

# The Pilot With Heart Disease

## Becoming Airworthy Again

Presented to: CAMA Annual Scientific Session  
Cleveland, Ohio

By: Andrew H. Miller, M.D.,F.A.C.C.,F.C.A.M.A.

Date: Sept 2019



Federal Aviation  
Administration



# Certifying Cardiac Conditions

- Coronary artery disease:
  - Coronary stents (bare metal or drug-eluting)
  - Percutaneous transluminal coronary angioplasty (PTCA)
- Coronary artery disease requiring coronary artery bypass surgery
- Myocardial infarctions (with or without PCI)

# Certifying Cardiac Conditions

- Valve replacements (aortic, mitral)
- Valve repair
- Pacemakers
  - single chamber
  - dual chamber
  - biventricular (without ICD)
- Dilated and Hypertrophic cardiomyopathy

# Certifying Cardiac Conditions

- Atrial fibrillation
- Bundle branch blocks
- PVC's
- Aortic root enlargement

# **Coronary Artery Disease**

Medical management of ischemia  
will not be certified

# Initial Certification: Stents/Balloons

- Three months recovery time
- Six months recovery time for left main
- Hospital records to include
  - Admission H&P
  - Discharge summary
  - Consultation reports (All)
  - Procedure reports
  - CD of the interventional procedure

# Cardiology Evaluation Report

Lack of symptoms

Exercise tolerance

Medication side effects

Any bleeding history on anticoagulants

Risk factor modification

Antianginal medications not acceptable-NTG

# Initial Certification: Stents/Balloons

- Current laboratory including fasting serum glucose, HgbA1C (DM) and Lipid panel
- Current cardiovascular status report (CVE)
- Exercise treadmill stress testing
  - 1st and 2nd class will require a nuclear study and a post-event cardiac catheterization
  - 3rd class will require a routine exercise stress test and no catheterization is required
- Cardiology Panel review for 1st and 2nd class



# Certifying Coronary Artery Disease

## Caveats for treadmill stress

### Bruce protocol

- Walk for a minimum of 9 minutes under the age of 70, 6 minutes 70 and older
- 90-95% predicted maximal heart rate

# **Certifying Coronary Artery Disease**

## **Caveats for treadmill stress**

Beta blockers and rate-limiting calcium  
channel blockers

Do not discontinue for testing

# Certifying Coronary Artery Disease

## Caveats for treadmill stress

- LBBB or false positive EKG requires a pharmacologic stress test for initial certification.
- Recertification may require a pharmacologic stress test alternating with a routine exercise treadmill stress test on a 12 month basis .

# Recertifying Coronary Disease

- Annual requirement
- (For all classes, unless otherwise specified)
- A current cardiovascular status report (CVE)
- Lab:12 hour fasting glucose, HgbA1C if diabetic, lipids
- Exercise treadmill stress test per policy

# Certifying Coronary Artery Disease

## Antiplatelet therapy

- Current ACC guidelines for stents recommend dual anti-platelet therapy with Aspirin plus Plavix, Brilinta or Effient
- a minimum of one year for drug-eluting stents
- a minimum of thirty days for bare metal stents

# Initial Certification: Coronary Artery Bypass Surgery

- 6 months recovery time
- Hospital records to include
  - Admission H&P
  - Discharge summary
  - Consultation reports (All)
  - Operative reports

# Initial Certification: Coronary Artery Bypass Surgery

- A current status report (CVE)
- Current laboratory data to include a fasting serum glucose, 12 hour fasting lipid panel and HgbA1C (DM)
- 1st and 2nd class medical certification-nuclear treadmill stress test
- A post-event cardiac catheterization also required.
- Cardiology Panel review for 1st and 2nd class

# Initial Certification: Coronary Artery Bypass Surgery

- Third class medical certification
- Routine exercise treadmill stress test
- No post-event cardiac catheterization
- No Cardiology Panel review
- No mandated recovery time



# Initial Certification: Myocardial Infarction

- Three month recovery period
- Hospital records to include
  - Admission H&P
  - Discharge summary
  - Consultation reports (All)
  - Procedure reports (if performed)
  - CD of interventional procedure (if the procedure is performed)

# **Initial Certification: Myocardial Infarction**

- 1st and 2nd class medical certification
- Nuclear treadmill stress test
- A post-event cardiac catheterization
- Cardiology Panel review

