Management, Triage and Outcomes of 378 Patients Presenting to the Emergency Department with Chest Pain of Acute Onset: A Single Centre Observational Study

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Abstract: Chest pain accounts for 700,000 hospital attendances in the UK each year. Prompt risk assessment and diagnosis both improves outcomes and reduces unnecessary admissions. Data on patients who presented to the ED with chest pain was collected retrospectively. Patients were then followed up via hospital records and telephone. 70% of the authors’ patients were triaged as low risk chest pain. Three represented within 30 d with non ischaemic chest pain. 1 patient had MACE. The authors’ triage pathway safely managed those presenting with chest pain.

Key words: Acute coronary syndrome, triage, near patient testing, troponin I, risk stratification.

1. Introduction

Chest pain accounts for around 700,000 hospital attendances in England and Wales each year, of which 40% are non-cardiac and 25% are admitted to hospital [1, 2]. Prompt diagnosis of Acute Coronary Syndrome (ACS) within this population improves outcomes [2]. Clinicians have a low threshold for hospital admission and subsequently a large proportion of patients admitted to hospital with a provisional diagnosis of ACS are found not to have ischaemic heart disease (IHD) [2, 3]. Improved risk assessment to identify patients suitable for outpatient care may improve efficiency [3-5]. Patients with normal ECG traces and biomarkers are often further risk stratified using clinical tools to define a group safe for discharge from the ED [2, 6, 7].

In 2009 the authors’ inner city teaching hospital introduced a guideline for patients presenting with chest pain, incorporating three pathways as described below (Table 1 and Appendix 1). The pathway mandates a clinical assessment, GRACE scoring, ECG and a triple panel point of care test on arrival; the triple panel is repeated at 2 h. The triple panel consists of assays for troponin, CKMB and myoglobin.

This observational study was performed to assess the safety and effectiveness of the guideline in managing patients presenting with low risk chest pain, without ECG changes or elevated cardiac enzymes as managed in the green pathway (Table 1).

2. Methods

A convenience sample of patients presenting with chest pain between 1st October 2011 and 25th November 2011 was identified and the full patient record obtained. All data was entered into a password protected Microsoft Access™ database on a password...
Table 1  Pathways defined in Chest Pain Guidelines.

<table>
<thead>
<tr>
<th>Pathway</th>
<th>Red</th>
<th>Orange</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition</td>
<td>ST Elevation in 2 or more leads</td>
<td>NSTEMI or diagnostic history, positive troponin or GRACE &gt; 88</td>
<td>Non-diagnostic history, normal ECG and negative biomarkers. GRACE &lt; 88</td>
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<tr>
<td>Management</td>
<td>Discuss with senior and rapid transfer to Cardiac Centre for Primary Coronary Intervention</td>
<td>Discuss with Cardiac Centre for Primary Coronary Intervention</td>
<td>Observe on Clinical Decision Unit (CDU) for 12 h troponin or discharge. Low Risk Chest Pain Clinic within 2 weeks</td>
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3. Results

Data was obtained for 378 patients, 67.5% male with a mean age of 53. Results are illustrated in Fig. 1.

Only three patients (1.5%) patients were triaged to the STEMI pathway, however in the authors’ region paramedics can triage patients with ST elevation directly to the local cardiac centre bypassing the ED. Of the 29.1% (n = 112) patients admitted to hospital, 69% (n = 77) had a past medical history of ischaemic heart disease, and/or positive biomarkers and/or a GRACE score of > 88. 60% (n = 67) of these patients had a discharge diagnosis of non-cardiac chest pain. However, 84% (n = 94) of these did not have definitive investigation. A clinical diagnosis of ACS was made in 17% (n = 19) of admitted patients, with a definitive diagnosis made using imaging or biomarkers in 9% (n = 10).

Eleven patients had a troponin > 50 ng/L on the first
point of care test, as did a further 7 on the second test. One patient with a final diagnosis ACS had a CKMB rise with no troponin elevation. 31 patients had a >25% rise in CKMB (n = 8) or myoglobin (n = 23) between the first and second triple panel test, of which 28 had negative initial troponin. Only one of these patients had a subsequent 12-hour troponin which was negative.

GRACE Scores were retrospectively calculated for all patients. 33% of calculations recorded in the notes were found to be incorrect. Only 17.5% (n = 66) of all patients had a GRACE score recorded.
Twenty nine patients (7.7%) re-presented to hospital within 30 days. Eight re-presented with chest pain, of which five were discharged from the ED with non-cardiac chest pain and three (0.8%) were admitted under the medical team with ACS diagnosed on the basis of ECG changes, all with negative troponin.

Electronic medical records showed that six (1.6%) of the patients subsequently died within 12 months of initial presentation. General practitioners were contacted for these patients, two of which were found to have died from ischaemic heart disease.

