

COMMOTIO CORDIS

LATIN: [AGITATION OF THE HEART]

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Presenter Bio and Disclosures:

- This presenter has no financial interest in any topic being covered in this presentation, nor is her receiving any compensation from any party not affiliated with this conference.
- Fire Service since 2001, EMS since 2003. Paramedic in 2006. CCEMT-P in 2008. CIC in 2014. Tactical Medic in 2014. 10 years as an EMS supervisor.
- Currently employed as a Quality Assurance Analyst and Clinical Educator for MultiMed Billing and as a Fly-Car Paramedic and Tactical Medic for Wayne County Advanced Life Support. Also an instructor for Medic-CE.com



Case:

- You are doing an EMS standby for an athletic event. You're deeply engrossed in a book and your partner is listening to a TED Talk.
- You notice the sounds of the game have stopped.
- Someone starts banging on the side of your vehicle.
- Someone else is screaming "Help him!"
- This is what you see in front of you...





Sudden Cardiac Arrest in Athletes:

- In the US, a young competitive athlete dies every three days.
- Young athletes a 2X as likely to experience SCA than young non-athletes.
- 90% of victims are male.
- Hypertrophic Cardiomyopathy (HCM) is the leading cause – 36%.
- 52% of HCM deaths are black.
- Average age is 17.5 years.
- Risk increases with age.



Another Cause:

- SCA can occur due to ventricular fibrillation (VF).
- This can occur from a sudden, blunt force to the chest, near the heart.
- If the patient has no pre-existing cardiac condition this is:

COMMOTIO CORDIS



Comotio Cordis



In the top 3 causes of SCA in athletes



Exceeded only by:

Hypertrophic Cardiomyopathy
Congenital Coronary Artery Abnormalities



How often?

- In 2012, 216 deaths were reported.
- Where is this recorded?
- There is a US Commotio Cordis Registry.



Who's At Risk?



Young, mostly male, athletes.



Probability of sudden, blunt, otherwise non-threatening blow to the front of the chest.



This blow causes ventricular fibrillation.



Survival rate is low, but is slowly improving.

Morbidity/Mortality

- There is a progressive decline in death due to commotio cordis.
 - From 1970-1993 survival was only 10%.
 - From 2006-2012 survivability is up to 58%.
- Reasons for improvement:
 - Earlier recognition
 - Earlier CPR
 - Earlier AED use.



Patient Demographics

Race:

- Nearly 80% occurrences are in white patients.

Sex:

- 95% of cases are males.

Age:

- Has been reported in a wide range of 6 months to 50 years.
- Most frequently happens in ages 10 years to 18 years.
- Mean age is 15 years +/- 9 years.
- 26% younger than 10 years.
- 75% younger than 18 years.

Sources of Impact

- Common cause is strike by a baseball
- Other causes:
 - Hockey
 - Softball
 - Lacrosse
 - Karate
 - Soccer
 - Football



Source of Blow

Hockey puck



Lacrosse ball



Baseball



Fist or elbow



Primary determinants and triggers

Precordial impact site
Timed during upstroke of T wave

Contributing variables

Greater hardness of projectile
Smaller sphere
Direct orientation
Thinner, more compliant chest wall

Left lung

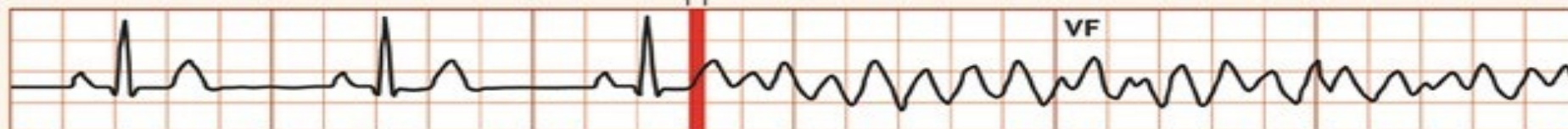
Rib

Chest wall

Heart wall

Rapid increase in intracavitary pressure

20-msec window



Upstroke of T wave

What does it look like?

A young athlete who has hit in the chest.

No visible trauma.