# Initial Certification: Myocardial Infarction

- Third class medical certification
- Exercise treadmill stress test

# **Certifying Cardiac Conditions**

## **VALVE REPLACEMENTS AND REPAIR**

# Initial Certification: Mitral Valve Repair

- Three month recovery period
- Submit all hospital records
- Current cardiovascular evaluation
- EKG
- Echocardiogram
- Holter
- Stress test
- Submit to OKC
- CACI for repair over 5 years prior

# Initial Certification:

## Single Valve Replacement

### ALL classes

- 6 month recovery period
- Hospital records to include
  - Admission H&P
  - Discharge summary
  - Consultation reports
  - Operative reports

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# **Initial Certification:**

## **Single Valve Replacement**

- Current cardiovascular status report (CVE)
- 2D/M-mode echocardiogram, cardiac doppler with color flow (No peri-valvular leaks)
- 24 hour holter monitor

# Initial Certification:

## Single Valve Replacement

- Routine exercise treadmill stress test may be required
- INR's (80% within 2.5 to 3.5 unless St. Jude bi-leaflet valve or ONYX then allow 1.5 to 2.5) for mechanical valves
- Manufacturer's recommendations



# Single Valve Replacement: Recertification

Six month intervals for class 1 and 2

Annual for class 3

AASI for class 3

# Initial Certification: Double Valve Replacement

## All classes

- 6 month recovery period
- Hospital records to include
  - Admission H&P
  - Discharge summary
  - Consultation reports
  - Operative reports

# Initial Certification: Double Valve Replacement

- Current cardiovascular status report (CVE)
- 2D/M-mode echocardiogram, cardiac doppler with color flow (No peri-valvular leaks)
- 24 hour holter monitor

# Initial Certification: Double Valve Replacement

- Routine exercise treadmill stress test may be required
- INR's (80% within 2.5 to 3.5 unless St. Jude bi-leaflet valve or ONYX then allow 1.5 to 2.5) for mechanical valves
- Manufacturer's recommendations

# Initial Certification: Double Valve Replacement

- Path report, if available(Cystic medial necrosis is disqualifying)
- Cardiology Panel or consultant review
- The Cardiology Panel's recommendation will be sent FAA Washington, DC for final decision on a case by case basis

# Recertification: Double Valve Replacement

## All Classes

- Current status report (CVE)
- 2D/M-mode color echocardiogram
- 12 lead electrocardiogram
- Routine exercise treadmill stress test, with caveats if coronary artery disease exists.

# **Recertification: Double Valve Replacement All Classes**

- INR requirements are the same for mechanical valves
- 80% of the values must be between 2.5-3.5 for most valves
- Onyx valves should have 80% of the values between 1.5 – 2.5

**PACEMAKERS**



# Initial Certification:Pacemakers

## All Classes

- Single chamber
- Dual chamber
- Bi-ventricular
- Biventricular with ICD (disqualifying)

# Initial Certification:Pacemakers

## All Classes

Initial pacemaker implantation is 2 months

Lead replacement with or without generator replacement is 2 months

Generator replacement alone can be certified as soon as the airman has fully recovered (as little as 10 days)

# Initial Certification:Pacemakers

## All Classes

- All hospital records should include:
  - Admission H&P
  - Operative report
  - Consultation reports
  - Discharge summary

# Initial Certification:Pacemakers

## All Classes

### FAA Pacemaker Protocol Worksheet

- Acute thresholds, post-implant
- Chronic thresholds 8-12 weeks post implant

A current status report by the treating cardiologist and hospital records forwarded to OKC for review

# Initial Certification:Pacemakers

## FAA Definition Of Pacemaker Dependency

- Pacemaker is to be set at its lowest rate (30) PPM for 3 minutes.
- Rhythm strip obtained to document the underlying rhythm.
- If the underlying rhythm remains paced rhythm and/or if the airman develops symptoms, the airman will be considered “**pacemaker dependent**”.

3rd class only can be issued a medical certificate if “pacemaker dependent”

# Maintenance Of Certification: Pacemakers

- Pacemaker analysis will be required every 6 months with completion of pacemaker worksheet
- 6 and 12 month worksheets will be submitted with a current status report from the airman's treating cardiologist

# Maintenance Of Certification: Pacemakers

When the estimated battery life reaches 6 months, the airman will be **denied**.

Once the generator has been replaced, the airman can apply for recertification.

