Many general aviation airmen will still require a third-class medical if they are flying outside of these specified aircraft and flight parameters.

In order to fly under the new law airmen have additional requirements.

- They will need to visit a state-licensed physician at least once every four years and provide their physician with an FAA-generated checklist.
- Their physician will need to certify that he or she has performed an examination and discussed all the items on the checklist, including medications. The physician will be required to certify that he or she is unaware of any medical conditions that, as presently treated, could interfere with the airman's ability to safely operate an aircraft.
- They will need to take a free online aeromedical education course every two years and provide the FAA with an authorization for a search of the National Driver Registry for information pertaining to their driving record.
- They must also provide the FAA a signed statement certifying that they understand that they can't operate an aircraft during any medical deficiency and that they don't know of, or have reason to know of, any medical condition that would



prevent them from flying safely.

Not surprisingly, I have been contacted by AMEs, physicians that are not AMEs, and airmen that feel the implementation of the new law will be problematic. In particular, they believe that most physicians will be unwilling to certify that the airman is safe to fly.

Our FAA legal colleagues have always told us that, in the event of litigation regarding medical certification, they could not defend an AME individually but would defend the FAA medical certification process. They have told us that any AME following FAA guidance, in the process of issuing a time-limited medical certificate, would have protection as an FAA designee. Many of those that have contacted me believe that signing off on the new form, without that protection, would pose a significant medico-legal risk that their malpractice providers would be unwilling to accept.

Many of the individuals that have contacted me also believe the insurance industry will soon become involved and will raise the rates for those airmen that elect to fly without a third-class medical, thereby making it a much better deal for airmen to fly with a third-class medical.

Most importantly, I believe most airmen have an excellent relationship with their AME and will be more than willing to maintain this relationship and their third-class medical certification. Keep in mind, with the advent of CACIs, AASIs, and new guidance throughout the *AME Guide* that leverages your training and expertise, ninety-six percent of the airmen that come to see you walk out with a medical certificate. I don't believe that there will be many airmen that will prefer to meet the requirements of the new law in order to fly without a third-class medical.

In summary, I don't know what will happen. We will know much more when the rulemaking team completes the implementing guidance. However, I do know that we need each and every one of you. I hope you will think long and hard if you have any thoughts about resigning, and speak to us first.

Thank you for all that you do for the FAA, the flying public, and the airmen you help keep safe. I will keep you advised.

-Jim



Workup Requirements for Common Electrocardiographic Conditions

BY WARREN S. SILBERMAN, DO, MPH

I am not sure that you all know that the fine Certification folks had me under contract to help with interpretation of the first-class electrocardiograms (EKGs). I have taken that over as one of my responsibilities, now that I am back working the Education Division. Those of you who remember me will recall that I am all for keeping our AMEs as knowledgeable as possible. We want you to get your airmen cleared without having to defer issuance and cause delays. Keeping in the spirit of that, I have had our Editor publish an updated list of EKG diagnoses that do not require a FAA workup (see page 4).

In addition, over the next several bulletins, I plan on informing you what the workup requirements are for the common electrocardiographic conditions. The policy has been that if a condition requires an evaluation, the airman should be sent for the workup, and if they can obtain results within the 14 days that are negative, you can issue the medical certificate. Otherwise, you will need to defer issuance. The majority of you all are doing great. I always review your comments in Block 60, and if you note that you sent your airman for an evaluation, I have the EKG section hold off on sending out a letter to the airman. Don't forget to mail the entire packet of material into certification. This should include all the computer printouts and all 12 lead electrocardiograms from the stress tests. (The certification Docs will compare the EKGs in the stress test with any other stress tests the airman may end up having in the future, many times avoiding more testing.) Make sure you send the actual typed reports of a nuclear scan interpretation. I would also obtain and mail copies of the nuclear scan films.

So let's start going over some of the things you could see.

Sinus Bradycardia: If the heart rate falls out of the range you see in the provided list (see page 4), try exercising the airman and repeat the graph, or at least note that rate in the Pulse section of the exam. You could also explain in Block 60 that the airman, for example, is an avid runner. I can't tell you how many times an AME will copy the EKG heart rate into the Pulse block thus leading to an unnecessary evaluation!

Sinus Tachycardia: This situation usually requires an explanation by the AME in Block 60. Obviously, make sure your airman doesn't have a profound anemia or is hyperthyroid. It will depend on our comfort level whether we will require an evaluation. At a minimum, if you can't figure out a reason, send the airman for a cardiovascular evaluation (CVE) and 24 hour Holter monitor study.

(Continued on page 6)



Mobitz Type II Second-degree AV Block: This occurs when the atria are going along and a QRS-T complex is just dropped. It portends a bad prognosis. The person can develop a complete heart block. It is better to defer such a case. The airman will, at a minimum, require a CVE (perhaps best done by a specialist in Electrophysiology) and 24 hour Holter monitor.

Complete Heart Block: This occurs when the ventricles are beating independently of the atria. The ventricular rate is usually quite slow since it originates below the AV node. There is likely something wrong in the AV conduction system. You would defer such a case and should be on the phone to your local cardiologist or just send the airman to the emergency department!

