Authors' objectives
To investigate which tests help identify those patients at risk of developing cardiovascular complications following blunt cardiac trauma.

Searching
MEDLINE was searched from 1967 to 1993 for articles published in the English language, using the following keywords: 'blunt chest' or 'cardiac trauma' and 'myocardial contusion'. The bibliographies of relevant articles were also checked. Databases of unpublished studies were not searched.

Study selection
Study designs of evaluations included in the review
Prospective and retrospective studies were eligible for inclusion.

Specific interventions included in the review
No inclusion criteria relating to the index test were defined. The included studies reported data for at least one of the following tests: electrocardiogram (ECG), MB-fraction serum creatinine phosphokinase level (CPK-MB), radioisotope scanning (Scan) and echocardiography (Echo). Definitions of an abnormal test were:

  for ECG, any new abnormality, or any abnormality in a patient with no previous ECG;

  for CPK-MB, any elevation of the MB fraction considered greater than normal by the authors of the primary study (range: 0 to 7%);

  for Scan or Echo, any examination reported as abnormal by the authors of the primary study.

Reference standard test against which the new test was compared
No inclusion criteria relating to the reference standard of diagnosis were defined. In the review, the presence or absence of complication was used as the reference standard. A complication was defined as any new cardiac problem that required treatment.

Participants included in the review
All studies of patients with blunt cardiac trauma were eligible for inclusion.

Outcomes assessed in the review
No inclusion criteria relating to the outcome measure were defined. The outcome measure reported in the review was the diagnostic odds ratio (OR), a measure of correlation of abnormal test result with cardiac complications.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.
Methods of synthesis
How were the studies combined?
Separate 2x2 tables were constructed for each test evaluated in each included study. The 2x2 tables were combined using the Mantel-Haenszel method to estimate pooled ORs with 95% confidence intervals (CIs).

How were differences between studies investigated?
Prospective and retrospective studies were analysed separately. Variability in the definition of abnormal tests and complications, and variability in study populations among individual studies, was discussed in the text.

Results of the review
There were 25 prospective studies with a total of 2,210 patients, and 16 retrospective studies with a total of 2,471 patients.

All studies: the majority of complications experienced by the patients were arrhythmias (76%).

Correlation of abnormal test result with complications from prospective studies.
The OR was 9.2 (95% CI: 4.3, 19.6) for ECG, 3.7 (95% CI: 1.6, 8.6) for CPK-MB, 1.4 (95% CI: 0.9, 1.8) for Scan and 12.3 (95% CI: 3.5, 41.6) for Echo.

The sensitivity analysis found that the result of abnormal Echo was skewed by a single study. The correlation between abnormal Echo and complications was no longer significant when this study was excluded.

Correlation of abnormal test result with complications from retrospective studies.
The OR was 26.0 (95% CI: 18.5, 36.5) for ECG, 7.7 (95% CI: 5.2, 11.4) for CPK-MB, 0.8 (95% CI: 0.07, 23.8) for Scan and 84.0 (95% CI: 32.8, 215.3) for Echo.

Authors' conclusions
The data support the use of ECG and CPK-MB in the diagnosis of clinically significant myocardial contusion. Radionuclide scanning is not useful in the evaluation of patients with blunt cardiac trauma. Further studies need to define the role of Echo, and to determine how long blunt cardiac trauma patients should be monitored for the development of complications.

CRD commentary
The review stated a clear research question. However, this was poorly defined in terms of inclusion criteria. The search strategy was limited and did not include any attempt to identify unpublished material. It is therefore possible that relevant data may have been overlooked. Details of the individual included studies were not available, making it difficult to assess the generalisibility of the findings. The authors discussed potential publication bias, selection bias, variability in the definition of abnormal tests and complications, and variability in study populations among the individual studies. However, the review methodology was poorly reported, making it difficult to judge the potential impact of bias at this level. Arrhythmia was the major complication experienced by the patients (76%).

Implications of the review for practice and research
Practice: The authors stated that the data support the use of ECG and CPK-MB in the diagnosis of clinically significant myocardial contusion.

Research: The authors stated that further studies are needed to define the role of Echo, and to determine how long blunt cardiac trauma patients should be monitored for the development of complications.
Bibliographic details

PubMedID
8639191

DOI
10.1016/S0735-6757(96)90165-5

Indexing Status
Subject indexing assigned by NLM

MeSH
Contusions /complications /diagnosis; Creatine Kinase /blood; Electrocardiography; Heart Injuries /complications /diagnosis; Humans; Isoenzymes; Predictive Value of Tests; Prospective Studies; Research Design; Retrospective Studies; Risk Factors; Wounds, Nonpenetrating /complications /diagnosis

AccessionNumber
11996000964

Date bibliographic record published
31/03/2005

Date abstract record published
31/03/2005

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.