# **Dilated Cardiomyopathy**

## **All Classes**

Echocardiography

Holter

Nuclear stress test

Frequently cardiac catheterization

Betablockers, ACE, ARB, Entresto all acceptable

LVEF must reach 40% to certify

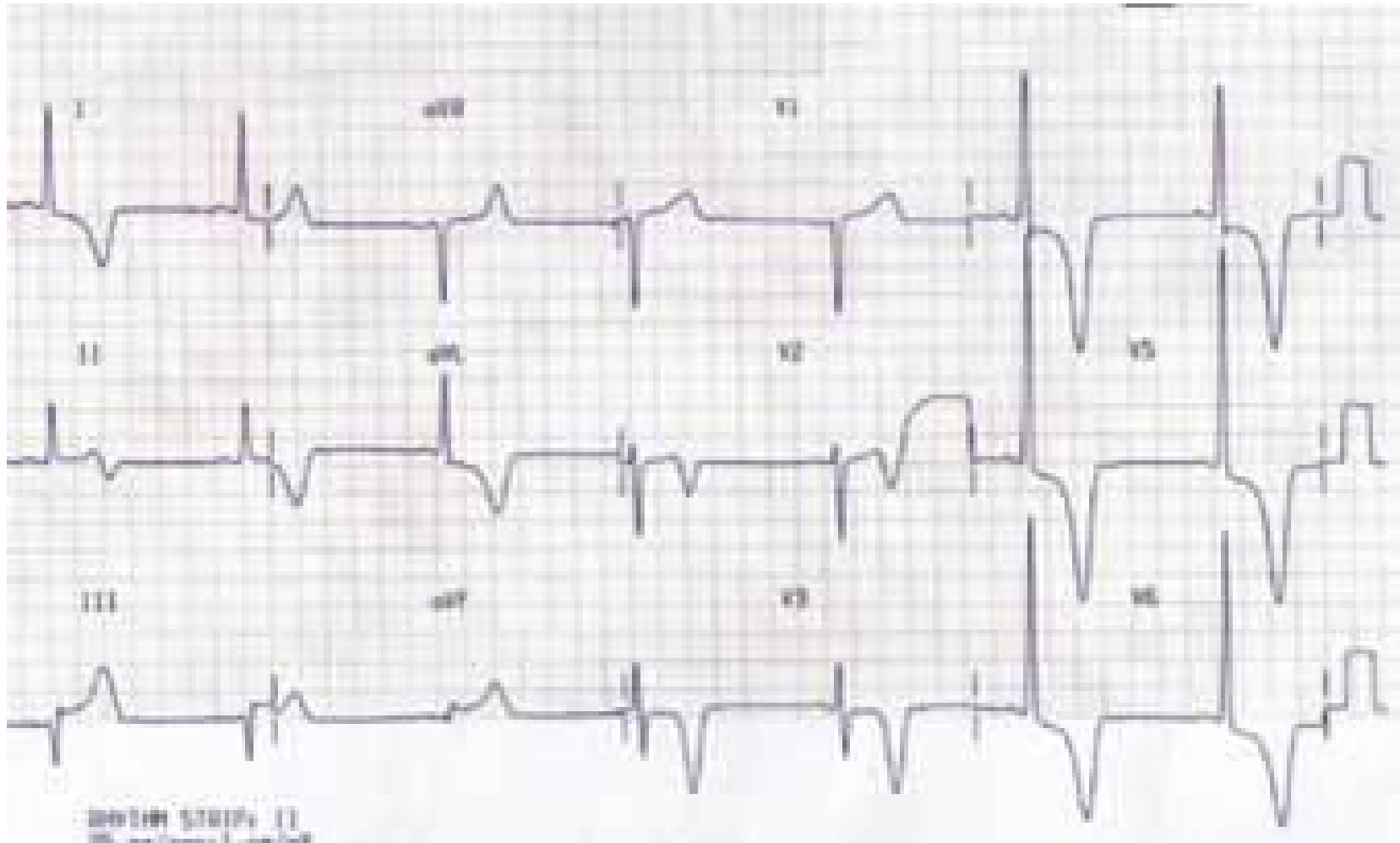
No defibrillators

Annual echocardiography for recertification

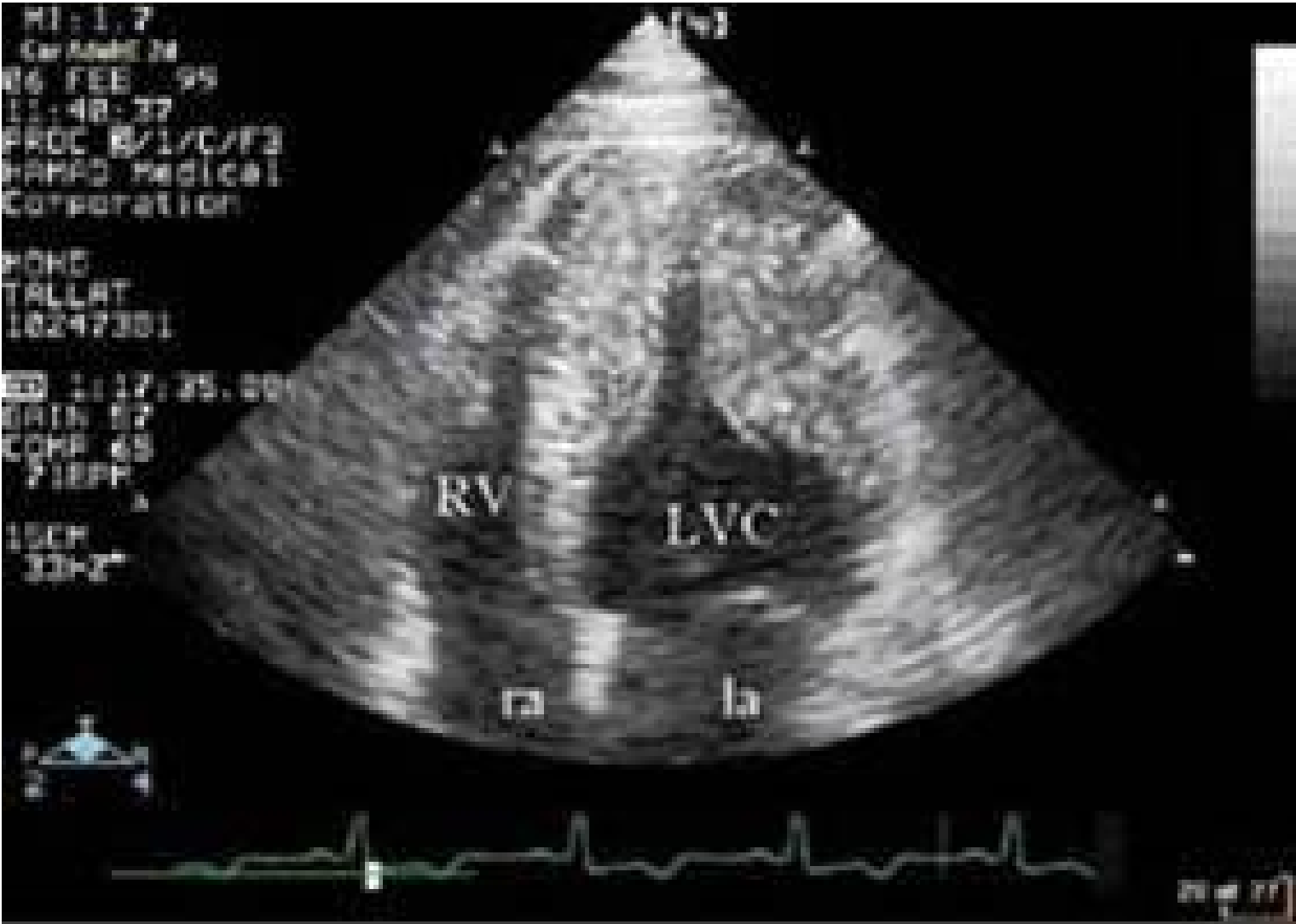


# **HYPERTROPHIC CARDIOMYOPATHY (HCM)**

# Hypertrophic Cardiomyopathy



# Hypertrophic Cardiomyopathy



# **Hypertrophic Cardiomyopathy**

**(Initial certification for all classes)**

## **HCM Risk-SCD Calculator**

**Risk factors used to determine whether or not the airman is considered high risk:**

- Family history of sudden death
- Unexplained syncope
- Documented ventricular tachycardia
- Symptoms of angina

# **Hypertrophic Cardiomyopathy**

**(Initial certification for all classes)**

**Risk factors used to determine whether or not the airman is considered high risk:**

- Congestive heart failure
- Lack of blood pressure augmentation during exercise treadmill stress testing
- Left ventricular wall thickness 30mm

# Hypertrophic Cardiomyopathy

**(Initial certification for all classes)**

- If the airman has **any** of these risk factors, he/she will be considered high risk and be **denied** medical certification.