Premature Ventricular Contractions (PVCs): Two or more PVCs on an EKG do require an evaluation! The airman needs to have at least a Maximal Bruce Protocol Nuclear Stress test and 24 hour Holter monitor. If the PVCs are reduced with exercise or disappear, this is a good sign. You need to make sure there isn't any ischemia or cardiomyopathy.

Premature Atrial Contractions: If there are two or more PACs on an EKG and the airman falls out of the criteria noted in the attached list, you need to have the airman obtain a Maximal Bruce Protocol Nuclear Stress test and 24 hour Holter monitor. Depending on these results, the airman may require more of an evaluation.

Complete Rt Bundle Branch Block: An incomplete RtBBB that on subsequent EKGs now becomes complete does not require an evaluation. A "new onset" Comp RtBBB requires an evaluation. The airman is to have a Maximal Bruce Protocol Nuclear Stress test. The reason why the FAA currently requests a nuclear stress versus a stress echocardiogram is because of the uniformity of the nuclear stress testing procedure. The stress echocardiograms are not performed with the same techniques in all facilities.

Complete Lt Bundle Branch Block: A new onset Comp LtBBB always requires an evaluation. Since plain nuclear stress tests usually demonstrate an abnormal area in the septum, this is one instance where the FAA prefers a Pharmacologic Nuclear Stress test. The abnormality is not seen in these studies.

I am going to conclude this article but will continue with the list of required EKG evaluations in a subsequent FASMB.

Dr. Silberman is currently a Medical Officer for the Aerospace Medical Education Division, AAM-400.



Electrocardiogram Changes Considered Normal Variant and Do Not Require a Workup, Updated May 11, 2016

BY WARREN S. SILBERMAN, DO, MPH

These electrocardiographic changes are NOT considered aeromedically significant and do NOT need an evaluation.

1. Sinus bradycardia rate ≥ 44 age 49 or higher (any rates less than 44 require evaluation) [Note: Check Pulse section 8500-8 to see if AME repeated and obtained higher.]
2. Sinus tachycardia rates ≤ 110
3. Sinus arrhythmia
4. Low atrial rhythm (when note upright P waves in lead AVR and inverted P's in other limb leads with short PR interval)
5. Ectopic atrial rhythm
6. Wandering atrial pacemaker
7. A single PVC on the EKG (2 or more PVCs require a workup)
8. 2 or more PACs in an airman less than 50 years old
9. First-degree AV block with PR interval $0.20 \geq 0.21$ sec
10. Wenckebach phenomenon (Second degree AV block Mobitz Type 1)
11. Incomplete RtBBB/RSR' in Leads V1 or V2
12. An incomplete RtBBB that in subsequent EKGs becomes complete
13. Intraventricular conduction delay (complexes do not appear like a Rt or Lt BBB)
14. Early repolarization
15. Indeterminate axis
16. Low voltage electromotive force (Make sure the EKG is performed with 10mm standardization)
17. Left axis deviation (axis less than -44 deg)
18. Short QT interval (with no history of arrhythmia)
19. Left ventricular hypertrophy by voltage criteria only
20. Left atrial abnormality



AVIATION MEDICAL EXAMINER SEMINARS

September 8-10, 2016	Rochester, Minnesota	CAMA (4)
October 24-28, 2016	Oklahoma City, Oklahoma	Basic (2)
December 2-4, 2016	Tucson, Arizona	Refresher (1)
February 10-12, 2017	St. Petersburg, Florida	Refresher (1)
March 20-24, 2017	Oklahoma City, Oklahoma	Basic (2)
May 1-4, 2017	Denver, Colorado	AsMA (3)
June 19-23, 2017	Oklahoma City, Oklahoma	Basic (2)
August 11-13, 2017	Washington, D.C.	Refresher (1)
September (TBD)	Greensboro, North Carolina	CAMA (4)
September (TBD)	Denver, Colorado	Refresher (1)
October 23-27, 2017	Oklahoma City, Oklahoma	Basic (2)
December 1-3, 2017	Portland, Oregon	Refresher (1)

NOTES

(1) A 2 ½-day Aviation Medical Examiner (AME) refresher seminar consisting of updates in aerospace medicine and FAA policies. Registration must be made through the Designee Registration System on the [AME seminar Web page](#).

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

(3) A 3½-day refresher AME seminar held in conjunction with the Aerospace Medical Association (AsMA). This seminar is a Medical Certification refresher with aeromedical certification lectures presented by FAA medical review officers, in addition to other medical specialty topics. 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.

(4) 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 Website: www.civilavmed.org



AME I.Q.

BY STEPHEN P. HORNER (SPA AWP)

Greetings! Welcome back to AME I.Q. In our last article, we focused on AME comments in block 60, and based on the feedback I received, it seems like the clarification really helped some AMEs understand why the comments are important. In this edition of AME I.Q., we are going to cover how to obtain disposition information for the “Complex Pilot Exam.” Aerospace Medicine Program Analysts throughout the country receive dozens of phone calls, emails, and texts every day inquiring about pilot conditions and exams. In a busy medical practice, it can sometimes be difficult to stop what you are doing and spend extra time researching a condition to fully understand if you should or should not issue a pilot medical certificate. There are several resources available to the AME, the AME staff, and the pilot to help with unusual medical cases or complex exams. I have found that AMEs and their staff simply want to find an answer in a fast and efficient way to minimize the impact on pilots and their practice, all the while ensuring that a correct decision to issue or defer is made.

