

# Chest pain – is it my heart, doctor?

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**TITLE** Thrombolysis in Myocardial Infarction risk score accurately risk stratifies patients with undifferentiated chest pain presenting to an emergency department.

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**LIST OF ABBREVIATIONS** Accident and Emergency (A&E), acute coronary syndrome (ACS), front door score (FDS), ST elevation myocardial infarction (STEMI), thrombolysis in myocardial infarction (TIMI).

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## SUMMARY

Most patients with ACS present to general physicians. The challenges are firstly to determine which patients with chest pain have ACS, and secondly to identify those at high risk of further cardiac events. It is these high risk patients who are most in need of prompt cardiology referral.

This article describes a simple, inexpensive scoring system which physicians can use to risk stratify their patients at the point of entry into hospital. It is truly 'home grown' since the work was done at the Royal Infirmary of Edinburgh.

One thousand consecutive patients presenting to the A&E Department with chest pain of potentially cardiac origin were given an FDS and subsequently a TIMI score once the result of their serum troponin was available. Patients were followed to hospital discharge or to thirty days after their initial presentation. Outcomes assessed were STEMI, troponin positive ACS, angioplasty, all cause mortality at thirty days and readmission with myocardial infarction within thirty days. These were summated in a single measure, the major cardiac event rate.

The TIMI score is based upon seven elements: age >65; three or more risk factors for coronary artery disease; known coronary stenosis; continuous use of aspirin for the preceding seven days; ST segment deviation of >0.5mm; two or more episodes of angina in the past 24 hours, and raised cardiac enzymes. It has been validated as a robust means of assessing the risk of a future vascular event. However, as cardiac enzymes are part of the score, it cannot be used when a patient is initially admitted to hospital.

The 'front door score' is a six point scale based upon all the TIMI criteria except for the cardiac enzyme troponin. By definition, this score can be used when the patient first presents to hospital since a cardiac enzyme result is not required.

The two principal aims of the study were to see how well the FD score correlated with the TIMI score and also determine the relationship with the major cardiac event rate.

There was close agreement between the TIMI and FD scores.

More importantly, it was shown that in a large unselected population of patients presenting with potentially cardiac chest pain, there was an incremental risk of a major cardiac event as the FD score rose. An FD score of zero was associated with a 30-day event rate of just 5%. Scores of one and two had an event rate of under 20% with a jump to 21% and 22% with scores of three and four respectively. A score of five resulted in an event rate of 41%, and this rose to 64% when the score was six.

## OPINION

Chest pain represents one of the most common causes of admission to Scottish hospitals. The majority of these patients receives care from general physicians rather than cardiologists. It is a constant struggle to decide who should be sent home quickly, who should undergo in-patient treadmill testing, and who should be referred to a cardiologist. While a positive troponin helps to confirm the diagnosis of an acute coronary syndrome and make cardiology referral more likely, this result is

not available when the patient first arrives in hospital. There are other factors conspiring against the general physician. Troponin can be checked only after at least 12 hours have elapsed from the onset of symptoms and many laboratories do not provide a 24-hour assay. This means that for patients being admitted in the evening and through the night, a reliable troponin result may not be available even on the morning post-take ward round.

The attraction of the FD score is that every patient with potentially cardiac chest pain can have an instant prognostic assessment prior to the results of cardiac

enzyme analysis becoming available. This in turn may not only facilitate prompt cardiology referral but also refine discharge planning. Put simply, patients with an FDS of five or six are likely to require cardiology input, irrespective of the troponin result, while those with scores of zero to two have a good chance of getting home quickly. Of the rest, FD scores three and four, those whose troponin is found eventually to be positive, should probably be referred to cardiology, while those with a negative result may warrant pre-discharge treadmill testing.

### FROM THE COLLEGE LIBRARY



Denis Jourdanet (born 1815). *Influence de la pression de l'air sur la vie de l'homme*. Paris: G Masson, 1875.

### BREATHLESSNESS ON MOUNTAINS

In 1802, the great naturalist Baron Alexander von Humboldt set a new world altitude record with his ascent of Mount Chimborazo in South America. At a height of

19,280 feet, Humboldt and his party were in sight of the summit when they were forced to retreat suffering from acute mountain sickness. Humboldt was the first to suggest that this altitude sickness may be due to the lack of oxygen, and not just changes in air pressure.

This was later to be proved true by the French researchers Denis Jourdanet and Paul Bert. Jourdanet, who had practised medicine in Mexico, provided the funding for Bert to conduct laboratory research, while he himself travelled and made field observations. Jourdanet's *Influence de la pression de l'air sur la vie de l'homme* appeared in 1875 and summarised the observational and experimental work he had done at different altitudes in remote parts of Asia and Latin America.

The two volumes are so profusely illustrated with maps, portraits and scenic views, that they appear more

like a travel book than a work of scientific research. Included is a depiction of Humboldt's collapse from acute mountain sickness during his historic attempt to climb Mount Chimborazo. Jourdanet compared the symptoms of altitude sickness to those of anaemia and suggested that both might be due to a lack of oxygen in the blood. For this condition, he coined the term 'anoxemia'.

For a modern view of human cardiopulmonary function at high altitude, see Sartori C, Scherrer U, Acclimatisation at high altitude: lessons from individuals prone to high altitude pulmonary oedema, *J R Coll Physicians Edinb* 2006; **36**:100–106.

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