

Electrocardiogram Problems

FOLKS, I HAVE sincerely attempted to avoid lecturing “down” to the aviation medical examiners because it seems to be unproductive; however, I have continued to notice a serious problem that only you can correct—not reviewing the electrocardiograms that are performed on first-class airmen. I had informed you three times¹ that I review all cardiovascular workups requested by our visiting cardiology consultant, Dr. **William Fors**.

I don’t know when it became the “norm” for you to ignore ECGs, but we need to get this under control. Among the many things that you as AMEs do, and I am mainly referring to our senior AMEs, but all other AMEs who perform examinations that require an electrocardiogram; for example, an initial hypertension evaluation. It is your responsibility as AMEs performing examinations to interpret the electrocardiograms you perform BEFORE you clear an airman for a medical certificate.

I am going to elaborate on some of the ECG abnormalities and what workups you can perform. This is one of the single most obvious areas that you can assist us with to reduce the backlog of cases that we must review. This will free us up to review other cases. In those previous *Bulletins*, I gave you a list of what the FAA considers as “normal variant” ECG changes (see sidebar chart). This means that if you have an interpreting ECG machine and you get one of these diagnoses or you read the graph and see one of these situations, you can clear the airman. We do not need a workup!

Oh, a quick footnote: There is nothing wrong with you having your electrocardiograms read by someone

¹ See Dr. Silberman’s columns in the 2008-1, 2008-3, and 2010-2 issues of the *Bulletin*; all of which are available online at www.faa.gov/library/reports/medical/fasmb/archives/

CERTIFICATION UPDATE

Information About Current Issues



By Warren S. Silberman, DO, MPH

who is more knowledgeable in their interpretation and then sending the findings in to us. I am going to spend the next *Bulletin* article describing the abnormal changes and what you can do to get your airmen cleared prior to granting them their medical certificate. I am pretty sure when an airman receives one of our letters requiring an evaluation for an abnormal ECG, they mention something to you or become upset.

Recently, I reviewed several hundred ECGs that our International AMEs sent in. Here are some of my observations and requests:

- Please get an ECG machine that has three simultaneous leads. Yes, come into the 21st century! We will still accept single-channel graphs, but when you need a new machine, please think of this.
- Do not have your technician cut out single complexes representing each lead and provide this. How else would we know if the airman has an arrhythmia?
- Interpret the electrocardiogram! Compare it with previous ones. If you see an abnormality and it is something that the airman has had in the past, then it won’t require an evaluation.

Continued on page 4

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

ECG Normal Variant List

These are considered normal ECG variants and not reasons to defer the applicant

- Sinus bradycardia. Age 50 and younger — if the heart rate is 45 or greater; Age 50 and older — if the heart rate is 49 or greater
- Wandering atrial pacemaker
- Low atrial rhythm
- Ectopic atrial rhythm
- Indeterminate axis
- First-degree AV (atrioventricular) block with PR interval less than 0.21 in age 50 and younger
- Mobitz Type I Second Degree AV block (Wenckebach phenomenon)
- One premature ventricular contraction or atrial contraction on a 12-lead ECG
- Incomplete RBBB (Right Bundle Branch Block)
- Intraventricular conduction delay
- Early repolarization
- Left ventricular hypertrophy by voltage criteria only
- Low voltage in limb leads (may be a sign of obesity or hypothyroidism)
- Left axis deviation, less than or equal to -30 degrees
- rSR’ in leads VI or V2, ORS interval less than 0.12 msec R>S wave in VI without other evidence of right ventricular hypertrophy
- Sinus arrhythmia
- Sinus tachycardia: Any age — if the heart rate is less than 110
- Left atrial abnormality
- Short QT

Note: If a first-class airman does not have a current resting ECG on file but we have any type of stress test (pharmaceutical stress, Bruce stress, nuclear stress, or stress echocardiogram) that was accomplished within the last year, we can accept it without writing out for a current resting ECG; however, we do need the tracings from any of these tests. A cardiac cath and a Holter monitor test are not acceptable in place of a resting ECG.