There are three main ways the AME can get clarification for conditions:

1. The online *Guide for Aviation Medical Examiners* (aka *AME Guide*).
2. Contact one of the Regions with a question.
3. Contact CAMI with a question.

So, what is the best way to get your question answered? Honestly, all three! The *Guide for Aviation Medical Examiners* is a great place to start. The NavAids section (see example 1 below) has a list of techniques, processes, and protocols listed alphabetically. For example, the Administrative Conditions section (see example 2 on page 6) includes arrests and convictions and medical disability benefits. If you had a pilot with a type of cancer, you can go to the “Cancers section” (see example 3 on page 6). Once you get to the area of the NavAids that addresses the pilot’s condition, you just need to click the link or condition and it will take you right to that condition in the *AME Guide*. If after a few clicks you are still having difficulties finding your specific condition, give us a call. Remember, there are 20 or so doctors located in the Regions and CAMI working several thousand pilot cases and 3000+ AMEs located across the country; not every call can be routed to a flight surgeon immediately and, frankly, doesn’t need to be. The regions and CAMI have knowledgeable analysts who, many times, can answer your question and get you moving in the right direction. When an analyst is faced with the unique question and can’t provide you the answer, he or she has the knowledge and network to find someone who can.

As we continue our journey into the digital age, there needs to be a balance be-



tween human interaction and online reference. The information available to AMEs and pilots online is extensive, and the ability to access vast amounts of information quickly is a positive step. I make the argument that even though you have access to a wide variety of information, you don't know what you don't know, so the value of being able to speak with a person who helps clarify and/or confirm for you is just as important when making difficult decisions. The Federal Aviation Administration's Office of Aerospace Medicine is regularly making positive changes in a very fluid and groundbreaking medical atmosphere. Although it is the AME's responsibility to stay up to date on all changes and procedures, we have a shared interest in having a positive relationship that will enhance your ability to navigate these changes. Working together, we have a powerful and positive impact on aviation safety.

Example 1: NavAids Section

Guide for Aviation Medical Examiners

Current revision date - July 27, 2016

The Guide provides pertinent information and guidance needed to perform the duties and responsibilities of an Aviation Medical Examiner.

Methods to navigate through the Guide

- [NavAids - Alternative Browsing for the AME Guide \(PDF\)](#)
- [NavAids FAQs \(PDF\)](#)

Example 2: Administrative Conditions

Administrative Conditions

Arrests, Convictions, Administrative Actions

History
 Item 18.v. History of Arrest(s), Conviction(s), and/or Administrative Action(s)
 Item 18.w. History of nontraffic convictions
 Dispositions
 Item 47. Substance Dependence
 Substances of Dependence/Abuse (Drugs and Alcohol)

Medical Disability Benefits

History
 Item 18.r. Military Medical Discharge
 Item 18.y. Medical Disability Benefits

Medical Rejection by Military Service

History - Item 18.s. Military Medical Discharge
 Exam Techniques - Item 47. Psychiatric Conditions (see paragraph 4)

Military Medical Discharge

History
 Item 18.r. Military Medical Discharge
 Item 18.s. Military Medical Discharge
 Exam Techniques - Item 47. Psychiatric Conditions (see paragraph 4)

Rejection for Life or Health Insurance

History - Item 18.t. Rejection for Life or Health Insurance

Statement of Demonstrated Ability (SODA)

Application Process
 Airman Appeals
 Medical Certification Decision Making
 Exam Techniques and Criteria for Qualification - Items 23-24. SODA; SODA Serial Number
 Disease Protocols - Musculoskeletal Evaluation

Student Pilot Rule

[Student Pilot Rule Change](#)

Example 3: Cancers Section

Cancers

Bladder (including AASI)
 Dispositions
 Item 41. Neoplastic Disorders
 CACI Worksheet
 AASI Links
 Bladder Cancer
 Certificate Coversheet (.pdf)
 Brain (Dispositions, see Intracranial Tumors)
 Breast (including AASI)
 Dispositions - Item 48. Neoplasms
 AASI Links
 Breast Cancer
 Certificate Coversheet (.pdf)
 Colon/Rectal (including AASI)
 Dispositions - Item 38. Abdomen and Viscera - Malignancies
 AASI Links
 Colon Cancer
 Certificate Coversheet (.pdf)
 Intracranial Tumor (Dispositions)
 Kaposi's Sarcoma (Dispositions)
 Leukemia (including AASI)
 Dispositions
 Item 45. Lymphatics
 Item 48. Blood and Blood-Forming Tissue Disease
 AASI Links
 Chronic Lymphocytic Leukemia
 Certificate Coversheet (.pdf)
 Lung
 History - Item 18.f. Asthma or lung disease
 Dispositions - Item 35. Pleura and Pleural Cavity (see Malignant tumors)
 Lymphoma and Hodgkin's Disease (including AASI)
 Dispositions

[Item 45. Lymphatics](#)
[Item 48. Blood and Blood-Forming Tissue Disease](#)



Let's test your AME IQ:

1. You have a pilot you have never seen before. During the exam you discover the pilot had three DUIs: one in 1997, one in 2004, and one in 2015 (still pending court). What do you do?

