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Sudden Cardiac Death in Young Athletes

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RIHVI Cardiology
Outline

• Background
• Specific Causes
Outline

• Background
• Specific Causes
Background

• Rare
  – Incidence is ~ 1 per 100,000 person-years
  – One study (cited below) in a population of 1.23 million filtered down to 361 cases over 30 years
• Represents 75% of all fatalities during sports
• Survival < 15% by many studies

Circulation. 2012;126:1363-1372
Causes of death in the US population aged 1 to 21 years.
Outline

• Background
• Specific Causes
Outline

- Background
- Specific Causes
Causes of Sudden Death

1. HCM
2. Anomalous Coronary Artery
3. Myocarditis
4. ARVC

Other congenital HD (2%)
Ion channelopathies (3%)
Aortic rupture (2%)
Sarcoidosis (1%)
Dilated C-M (2%)
AS (3%)
CAD (3%)
Tunneled LAD (3%)
MVP (4%)

Indeterminate LVH - possible HCM (8%)

Other (3%)
Normal heart (3%)

Circulation. 2007;115:1643-1655
Hypertrophic Cardiomyopathy
Normal Heart

RV VS LV
LA = left atrium, LV = left ventricle, RV = right ventricle, IVS = intraventricular septum, AoV = aortic valve, MV = mitral valve
Ventricular Tachycardia
Athlete’s Heart versus HCM

- Symmetric hypertrophy
- Hypertrophy is rarely greater than 17 mm.
- LV cavity dimension is increased, whereas it is decreased in HCM.
- Diastolic function is normal (Ea >7 cm/sec).
- Tissue Doppler velocities and strain values are normal.
Anomalous Coronary Artery
“Pistol” Pete Maravich
Myocarditis
Reggie Lewis
Arrhythmogenic Right Ventricular Cardiomyopathy (ARVC)
Antonio Puerta
Conclusion

• Sudden cardiac death in young athletes is a rare, but tragic phenomenon that results from a number of pathologies, most commonly hypertrophic cardiomyopathy.
### Family History

1. Premature sudden cardiac death
2. Heart disease in surviving relatives < 50 yr

### Personal History

3. Heart murmur
4. Systemic hypertension
5. Fatigue
6. Syncope, near-syncope
7. Excessive, unexplained exertional dyspnea
8. Exertional chest pain

### Physical Examination

9. Heart murmur (supine/standing)
10. Femoral arterial pulses (to exclude coarctation of aorta)
11. Stigmata of Marfan syndrome
12. Brachial blood pressure measurement (sitting)
Sodium Channel and Heart Conditions

- Atrial fibrillation (AF)
- Brugada syndrome (BrS)
- BrS or LQTS
- Cardiac conduction defect (CCD)
- Dilated cardiomyopathy (DCM)
- Drug-induced torsades de pointes (drug-TdP)
- Long QT syndrome (LQTS)
- Mixed phenotype (BrS with SSS and/or CCD)
- Rare and common missense variants in health
- Sick sinus syndrome (SSS)
- Sudden infant death syndrome (SIDS)
Long QT Syndrome
Brugada Syndrome