# Hypertrophic Cardiomyopathy

**(Initial certification for all classes)**

- If the airman has **none** of the high risk factors, the airman's medical information will be reviewed by the Cardiology Panel



## HCM Risk-SCD Calculator

|                                  |  |  |
|----------------------------------|--|--|
| <b>Age</b>                       | <input type="text"/> <b>Years</b>                  | <i>Age at evaluation</i>   |
| <b>Maximum LV wall thickness</b> | <input type="text"/> <b>mm</b>                     | <i>Transthoracic Echocardiographic measurement</i>   |
| <b>Left atrial size</b>          | <input type="text"/> <b>mm</b>                     | <i>Left atrial diameter determined by M-Mode or 2D echocardiography in the parasternal long axis plane at time of evaluation</i>   |
| <b>Max LVOT gradient</b>         | <input type="text"/> <b>mmHg</b>                   | <i>The maximum LV outflow gradient determined at rest and with Valsalva provocation (irrespective of concurrent medical treatment) using pulsed and continuous wave Doppler from the apical three and five chamber views. Peak outflow tract gradients should be determined using the modified Bernoulli equation: Gradient= 4V<sup>2</sup>, where V is the peak aortic outflow velocity</i> |
| <b>Family History of SCD</b>     | <input type="radio"/> No <input type="radio"/> Yes | <i>History of sudden cardiac death in 1 or more first degree relatives under 40 years of age or SCD in a first degree relative with confirmed HCM at any age (post or ante-mortem diagnosis).</i>  |
| <b>Non-sustained VT</b>          | <input type="radio"/> No <input type="radio"/> Yes | <i>3 consecutive ventricular beats at a rate of 120 beats per minute and &lt;30s in duration on Holter monitoring (minimum duration 24 hours) at or prior to evaluation.</i>   |
| <b>Unexplained syncope</b>       | <input type="radio"/> No <input type="radio"/> Yes | <i>History of unexplained syncope at or prior to evaluation.</i>   |

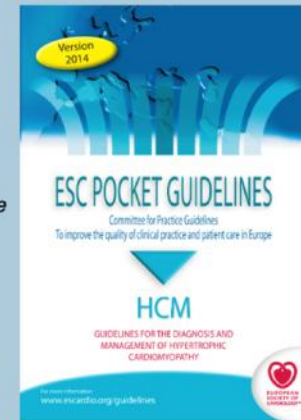
|  |
|--|
| <b>Risk of SCD at 5 years (%)</b> : <input type="text"/> |
| <b>ESC recommendation</b> : <input type="text"/>         |

Reset

2014 ESC Guidelines on Diagnosis and Management of Hypertrophic Cardiomyopathy (Eur Heart J 2014 – doi:10.1093/eurheartj/ehu284)