- a. Search the *AME Guide* for alcohol-related offenses.
- b. Call the Region or CAMI to determine what decision to make.
- c. Defer the pilot and let the FAA figure it out.
- d. Both a and b.

Answer: d

2. You have an existing 32 y/o pilot that comes in for his third-class exam. The pilot has several conditions that are obvious: HTN, overweight, pre-diabetes, and, since his last exam, he disclosed he had a bout of depression for which he took medication. What do you do?

- a. Review the information from his physician for HTN and pre-diabetes, review the CACI worksheets, and issue.
- b. Review the information from his physician for HTN, pre-diabetes, and depression, review the CACI worksheets, and issue if the depression is stable.
- c. Review the information from his physician for HTN, pre-diabetes, and depression, review the CACI worksheets and the *AME Guide* for the depression, and if the pilot meets the criteria issue.
- d. CACI the HTN and pre-diabetes and defer for hx depression; depression is always deferred.

Answer: c

Stephen Horner is a Surveillance Program Analyst for the Western Pacific Regional Medical Office.



Amyloidosis Treated with Experimental Treatment

CASE REPORT BY BRYANT R. MARTIN, MD, MPH

Amyloidosis is a group of related conditions leading to the deposition of abnormal proteins referred to as amyloids. This protein deposition affects multiple organs of the body, with the most profound impact on the heart and lungs, kidneys, and liver. It is estimated that 1,500 to 2,500 new cases of type AL amyloidosis develop each year. This article presents a case report of a third-class pilot who applied for a renewal of certification while undergoing treatment for AL amyloidosis.

History

A 54-year-old male third-class pilot with over 14,000 hours of flight time presented to the clinic for a third-class medical recertification. Two years prior to presentation the airman had been granted third-class medical certification with the only documented medical issues being hypertension well controlled on a single agent.

Laboratory results obtained by the AME revealed a creatinine level of 2.21 mg/dL and a GFR of 33 ml/min/1.73 m² (M-NAA) qualifying for a classification as stage 3 chronic kidney disease (CKD). A good medical history by the AME revealed a previously unreported diagnosis of amyloidosis type AL dating back seven years. The airman had been treated aggressively with chemotherapy at a leading cancer institute and the condition had been arrested with no further complications. Until a year prior to this recertification appointment, the airman had been in good health with normal renal function. Unfortunately, the plasma cells driving the AL amyloidosis had reactivated, causing further deposition in the airman's kidneys and leading to a rapid decrease in function.

At the time of the recertification visit, the airman had already returned to cancer institute and was nine months into an FDA-approved stage 3 experimental treatment course involving once-monthly injections designed to bind the fibril proteins produced by the aberrant plasma cells. At the time of the aeromedical assessment, the airman remained in the treatment protocol, and follow-up letters from the airman's specialist verified improvement of renal function. The specialist confirmed that the airman had not suffered any ill effects from the treatment, his condition had stabilized, he had remained alert and oriented throughout the nine months of treatment, and anticipated further improvement in renal function but did not provide information as to the length or course of the treatment protocol in two correspondences.



Aeromedical Issues

Amyloidosis presents a challenging problem to the AME, given the varied presentations of the condition. The protein fibrils can deposit throughout the body having deleterious effects on multiple organ systems.¹ Examining the case from a system-based approach makes the most sense and will aid in the medical decision-making process. Also, the treatment and management for each disease component must be considered.

Cardiac Involvement² – deposition of the amyloid in the heart tissue can lead to systolic and diastolic dysfunction progressing to heart failure. A rapidly progressive compromise in function in the aviation environment can alter visual performance, endurance, equilibrium, and other sensory systems leading to poor outcomes. Accumulation of amyloid in the coronary arteries can lead to additional symptoms including angina or infarction and syncope may arise secondary to arrhythmias. Given the potential of cardiac involvement, any airman presenting with amyloidosis deserves a rigorous cardiac workup. Airman presenting with symptoms suggestive of cardiac dysfunction such as hypertension, ECG findings, or exercise intolerance should prompt an evaluation focusing on electrophysiology of the heart muscle, cardiac function to evaluate both systolic and diastolic function, coronary blood flow, and pulmonary function testing.

Renal Impairment – Amyloidosis can present in varied manners based on the type and locations of deposits. Renal involvement will commonly present as asymptomatic proteinuria or as a nephrotic syndrome. If the deposition is limited to the tubules and preceding blood vessels, the patient may present with renal failure as seen by a decreased creatinine clearance and decreased GFR. CKD is not an uncommon condition found among airmen, given the prevalence of diabetes and hypertension in the population. The *Guide for Aviation Medical Examiners (AME Guide)* contains a clearly designed table outlining the required actions for managing airmen with CKD. The required actions are based on an airman's GFR levels as a function of disease severity. A GFR between 45 and 59 simply needs to be summarized in block 60. A GFR between 35 and 44 will require completion of the CACI worksheet and, if requirements are met, can be summarized in block 60. The FAA does not grant certification to airmen whose GFR is less than 34.

