Certification Update

Information About Current Issues

By Warren S. Silberman, DO, MPH

Common ECG Insuffiencies

THIS INITIAL PIECE is going to be part chastisement and the rest educational. I have become aware that a significant number of Senior aviation medical examiners are not reviewing the first-class electrocardiograms that are sent into the ECG Section of the Aerospace Medical Certification Division. I have been reviewing a significant number of electrocardiograms, as we had a small backlog problem. I make it a habit to look at Block 60 to see if you made a comment, and in most cases, there are not any!

I know there is no rule that states you should do this. I also know that many of you have interpretive ECG machines. Did you know that these machines regularly over-read the graphs? Some of the electrocardiographic changes are quite significant to an old internist like me. Once again, in those cases, there was no comment by the AME. I have come across many, many graphs where the AME could have resolved any questions that our reviewing physician may have had by simply exercising the airman in place, repeating the graph, or making a comment in Block 60.

Our ECG staff reviews the graphs soon after they arrive, but the ones they have a physician review may not be seen for at least a month. Would you think that the airman who has an abnormal electrocardiogram might want a heads-up before leaving your office?

Review of ECG Practices and Procedures

Electrocardiograph Basics

I shall explain some common ECG findings and what procedures you as a "good" AME should perform for your airman. For those of you who follow these procedures, please forgive me, but from what I have seen over the past several months, this lesson is needed.

Did you know that there are certain ECG findings that are considered "normal variants," meaning that if an airman has one of these, there is no need to have the airman undergo further testing? These normal variants are shown on the right.

If the airman has one of the above diagnoses on the ECG, you may "clear" the airman for medical certification. We will just note this for our records.

If an airman has a sinus bradycardia rate of less than 50 beats per minute, we would like you to take a history, exercise the airman in place, and repeat the ECG. If able to mount a ventricular response, she may be cleared.

This would be the same situation with a prolonged PR interval or first-degree AV block. You should exercise the airman, repeat the ECG, and if the interval shortens, he can be cleared.

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NORMAL ECG VARIANTS

- Sinus bradycardia rate between 50 and 59
- Sinus arrhythmia
- Wandering arrhythmiamaker
- Low atrial rhythm
- Ectopic atrial rhythm
- Indeterminate axis
- First-degree atrioventricular block
- Mobitz Type I Second Degree AV block (Wenckebach phenomenon)
- One premature ventricular contraction or atrial contraction on a 12-lead ECG
- Incomplete RT 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 V1 or V2, ORS interval <0.12 msec

R> S wave in V1 without other evidence of right ventricular hypertrophy[1]

Medical Certification Issues Related to Regional Enteritis

Case Report, by Randy J. Guliuzza, MD, PE, MPH

Regional enteritis includes the inflammatory bowel diseases ulcerative colitis and Crohn's disease. Uncontrolled Crohn's disease can manifest itself in sudden incapacitating abdominal problems. The episodic occurrence of symptoms and the type of medications used for treatment of Crohn's disease are aeromedical concerns. Infliximab (Remicade) is a powerful drug approved by the FDA for the treatment of Crohn's disease. Aviation medical examiners (AMEs) will see increasing numbers of airmen on Infliximab, and, although not disqualifying, there are several rare, aeromedically important concerns associated with Infliximab use.

History. A 24-year-old white male private pilot with 150 total flying hours presented for renewal of his 3rd-class medical certificate in May 2003. Because of his long history of regional enteritis (Crohn's) and a recent change in treatment regimen, his AME forwarded his application with all of the necessary supporting documentation and certification determination to the Aerospace Medical Certification Division (AMCD) in Oklahoma City. The airman's history is significant for inflammatory bowel disease prior to his initial 3rd-class medical certification application in 1995. He has been treated with several medications per treatment protocols (including sulfasalazine, mesalamine, corticosteroids, and azothioprine), which resulted initially in good control of his symptoms, allowing him to initiate and continue flying. However, by the summer of 2002, he experienced increasing bouts of diarrhea, bleeding, abdominal pain, and fever. An upper GI barium series demonstrated a classic string sign and an abdominal and pelvic CT scan showed intestinal transmural thickening. He was diagnosed with Crohn's disease. Unfortunately, his condition became so severe that he required a terminal ilectomy and right hemicolectomy. After recovery, he was started on, and continues to use, Infliximab (Remicade) 5mg/kg IV every eight weeks. He discontinued all other medications. A follow-up abdominal and pelvic CT scan in November 2002 showed no active Crohn's disease. Medical history was also positive for a Crohn's disease-related dermatological condition controlled with betamethasone cream and dermasmooth oil.

Family history. Parents and siblings are healthy without a history of any autoimmune diseases.

Review of symptoms. The airman claimed that his Crohn's disease has improved dramatically. He denied any bouts of nausea, vomiting, diarrhea, abdominal pain, or bleeding. He also reported that his stress-related psychosocial problems have resolved. The rest of the review was negative.

Physical exam. The airman was well developed and nourished. The cushingoid facies had resolved. Temperature was 98.7° F, BP was 130/84, pulse was 78, and weight was 185 lbs. The conjunctiva was clear, and the mucous membranes were moist without ulceration. The neck was supple without thyromegaly. The lungs were clear. Cardiac exam revealed regular

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ECG REVIEW (Continued)

As you should recall, comparison with previous graphs that the airman has had performed would be very helpful. For example, an airman comes in for a yearly graph and has a complete RTBBB. If you can document that she has had this in the past, then a workup would not be needed. Please send us ECGs that have been performed by her treating physician, especially if they would resolve a question we may have. There is no need to send us an electrocardiogram that was performed and previously sent into the AMCD. We have those historical graphs saved in our Mortara system, so we can view them for comparison.

Another commonly seen situation is with lead III and "q" waves. Limb Lead III is the most "variable" lead on the electrocardiogram. It can be affected by respiration! If you see a q wave or very small r wave and deep S wave in that lead, have the airman remain hooked up to your ECG machine and repeat the graph while he is taking a deep breath and then in exhalation. Record an ECG during each one of these. You may see the q wave disappear with exhalation. Thus, what may have been thought to be an old inferior wall myocardial infarction will turn out to be a respiratory variant.[1]

Along the same lines, but nothing to do with electrocardiograms, is the airman who comes into your office with elevated blood pressure (even if the airman has known hypertension). We see this all the time. Generally, the AME just issues the medical certificate, and we end up retracting the certification due to the BP being out of standards. An AME should first repeat the BP after a period of rest. Take readings in both of the applicant's arms while standing. If the pressure remains elevated, you should have the airman repeat the blood pressures morning and evening for three days. These days do not need to be consecutive ones. You may have a local nurse or even have the airman drop into a local fire station, if it has a paramedic, and have the paramedic record the pressure. If the averages of these pressures are less than 155/95, you may issue the airman's certificate.

Reference

[1]Rayman, RB, Hastings, JD, Kruyer WB, and Levy RA. Clinical Aviation Medicine, Third Edition; 2000; Castle Connolly Graduate Medical Publishing LLC, page 148.

Dr. Silberman manages the Aerospace Medical Certification Division.