ECGs from page 3

- Do not send us ECGs performed at 50 cycles per second. We are no longer going to accept them. We need them performed at 25 cycles per second.

The following is an introduction to the “Top Ten Things That an AME Can Do When Performing an Electrocardiogram for the FAA.”

1. If an airman has a heart rate less than 50, have the airman exercise in place and repeat the ECG. If the heart rate goes up above 50, send us both ECGs (in case this happens again down the road), and you can clear the airman.
2. This also goes for a significant first-degree AV block. Exercise the airman in place, and if the block becomes less, you may clear the airman.
3. If an airman has a rate over 110—sinus tachycardia—perhaps have the airman relax a bit and repeat the graph. If the rate drops below 110, send us the graph and clear the airman.
4. Two or more premature atrial contractions or ventricular contractions on an ECG requires the applicant to have a maximal nuclear stress test. If this has been previously worked up, you do not need to provide a new evaluation.
5. If the airman demonstrates new onset of complete right bundle branch block (in other words, this has not been seen on previous graphs), then you are to have the airman undergo a maximal nuclear stress test. NOTE: All stress testing in first- and second-class airmen should be maximal nuclear stress testing (unless we specify otherwise in our letter to you).
6. An airman who has an incomplete RBBB pattern on previous electrocardiograms, and then demonstrates a complete RBBB, does not require an evaluation.
7. An airman with a new onset of a complete left bundle branch block is to provide a cardiovascular evaluation and a pharmacologic nuclear stress test. This is one of the conditions

where we will accept a pharmacologic stress test. Airmen with a LBBB demonstrate what appears to be an area of ischemia in the septum, and the pharmacologic stress test helps better determine if there is actual ischemia.

8. An airman with left anterior or posterior hemiblock must demonstrate an absence of coronary artery disease, so a maximal nuclear stress test is required.
9. Limb lead III is the most variable lead. This lead sometimes is affected by respiration, which can falsely indicate that the airman had a previous inferior infarction. So if you have a small R-wave with a deep S-wave in that lead, and even perhaps in lead aVF, you need to perform an ECG in inspiration and again in expiration. If the S-wave disappears and you get a larger R-wave, you can clear the airman—but don't forget to provide us all these graphs.
10. An airman who has ST- and T-wave changes that suggest ischemia or left ventricular hypertrophy requires an evaluation if one has not been previously performed for this reason. No kidding, I have read ECGs here that, if I were in my office practice, the airman would have been sent immediately to the emergency room to be evaluated by a cardiologist! These situations require a cardiovascular evaluation, perhaps an echocardiogram, and definitely a maximal nuclear stress test.

Well, this concludes your *Introduction to Aeromedical Electrocardiography*. Please remember to read and interpret those ECGs before clearing the applicant because it will better serve your airmen and will also reduce our caseload here in Oklahoma City.

We appreciate all of you who work hard for us to improve the quality of our services. To reiterate something that the Federal Air Surgeon mentions at each seminar, “This whole program relies on you. We cannot do this without you!”



New CertDocs from page 1

Leigh graduated from the University of Miami School of Medicine. She then served on active duty in the U.S. Navy for four years.

During this time, she completed a surgical internship at National Naval Medical Center in Bethesda, Md., and served as a Flight Surgeon for VP-30 in Jacksonville, Fla. She then went on to the combined Aerospace and Internal Medicine Residency at the University of Texas Medical Branch in Galveston, Texas.

Dr. Lewis will primarily be working in the Medical Appeals Section here at the Civil Aerospace Medical Institute in Oklahoma City.

Dr. Judy Frazier graduated from the University of Oklahoma College of Medicine and is board certified in Family Medicine. She completed her residency in 2002, serving as Chief Resident in her final year.

She has since been an attending physician, urgent care physician, and was in private practice in Mustang, Okla., from 2004-2009. She earned her MBA in Health Care Management in 2005. She has worked at CAMI since 2009 in the Occupational Medicine clinic taking care of employees, students, and pilots. Her new duties will primarily be working general review cases.



Dr. Scott is the Deputy Manager of the Aerospace Medical Certification Division.