Liver/GI Impairment – Deposits may lead to hepatomegaly with or without splenomegaly. Gastrointestinal bleeding, gastroparesis, constipation, malabsorption, and other GI complications are seen depending on the amount and location of the protein depositions. Specific aeromedical concerns again focus on the uniqueness of the environment. Trapped gases in the GI system can be problematic to the air-



man. Liver dysfunction can lead to toxin accumulation and altered mental status. At a minimum, a good gastrointestinal history, along with liver function testing and physical exam, should be completed to document current status. Any abnormal findings should be further assessed by a GI specialist.

Investigative Drug Protocol – *AME Guide* (Nov 2015)³ contains the following statements regarding new medications.

Any medication newly approved by the Food and Drug Administration (FDA) (those drugs issued initial FDA marketing approval within the past 12 months). We require at least one-year of post-marketing experience with a new drug before we will consider whether we can safely certificate an applicant using the drug.

The FAA does not permit an airman who is receiving an investigational drug or is participating in an experimental trial to fly.

In this case, the airman was undergoing treatment with a novel monoclonal antibody recently developed for the treatment of amyloidosis.⁴ Despite being treated for nine months and having clinically stabilized without significant adverse effects, the treatment lacks adequate data with regard to frequency of side effects and dangers. At the time of examination, the treatment was still in Phase 3 clinical trials and therefore, could not be approved. Historically, certification has been granted to airmen undergoing monoclonal antibody treatment but only after the treatment met the criteria noted above.

Outcome

The AME deferred a third-class certificate renewal for the 54-year-old airman to the Aerospace Medical Certification Division. They reviewed the case, solicited additional reports from the specialists and, in light of the investigative drug with unknown/unsure side effects profile, denied the certificate.⁵

References

1. Brigham and Women's Hospital. A Patient Guide to Amyloidosis. http://www.brighamandwomens.org/Departments_and_Services/medicine/services/cvcenter/Amyloidosis/patients.aspx. Accessed 13 Dec 2015.
2. Gorevic PD, Schur PH, Romain PL. Overview of amyloidosis. http://www.uptodate.com/contents/search?search=amyloidosis&sp=0&searchType=PLAIN_TEXT&source=USER_INPUT&searchControl=TOP_PULLDOWN&searchOffset=&autoComplete=true Accessed 13 Dec 2015.
3. Federal Aviation Administration. Guide for Aviation Medical Examiners. Revision date: 25 Nov 2015. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/ Accessed 13 Dec 2015.



4. Prothena. NEOD001. An investigational agent for the treatment of al amyloidosis. http://www.amyloidosisupport.org/NEOD001_factsheet_122112.pdf Accessed 13 Dec 2015.
5. 14 CFR, Chapter 1, Subchapter D, Part 67 Medical Standards and Certification. <https://www.gpo.gov/fdsys/granule/CFR-2012-title14-vol2/CFR-2012-title14-vol2-part67>. Accessed 13 Dec 2015.
6. Berk JL, Suhr OB, Obici L, et al. Repurposing diflunisal for familial amyloid polyneuropathy: a randomized clinical trial. *JAMA* 2013; 310:2658.
7. De Genst E, Messer A, Dobson CM. Antibodies and protein misfolding: From structural research tools to therapeutic strategies. *Biochim Biophys Acta* 2014; 1844:1907.

Bryant R. Martin, MD, MPH was a resident in aerospace medicine at United States Air Force School of Aerospace Medicine when he wrote this case report at the Civil Aerospace Medical Institute.

ETIOLOGY OF AMYLOIDOSIS – AL TYPE

Amyloidosis is a group of relatively rare conditions involving proteins that abnormally fold, forming aggregates termed amyloids.² These fibril proteins can accumulate throughout the body and cause severe damage to organs and tissues. The most common of these conditions is caused by an aberrant plasma cell overproducing an antibody fragment of the light chain protein and is called AL (amyloid Light chain) amyloidosis. AA amyloidosis results from the production of serum amyloid A, an acute phase reactant, during chronic inflammation. Other major forms of amyloidosis include heritable amyloidosis, dialysis-related amyloidosis, senile systemic amyloidosis, and organ-specific amyloid.

Regardless of the exact type of disease, the manifestation is determined by the precursor protein, the tissue distribution, and the actual amount of amyloid deposited in the tissue. The major clinical sites of significance for primary (AL) and secondary (AA) amyloidosis include the kidneys, heart and lungs, and gastrointestinal tract (specifically, the liver). End-stage renal disease will lead to death in a minority of the patients but provides a significant morbidity involving nephrotic syndrome and chronic kidney disease. The heart is susceptible to deposition leading to both systolic and diastolic dysfunction ending in heart failure. Additional complications include syncope related to disruption of conduction and arrhythmias and myocardial infarctions secondary to deposition in the coronary vessels. Hepatomegaly is not an uncommon finding as the proteins frequently deposit amyloid in the hepatocytes, disrupting function and leading to reduced hepatic blood flow. Other, less common, sites include neurologic involvement, musculoskeletal problems, and hematologic abnormalities.

