

# Medicine for Managers

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## Commotio Cordis

Many years ago, when I was working in an Accident and Emergency Department, a teenage boy was brought into the department. He had been playing cricket at first slip (close to the opposing batsman). The fast bowler delivered the ball, which flew off the bat and struck the young man on the left side of the chest. He collapsed, pulseless. He received first aid but he died where he fell. What a difference a defibrillator could have made.

**H**e died as a result of a rare condition called **Commotio Cordis**. The term is Latin meaning **heartbreak** or **agitated heart**. It can occur following sudden blunt impact on the left side of the chest.

If the impact is at a particular point in the heart beat cycle, it may trigger the heart to **fibrillate** (the regular heart rhythm ceases, disrupting the beat resulting in a quivering movement due to unco-ordinated contraction of heart muscle fibres). This results in sudden **cardiac arrest**.

It is not associated with underlying heart disease of any sort but is often fatal. In such circumstances, the person's life can be saved by speedy use of **cardiopulmonary resuscitation (CPR)** and the use of an **automated external defibrillator (AED)**.

### Incidence

The number of cases is extremely low. In the UK there is no Classification Code for commotio cordis and it would be recorded in the

International Disease Classification as S26.9 (injury to heart unspecified).

There are, perhaps 6-10 cases a year in the UK, most commonly occurring in male athletes between the ages of about 12 -20 engaged in sporting activities.

*A hard blow during rugby, or from a cricket ball, lacrosse ball or hockey puck striking the left chest hard may induce the arrest.*

It can occasionally occur as a result of a car accident or an assault. In the US about 20-30 cases are reported annually.

It is interesting that the vulnerable group is principally young adults during their teenage years. Indeed very few cases are reported in people over the age of 20. It is postulated that teenagers have thinner, less well-developed

chest walls and they are the key group most likely to be playing such sports. Although rare it is a significant cause of death in young athletes and there is speculation that it is under-reported.

### Why does it occur?

The development of the lethal arrhythmia depends on four factors:

- A forceful impact on the chest
- The precise location of the blow over the heart
- The exact point in the cardiac cycle
- The exact trauma to the heart muscle

Structural cardiac abnormality is normally absent.

The explanation of the events involving the heart is quite complicated.

I shall try to explain it as simply as possible. Here is a picture of an ECG recording, which shows the electrical activity in the heart during the stages of heart contraction.

One beat of the heart occurs about every four-fifths of a second.

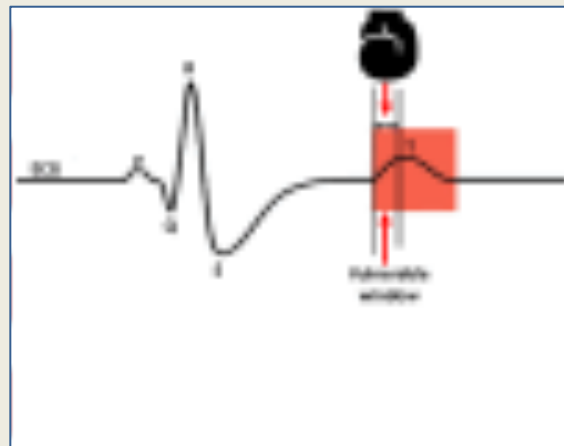
The wave shown represents the process of each electrical stimulus which spreads through the various chambers of the heart, causing the muscle to contract and push blood into the circulation.

Only at the end of each beat, when the muscle is recovering prior to the next stimulus, there is a brief moment (*shown in the area of red between the red arrows where the boxing glove symbol is above*), representing only about 5% of the electrical cycle, when the heart muscle is unstable and may fibrillate (*cease to pump effectively*) if a blow is delivered.

Therefore, only a small percentage of blows to the chest result in fibrillation making such episodes rare.

### Symptoms of Commotio Cordis

Simply, it is the sudden onset of collapse, with lack of responsiveness and no breathing, pulse or heartbeat.



### Management of Commotio Cordis.

The standard principles of cardiac arrest management apply.

1. Dial 999 as an emergency
2. Start cardio-pulmonary resuscitation (CPR)
3. As soon as possible,

when a defibrillator (AED) is available, the heart should be shocked into normal rhythm.

There is a difference between commotio cordis and other sudden cardiac arrest, which both involve the heart suddenly stopping. Commotio cordis involves an impact to the chest by a heavy blow whereas sudden cardiac arrest occurs if the heart suddenly stops, often linked

to heart disease or other factors which cause the heart's electrical system to malfunction. Both are treated by CPR.

### Recovery

Patients who have survived commotio cordis are not thought to be at higher risk for other heart events.

However, following such an episode, the individual should undergo full cardiac assessment to exclude any form of existing heart disease, including ECG, echocardiogram and stress testing.

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