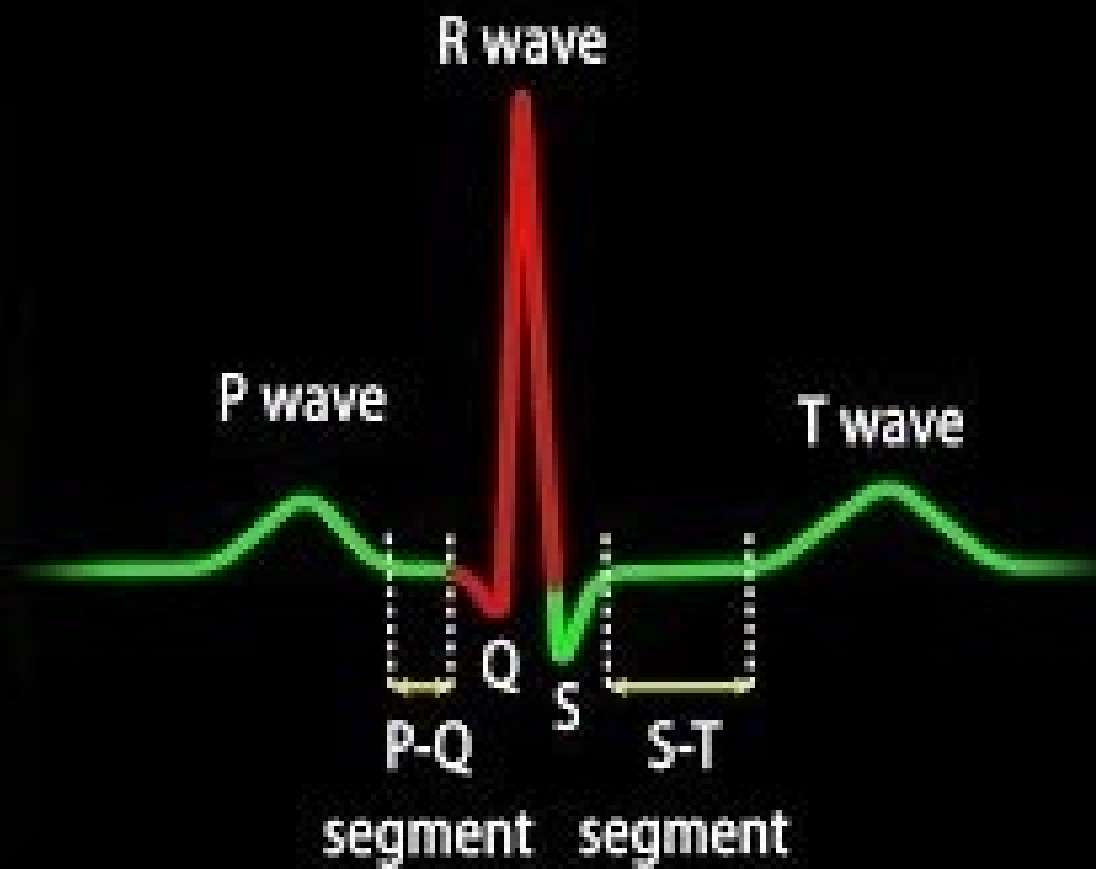
Will usually stumble forward, become unresponsive, pulseless and apneic.

If a sideline AED is applied, it will sense a shockable rhythm.