Although considered a rare condition, estimates show that 1,500 to 2,000 new cases develop each year in the United States of the most common form, AL amyloidosis. Diagnosis is suggested by clinical manifestations consistent with the organs and tissues involved and later confirmed by tissue biopsy. Given the rare nature of the condition, the disease is often advanced by the time of accurate diagnosis. Treatments vary based on the type of amyloidosis, and many new approaches are entering the market. Biological agents used in the treatment of rheumatoid arthritis have shown promise.⁶ Newer monoclonal antibodies are being developed for treatment and have been effective against AL and AA type.⁷



Eosinophilic Esophagitis: To Certify or not to Certify

CASE REPORT BY TRACY BOZUNG, MD, MPH

Eosinophilic esophagitis (EoE) is an immune-mediated dysfunction of the esophagus secondary to eosinophils in the esophageal mucosa. Symptoms range from asymptomatic to nausea, vomiting, chest pain, or dysphagia. Acutely, EoE can be associated with esophageal food impaction and the inability to swallow saliva. Any of these symptoms can cause a safety of flight issue. This article presents a case report of a first-class pilot with multiple food impactions related to his diagnosis of EoE. Also included is a brief review of EoE and the associated aeromedical issues.

History

The commercial airline pilot rubs his throat subconsciously as he begins his story, "So there I was, enjoying my Thanksgiving dinner, when I felt a piece of turkey lodge in my throat." After 5 hours of failed attempts to dislodge the turkey himself, the pilot went to the emergency room as he was unable to swallow his saliva. An urgent endoscopy was performed, and the offending poultry was gently pushed into his stomach. The endoscopist noted a tight stricture that was dilated to 9mm as the endoscope pushed the obstructing meat through the constriction. The identification of multiple linear scars in the distal esophagus made eosinophilic esophagitis a concern. Biopsy confirmed significant eosinophils in the esophagus consistent with the suspected diagnosis. He concludes his story saying, "I was on omeprazole for a few months until I had a repeat dilation procedure. I chew meat very carefully and I think I'm cured!"

This airman presents to you for first-class medical recertification. He takes no medications currently and states he had been in good health until "the turkey incident." On further questioning, he does report having intermittent dysphagia to meats throughout his life. "Honestly Doc, I have had two other ER visits for the same problem. One was 10 years ago and one was last year. They used a scope the first time and a medication (glucagon) last year to fix the problem. I have never had any chest pain or vomiting."

Aeromedical Issues

The primary aeromedical concern regarding eosinophilic esophagitis is the potential for obstruction of the esophagus. This blockage could cause discomfort or pain, nausea, or other distractions to the pilot, thus causing subtle incapacitation.



Like this patient who was unable to swallow his saliva, acute blockage may interfere with the pilot's ability to communicate during critical phases of flight, thereby representing a safety concern. There is no specific mention of esophagitis or eosinophilic esophagitis in the *Guide for Aviation Medical Examiners (AME Guide)*. There are thousands of specific diagnoses that are not individually listed in the *AME Guide* or other regulations, but the AME's responsibility is to recognize the safety issues that could arise from any medical issue. According to FAR 67.113.b.1, any functional or structural disease or defect, or limitation that makes a person unable to safely perform the duties or exercise the privileges of the airman certificate held, would fit this particular airman's medical condition.¹ For any questions or concerns about diagnoses not specified in the *AME Guide*, it is recommended AMEs contact the Aviation Medical Certification Division or their Regional Flight Surgeon.

Case Outcome

This pilot was initially denied medical certification because of his recurrent esophageal obstructions. The airman saw an allergist, who prescribed lansoprazole twice daily and nasal steroids. The allergist also evaluated him for food allergies given their significant correlation to eosinophilic esophagitis. The pilot started the prescribed medications, converted to a vegan diet to eliminate food allergens, and had a third esophageal dilation. His dysphagia completely resolved after several months. With resolution of his symptoms, the airman was granted a special issuance (SI) for this condition, and his first-class medical certification was reinstated. (His allergic rhinoconjunctivitis is also listed on his SI but, per the *AME Guide* this condition does not require SI. It is within the AME's purview to issue a certificate if this diagnosis is well controlled on nasal steroids.) The AME is responsible for providing interim histories annually for continued certification and ensuring the pilot understands his personal responsibility for self-grounding, should his symptoms recur.

References

1. 14 CFR, Chapter 1, Subchapter D, Subpart B Part 67 Medical Standards and Certification. http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title14/14cfr67_main_02.tpl. Accessed 12 Dec 2015.
2. Dellon ES. Diagnosis and management of eosinophilic esophagitis. *Clin Gastroenterol Hepatol*. 2012 Oct;10(10):1066-78. doi: 10.1016/j.cgh.2012.06.003.



3. Dellon ES, Gonsalves N, Hirano I, et al.; American College of Gastroenterology. ACG clinical guideline: Evidence based approach to the diagnosis and management of esophageal eosinophilia and eosinophilic esophagitis (EoE). *Am J Gastroenterol*. 2013 May;108(5):679-92; quiz 693. doi: 10.1038/ajg.2013.71.
4. Sperry SL, Crockett SD, Miller CB, et al. Esophageal foreign-body impactions: epidemiology, time trends, and the impact of the increasing prevalence of eosinophilic esophagitis. *Gastrointest Endosc*. 2011 Nov;74(5):985-91. doi: 10.1016/j.gie.2011.06.029.