Patients from the green pathway were followed up in Low Risk Chest Pain (LRCP) clinic where 51 patients (60.1%) needed further investigations (Fig. 2). Patients were contacted by phone at 3-6 months. Only 51 (13.5%) were contactable by phone of which 27 (58.2%) of patients had further symptoms of chest pain.

The rate of Major Adverse Cardiac Events (MACE) at 30 days was assessed as in previous studies [6, 8]. One patient had MACE, (MI 1 week post discharge from the low risk pathway), giving a MACE of 0.26%.

This study demonstrates the safety and efficacy of a triage pathway for the management of chest pain in the Emergency Department. In this study 47.5% of patients presenting with chest pain were discharged directly from the ED. This is high when compared to other centres [2, 9]. This may be due to a younger population, although the authors’ average age of 53 was similar to the ESCAPE (54.2) and RATPAC (54.5) trials [2, 10].

In addition in the authors’ region many high risk patients are triaged directly to the authors’ local cardiac centre by ambulance providers. the authors’ 30-day re-admission rate was 7.7%, with a death rate of 1.6% [3]. These figures are low compared to the study by Dunham et al. who looked at current practice in England [3]. This may be due to the authors’ ED not being co-located with a cardiac centre, so high risk chest pain patients are triaged elsewhere. In addition, the authors’ MACE was 0.26%, with just one patient; similar to Kelly [8] studied a comparable population.

A key issue with the authors’ pathway is that the “Did Not Attend” rate at the LRCP Clinic was very high. This was a cause for concern as a good number of those that did attend required further investigations and or management. The authors suspect this is due to the system for referral and appointment invitation which has since been addressed locally.

The limitations of this study are the interpretation of clinical documentation that may not accurately reflect the clinical assessment made by the treating physicians as well as several incomplete electronic patient records. In addition, this study had a low response rate to telephone follow up and a high percentage of those that answered the phone did not speak English adequately enough to complete the follow up assessment.

Since this study took place evidence has emerged which has prompted changes in the authors’ pathway to include the HEART score which has been shown to exclude short term MACE with > 98% certainty [11]. In addition TNI is now used on arrival and a 6-hour as opposite to the triple panel test. This is performed using radiometer AQ90.

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References

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Symptoms suggestive of an Acute Coronary Syndrome, GIVE 300mg Aspirin (even if patient is already taking aspirin)

Clinical Assessment and 12 Lead ECG. Red – orange to resus and ?LCH. Green assess streaming plus

- ST1 2mm in >2 contiguous chest leads, or
- ST1 1mm in >2 contiguous limb leads, or
- ST1 1mm in V1-V3 with a dominant R wave in V1 (Posterior MI), or
- New LBBB

ACUTE STEMI (± Posterior /LBBB infarction)

STEMI Pathway

Clopidogrel 600mg

Exclusion Criteria? Discuss with SpR @LCH (if following are true)
- Reduced conscious level
- In cardiac arrest
- Trauma (Not CPR)
- Paced Rhythm
- Imbalanced
- Pain onset >12 hours ago

YES

NO

Call LAS to transfer patient to the LCH as CRITICAL TRANSFER

Give Abciximab bolus (0.25mg/kg) unless contraindicated

Admit to CCU

Thrombolysis

If patient is not fit for transfer once discussed with the LCH SpR and they are having a STEMI

Give Abciximab bolus (0.25mg/kg) unless contraindicated

Admit to CCU

MONITOR PATIENT IN RESUS for ongoing ischaemia

First Triple Panel Test, FBC, VBG, ABG if hypoxic

TNI <0.05

Admit to CDU (if pain free), excluding patients:
- Haemodynamically unstable
- Respiratory distress
- Atrial fibrillation/atrioventricular block
- QRS >15
- Abnormal ECG (unless known to be old)
- Medical or social co-morbidity preventing 12 hour discharge

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- Abnormal ECG (unless known to be old)
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MONITOR PATIENT IN RESUS for ongoing ischaemia

First Triple Panel Test, FBC, VBG, ABG if hypoxic

TNI >0.05

History unclear?
- Hypoxic?
- Anemic?
- Other non coronary causes of chest pain?
- Rise in Myoglobin: CKMB?

YES

NO

Call LAS to transfer patient to LCH as IMMEDIATE TRANSFER

Excluding patients:
- Shock
- Anemia
- Hypoxia
- Cardiac Arrest
- ARF
- Trauma (not CPR)

If no exclusions:
- Give Ephedrine (100mg/kg) bolus. Unless contraindicated (See bleeding Chart

Discuss with Senior A&E Dr. before contacting SpR @ LCH re: possible transfer or admission.

£C: OCP: Chest Pain, STEMI= ST Elevation Myocardial Infarction, NSTEMI= Non-ST Elevation Myocardial Infarction, Non ST = Non ST Acute Coronary Syndrome, LCH= London Chest Hospital, LAS= London Ambulance Services, CCS= Coronary Care Unit, GES= General Emergency Services, MCI= Myocardial Infarction, LLoS= Lead-Acute Medicine.

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