O'Mahony C et al Eur Heart J (2014) 35 (30): 2010-2020

*HCM Risk-SCD should not be used in:*

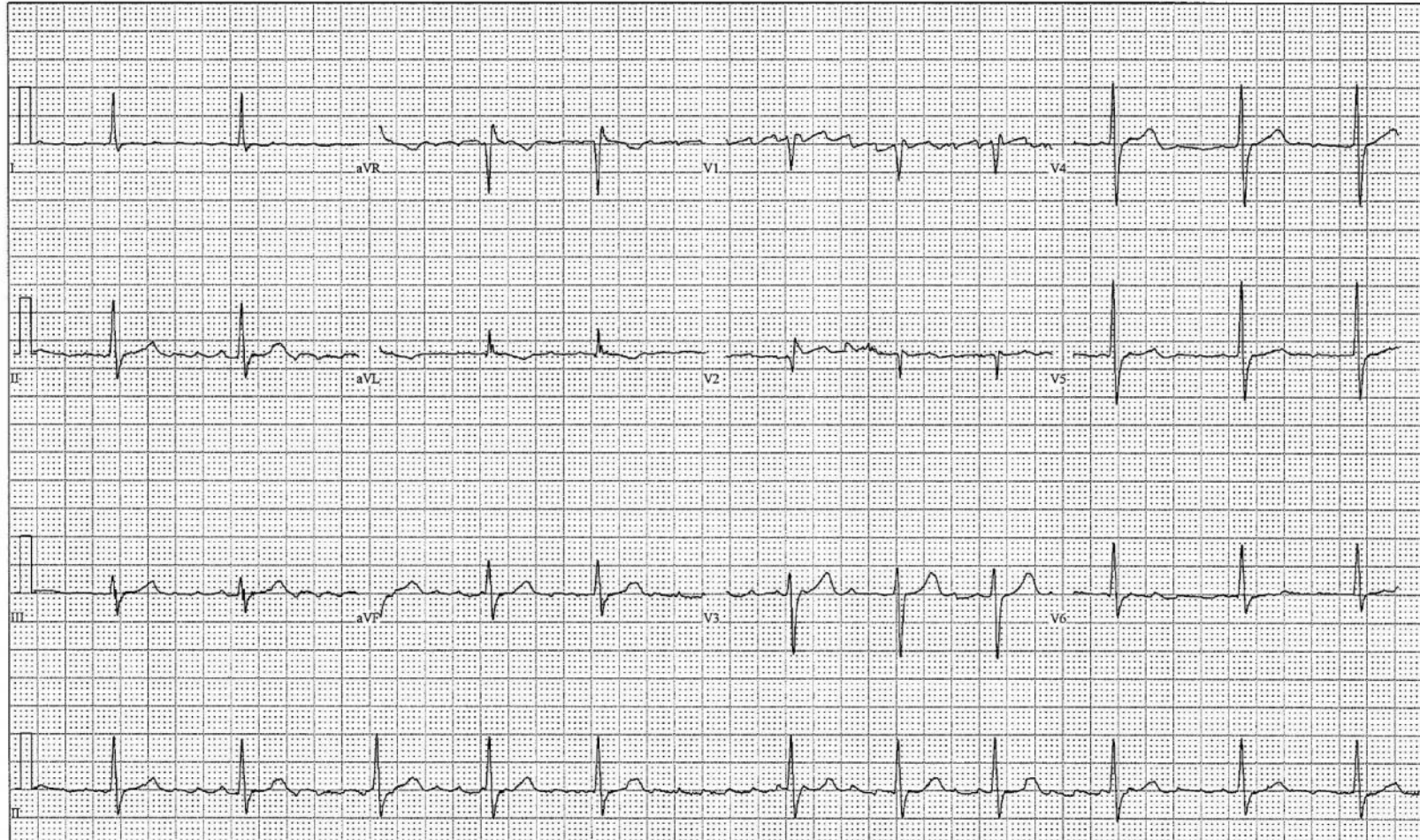




# **ATRIAL FIBRILLATION**

# Atrial Fibrillation

Comments: Unconfirmed Report



# Initial Certification: Atrial Fibrillation

- Episode over 5 years ago does not necessarily require diagnostic evaluation
- Chronic or paroxysmal both require evaluation
- Cardiovascular evaluation
- Stress test(nuclear preferred)
- Holter
- Echo
- Special issuance required
- AASI after initial certification
- Consider sleep apnea

# ATRIAL FIBRILLATION: ANTICOAGULATION

## CHADS2 score

- Congestive heart failure **(1)**
- Hypertension **(1)**
- Age (75) **(1)**
- Diabetes mellitus **(1)**
- Stroke **(2)**

# **ATRIAL FIBRILLATION: ANTICOAGULATION**

**(Initial certification for all classes)**

- A score of 0 requires no anticoagulation
- A score of 1, requires Aspirin ( can opt to use Coumadin or newer agents)
- A score of 2 or higher requires Coumadin or one of the new oral anticoagulants (Xarelto, Eliquis or Pradaxa)

# Certifying Atrial Fibrillation

## 24 HOUR HOLTER MONITOR

- The maximum average heart rate  $\leq 120$  beats per minute.
- 3 second or greater pauses disqualifying if the airman is symptomatic or if occurring during waking hours with activity.
- Increased vagal tone during sleep is not disqualifying.

# **Atrial Fibrillation Recovery Time**

- **Cardioversion-one month**
- **Ablation-3 months**
- **Holter monitor post procedure**

# Initial Certification: Bundle Branch Blocks

- RBBB under age 30 no work up required
- RBBB over 30-CVE and treadmill(nuclear) stress test
- LBBB all ages-CVE and nuclear stress test
- Special issuance not required unless CAD or cardiomyopathy discovered



# PVC's

- **Class 1 EKG with 2 or more PVC's**
- **Nuclear stress test and Holter monitor**
- **One time evaluation unless abnormal**
- **PVC's must be less than 20% total heart beats on Holter monitor**

# Aortic Enlargement

- **5 cm. aortic root disqualifying**
- **Annual CTA or echo required for 4 cm.**

# **Certifying Cardiac Conditions**

**ANY QUESTIONS:**

**AME guide**

# Thank You



# Safe Travels



**the LORD will watch  
over your coming  
and going both now  
and forevermore.**

**PSALM 121:8**