Tracy Bozung, MD, MPH, Lt Col, USAF, MC, FS, was a resident in aerospace medicine when she wrote this case report while on rotation at the FAA Civil Aerospace Medical Institute.

ETIOLOGY OF EOSINOPHILIC ESOPHAGITIS

Eosinophilic esophagitis (EoE) is a chronic inflammatory disorder defined by symptoms of esophageal dysfunction with histologic evidence of eosinophilic infiltrate in the esophageal epithelium, absent other causes of eosinophilia.^{2,3} The American College of Gastroenterology's diagnostic criteria for EoE include histologic confirmation with ≥ 15 eosinophils per high-powered microscopic field.³ However, other disorders (gastroesophageal reflux disease [GERD], PPI-responsive esophageal eosinophilia) can cause eosinophils in the esophagus and must be ruled out.^{2,3} Individuals with EoE can have overlapping GERD or GERD-like symptoms, thereby complicating the diagnosis. A two-month trial of a proton pump inhibitor with repeat endoscopy and biopsies is recommended to help differentiate EoE from the others in the differential diagnosis.²

Despite being originally reported in 1978, the condition was rarely identified until the late 1990s, at which time increased recognition in both adults and pediatrics caused a substantial increase in the incidence and prevalence of the disorder.² In 2012, the overall prevalence of EoE in the general population was between 43 and 52/100,000.² Those patients undergoing endoscopy for upper GI symptoms had a 5 to 16% likelihood of having EoE.² The underlying etiology of EoE is suspected to be immune-mediated.^{2,3} Food or environmental allergens trigger an immune cascade stimulating eosinophils to release pro-inflammatory mediators in the esophagus, causing local damage and dysfunction.² While symptoms can vary, a hallmark is solid food dysphagia, with acute food impaction as the most extreme and dangerous presentation.^{2,3,4} In one study of 548 esophageal foreign body impactions, 9% of the patients had EoE; however, EoE was the strongest predictor of multiple esophageal foreign body impactions, with an odds ratio of 3.5.⁴ It is also important to identify less dramatic symptoms of EoE, such as food avoidance, the need for thorough chewing of food, episodic swallowing problems, nausea, heartburn, or regurgitation.²



Volunteer AMEs Needed

STEPHEN D. LEONARD, MD, FACS

SENIOR AME - HIMS

CHAIRMAN, EAA AEROMEDICAL ADVISORY COUNCIL

Most pilots are fortunate enough to go through life and encounter little difficulty with their periodic visits to their AME. But for those with significant medical conditions, the process can be a daunting, confusing, and somewhat intimidating challenge. They often don't know where to turn for help and advice and, unfortunately, there are AMEs who lack the time or familiarity with the CACI and Special Issuance process to offer much assistance. The newly-enacted changes to requirements for a third-class medical should partly alleviate this problem, but many private pilots and, of course, all professional pilots will still require an FAA medical certificate.

About fifteen years ago, the Experimental Aircraft Association identified many of its members who were both pilots and experienced AMEs and invited them to participate in a volunteer AME Pilot Advocate program, to be available to help pilots with medical certification problems. Pilots call EAA headquarters for advice, and if the staff cannot answer their questions they are referred to one of the Pilot Advocate volunteers, either in their geographic area or in a medical specialty corresponding to their medical problem. More often than not, it only takes a few minutes on the phone to advise an airman what test results or documentation is needed to take to the AME to obtain a certificate or at least apply for a Special Issuance with the best chance for approval. Occasionally, pilots elect to make an appointment with the Pilot Advocate AME for a formal consultation or a flight physical exam.

The FAA Office of Aerospace Medicine has been supportive from the start, and over the years Doctors Jordan, Tilton, Fraser, Silberman, Berry, and Scott have taken the time to meet with the Pilot Advocate group at Oshkosh each summer to provide guidance and help us to help them.

Those of us involved since the beginning have probably averaged two to three phone calls a month, so it has never been a burden. It is always satisfying to hear the gratitude in a pilot's voice upon learning that what was thought to be an indecipherable nightmare is, in fact, a simple problem with an easy solution.

There were initially about 150 volunteer AMEs from all over the country in the program, but time has reduced the number, and we are looking to recruit additional new AMEs to join us in helping their fellow aviators. We invite any interested AME to contact Tom Charpentier at EAA at (920) 426-6124, or me at (208) 901-4493.



Arvind Chaturvedi Colloquium on Postmortem Forensic Toxicology in Aviation

APRIL 4–6, 2017

CAMI, OKLAHOMA CITY, OKLAHOMA

The Federal Aviation Administration's (FAA's) Civil Aerospace Medical Institute (CAMI) is organizing the Arvind Chaturvedi Colloquium on Postmortem Aviation Toxicology. The symposium will be held April 4–6, 2017, at the FAA's Mike Monroney Aeronautical Center in Oklahoma City. This three-day colloquium, named in honor of long-time research toxicologist at CAMI, Dr. Arvind Chaturvedi, will include presentations focusing on recent advances in the field of postmortem aviation toxicology including current research interests at CAMI. Topics will include post-mortem sample processing, importance of chain of custody of samples, analyses of samples for combustion gases/ethanol/drugs, interpretation of results, significance of quality control/quality assurance, prevalence of drugs in pilot fatalities, postmortem drug distribution, and litigation/expert testimony issues.