Review of Cardiac Conduction

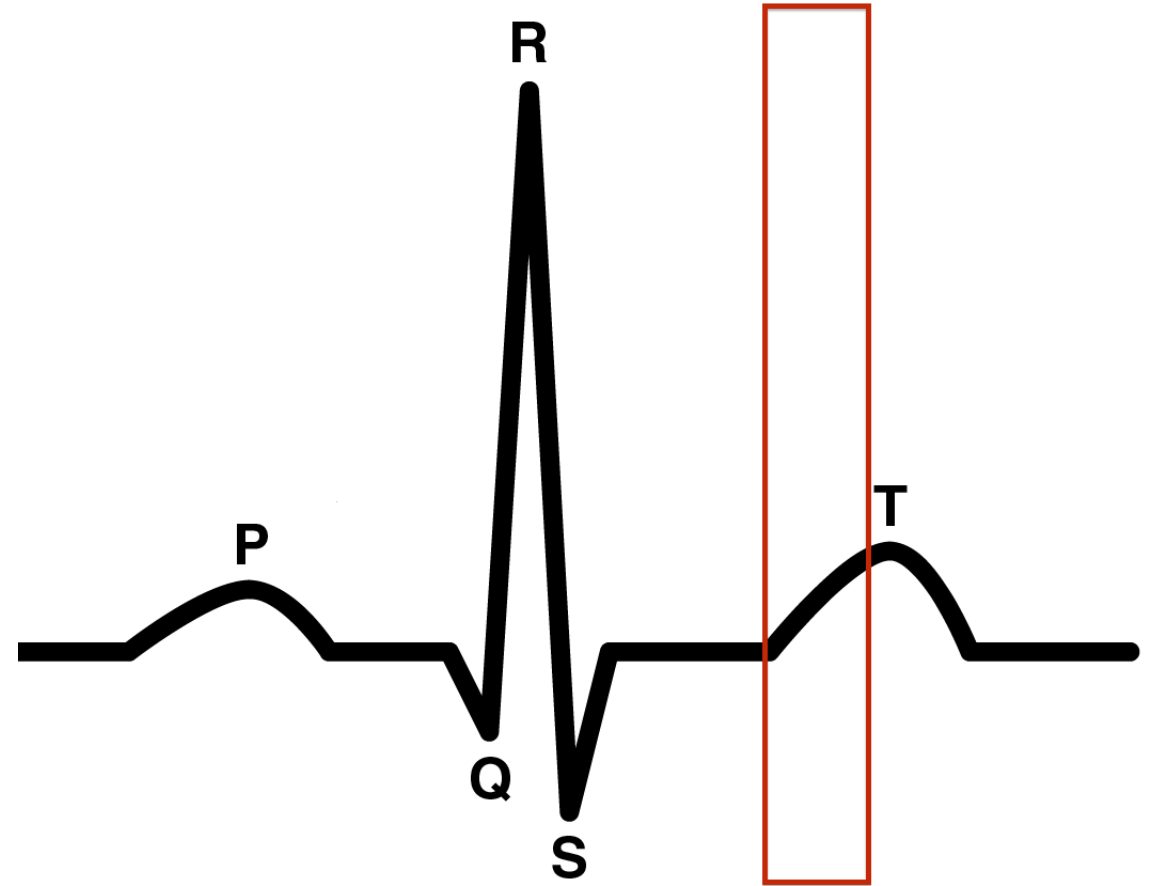




The Event

Timing of Impact

- This impact has to happen at the “vulnerable time” when the ventricles are repolarizing.
- This is represented by the T-wave.



At risk window for commotio cordis



What Else Could This Be?



Cardiac arrest of other etiology.



Respiratory/Pulmonary problems.



Hypertrophic Cardiomyopathy.



High Grade Concussion.



Syncope due to heat exposure.



How Do We Treat It?

- CPR and AED immediately.
 - For every 1 minute without a shock, survival decreases by 10%.
 - AED gives the patient the best chance for survival.
 - Is there one on the sidelines of your practices and competitions?



ALS?

- Yes, for cardiac monitoring minimally.
- Antidysrhythmic agents may be needed to stabilize patient's cardiac conduction.
- Advanced airway placement may be needed.



What Happens After A Successful Outcome?

- May result in no further treatment.
- An EKG may need to be done before return to play.
- If dysrhythmias continue, medications may be needed.
- An implanted pacemaker/defibrillator may be needed.



Return to
Play

Be monitored regularly by your athletic trainer to screen for cardiac abnormalities.



Change your practice and play to include chest protection or use safety balls.





Prevention of Commotio Cordis

- Injuries to the chest may not be possible to prevent.
 - Sports, MVCs and assaults.
- Sports Teams can:
 - Have an athletic trainer or medical professional at all practices and games
 - Have an AED readily available all the time
 - Ensure coaches can access and use the AED
 - Educate trainers, coaches, parents, and players how to recognize Commotio Cordis and to perform CPR and use an AED.

Is this required where you are?



References:

- Sudden cardiac arrest foundation
- <http://www.your-heart-health.com/content/close-the-gap/en-US/heart-disease-facts/young-athletes.html>
- <https://ksi.uconn.edu/emergency-conditions/cardiac-conditions/commotio-cordis/#>

Additions or Clarifications?



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