



Cardiovascular disorders Case study

By

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Case study 1

A 66-year-old man had experienced central chest pain on exertion for some months, but in the afternoon of the day prior to admission he had had a particularly severe episode of the pain, which came on without any exertion and lasted for about an hour. On admission there were no abnormalities on examination and the ECG was normal. The troponin was clearly detectable.

Comment on these results. Has he suffered an MI?

Comments: He has an elevated troponin plus a typical history. This is sufficient to diagnose an MI by the most recent definition, even in the absence of ECG changes.

Case study 2

A well-trained marathon runner collapsed as he was approaching the finishing line. An ECG was normal, but CK was elevated at 9500U/L (male reference range 55–170U/L), and the CK-MB was 14% of the total CK (normally <6%). Troponin was undetectable.

Comment on these results.

Comments: The total CK is substantially elevated, and CK-MB >6% can usually be taken to mean that it is of myocardial origin. However, the normal ECG and troponin are both reassuring. In trained endurance athletes, the proportion of CK-MB in muscle increases from the normal low levels and may be as high as 10–15%. An elevated CK-MB in such individuals can no longer be taken to imply a cardiac origin for the raised CK. Extreme exercise, especially in unfit individuals, causes an elevated CK, potentially to very high levels.

Case study 3

A 46-year-old man was admitted late at night (23.30 h) to casualty by ambulance because of a tight central chest pain that had started at 03.00 h that morning. He had delayed calling for medical assistance because he thought it was only indigestion. In the ambulance, the paramedics gave him an intramuscular injection of diamorphine for pain relief. The ECG was normal.

Plasma

Creatine kinase (CK) 565 U/L (< 250)

Troponin T 1.0 ng/L (< 10)

DISCUSSION

The normal plasma troponin T makes a diagnosis of acute myocardial infarction unlikely, as this would be expected to be elevated in view of when the chest pain started. The elevated plasma CK concentration is not specific for cardiac damage and may have been raised as a result of muscle damage secondary to the intramuscular injection: beware of interpreting elevated plasma CK concentrations in the presence of intramuscular injections. A CK-MB concentration would be less likely than total CK concentration to be elevated in skeletal muscle damage, as CK-MB is predominantly cardiac in origin.

Case Study 4

A 66-year-old man was sent by his general practitioner to casualty because of tight chest pain that had occurred 3 days previously. The pain had largely resolved after 6 h, but he was left feeling weak and breathless, which worsened over a few days, causing him eventually to seek medical attention. The following laboratory test results were found:

Plasma

Creatine kinase (CK) 235 U/L (< 250)

Troponin T 13.0 ng/L (< 10)

An electrocardiogram showed changes suggestive of a myocardial infarction.

DISCUSSION

The plasma CK activity has returned to normal because of the time delay since myocardial infarction, while the plasma troponin T concentration still remains elevated. Plasma CK usually starts to rise 4–6 h after a myocardial infarction and to normalize after a couple of days. Conversely, plasma troponin T starts to rise at 4–6 h post infarct and remains elevated for as long as about 10 days. Troponins are thus useful cardiac markers in both the early hours and a few days later.



Thank you for your attention