Commotio Cordis

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Case Discussion

- 17 yo female Goalie
- Struck in the chest
- Fell to ground
- Delayed recovery
- Irregular heartbeat
- Resolved
- Continued to play
Objectives

- Define the condition
- Prevent the problem
- Identify the emergency
- Initiate appropriate treatment
- Follow up recommendations
Commotio Cordis

- “Agitation of the heart”
- 216 cases
  - 156 died (72%)
  - 60 survived (28%)
- US Commotio Cordis Registry
Epidemiology

- **Sports**
  - Projectile
  - Strike
- **Gender** - 95% male
- **Race** – 80% white
- **Age** - 10-18 years old
- **United States**
  - Baseball, softball, football, hockey, lacrosse
- **Europe**
  - Soccer, cricket, hockey
Epidemiology

Sudden Cardiac Arrest at a Martial Arts Event – (MWV)

Sudden Cardiac Arrest at a Martial Arts Event - (MP4)
Etiology

• Timing, Location, Speed, Hardness

• Contact
  – Where
    • Anterior left ventricle
  – Velocity
    • 30 -50 mph
  – What
    • Ball hard>soft
    • Stick
    • Fist, foot, head
Etiology

‘98 Playoffs - Blues@Red Wings Game 2 – (MWV)  (3:35-4:20)

‘98 Playoffs - Blues@Red Wings Game 2 – (MP4)  (3:35-4:20)
Electrocardiography

- Very small vulnerable window
  - 30 ms, 10-40 ms before T-wave peak
  - 6% entire cardiac cycle
  - Ventricular fibrillation

- Cellular mechanisms not completely understood.
Prevention - Projectiles

• National Operating Committee on Standards for Athletic Equipment (NOCSAE)
  • Soft balls
    – Reduced Injury Factor
    – Reduce risk
    – Recommended for youth baseball
• Air-filled balls
  – European experience
Prevention

- Chest protectors
  - Data
  - Marketing
- Rule modification
Identify the Emergency

• Pre-event probability and preparation
  – Anticipate needs
  – Prepare response
• Emergency Action Plan
• Availability, Education and Empowerment
Appropriate Treatment

• Make a diagnosis
  – Rapid assessment
  – Use pre-event preparation clues
• Activate EMS
• ABC
• Automated External Defibrillator (AED)
Ventricular Fibrillation

- Don’t want this
- Spontaneous conversion
- Precordial thump
- Early Defibrillation
  - 25% survive < 3 minutes
  - 5% survive > 3 minutes
Follow up Recommendations

• Go to hospital
• Cardiology evaluation
  – ECG, Holter, Echo, and other focused studies
  – Check for other things
    • Myocardial damage, arrhythmia, prolonged QT
    • Coronary artery issues
  – Electrophysiology studies or Implantable defibrillator recommendations
• Return to play decision
Final Thoughts

• Be prepared
  – Review likely scenarios in advance
• Evidence-Based Prevention Advocate
• Emergency Action Plan
• Access to AED
Backup Slides
Videos Links

- Sudden Cardiac Arrest at a Martial Arts Event – (MWV)
- Sudden Cardiac Arrest at a Martial Arts Event - (MP4)
- ‘98 Playoffs - Blues@Red Wings Game 2 – (MWV) (3:35-4:20)
- ‘98 Playoffs - Blues@Red Wings Game 2 – (MP4) (3:35-4:20)
- Hank Gathers – MWV (1:20 - 2:40)
Hypertrophic Cardiomyopathy

Hank Gathers – MWV (1:20 - 2:40)

Hank Gathers – MP4 (1:20 - 2:40)