The intended audience for this scientific platform includes medical examiners, pathologists, coroners, forensic toxicologists, academics, students, aerospace medicine scientists/specialists, regional flight surgeons, National Transportation Safety Board personnel, and other accident investigation authorities, including employees of the FAA's Flight Standards District Offices and Office of Accident Investigation and Prevention.

There is no registration fee for attending this colloquium. However, attendees are responsible for all other expenses associated with the colloquium. Individuals interested in attending may contact Kristi Craft by December 16, 2016, to receive additional information (include your name, official title, organization, postal and e-mail addresses, and telephone and fax numbers). Ms. Craft may be contacted via e-mail at kristi.craft@faa.gov or via mail at Bioaeronautical Sciences Research Laboratory (AAM-610), FAA Civil Aerospace Medical Institute, P. O. Box 25082, Oklahoma City, Oklahoma 73125, USA. Physical address of the laboratory is Bioaeronautical Sciences Research Laboratory (AAM-610), FAA Civil Aerospace Medical Institute, 6500 South MacArthur Boulevard, Oklahoma City, Oklahoma 73169, USA (Telephone: 405-954-2302; Fax: 405-954-3705).

The web-link for the colloquium is <http://www.faa.gov/go/toxmeeting>.



New Faces Around CAMI

Dr. David O'Brien has been selected as the new manager of CAMI's Aerospace Medical Certification Division.

Dr. O'Brien was the Command Surgeon at the Department of Defense United States Transportation Command where he was the manager responsible for global patient movement, supporting military operations and national disasters through Federal Inter-agency collaboration.

Dr. O'Brien's previous leadership assignments include: Command Surgeon at the 13th Air Force in Pearl Harbor, Hawaii, Commander/Chief Executive Officer at the 51st Medical Group in South Korea, Squadron Commander/Chief of Aerospace Medicine at the 1st Aerospace Medicine Squadron in Hampton, VA, Squadron Commander/Department Chairman at the 96th Aerospace Medicine Squadron in Eglin AFB, FL, Command Flight Surgeon at the Headquarters Air Mobility Command in Scott AFB, IL,



FAA Photo by Rick Butler

Squadron Commander/Department Chair at the 47th Aeromedical-Dental Squadron at Laughlin AFB, TX, and Aerospace Medicine Flight Commander/Department Chair at the 354th Medical Operations Squadron at Eielson AFB, AK.

Dr. O'Brien is a graduate of the Loyola University, Stritch School of Medicine where he obtained his medical degree, and from the University of Texas School of Public Health where he obtained his Master of Public Health. He completed the Aerospace Medicine Residency Program and the Occupational Medicine Residency Program and the USAF School of Aerospace Medicine. He is Board Certified in Aerospace Medicine and Occupational Medicine. He is President of the American Society of Aerospace Medicine Specialists, Fellow of the Aerospace Medical Association and former Secretary/Treasurer of the USAF Society of Flight Surgeons.

Dr. Deann King is an Instructional Systems Specialist who will be working with the Airman Education Division to deliver face-to-face AME seminars. She started her career at the MMAC as a contractor to the Academy doing course maintenance and teaching new hire Aircraft Certification and Flight Standards courses. She was hired by the FAA Academy in 2005 to teach train-the-trainer courses like Basic Instructor Training, Instructional Testing, and Curriculum Development. In 2011, she went to work for Aircraft Certification as an ISS/Program Manager developing and maintaining training for the Aircraft Certifi-



FAA Photo by Rick Butler

cation branch of the Academy.

Deann has a Bachelor's degree in English Education from UCO, a Master's degree in Adult Education from UCO, and a Doctorate degree in General Education with an emphasis on Aviation and Space Science from Oklahoma State University.

Deann is married to Allen, a retired FAA Tech Ops instructor. They are extremely active with the Oklahoma Mustang Club and also love spending time with their 8 grandchildren.



In Memoriam

We are saddened to report the passing of Aerospace Medicine Certification Physician, **Dr. Steve Schwendeman**, on February 19, 2016. Dr. Schwendeman had been with the Aerospace Medical Certification Division since June 1995 and is greatly missed by the aerospace medicine community.

AME Guide Updates

2016-17 Scheduled Release Dates

September 28, 2016
October 26, 2016
November 30, 2016
December 28, 2016
January 25, 2017
February 22, 2017

Attention: In an effort to collect feedback on airman medical certification services and the support the FAA provides to AMEs, the Office of Aerospace Medicine is mailing you a personal invitation to complete an online survey evaluation of our airman medical certification services the week of September 12th, 2016. The invitation contains important details on how to access the survey. We rely on your feedback to help us continuously improve the AME Program. The survey will remain open until December 5th, 2016. Thank you for assisting us with your valuable feedback.

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