

Delay in thrombolytic treatment in acute myocardial infarction: the role of the accident and emergency department

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SUMMARY

During a 6-week period, 248 patients presenting with chest pain presumed to be cardiac in origin, were recruited in a time and motion study in the Accident and Emergency Department of the Leicester Royal Infirmary. The study considered the ambulance-response and transfer times from the scene to the hospital, as well as the duration of the patients stay in the Department. While Ambulance Time from the scene of the incident to the hospital averaged 28 min, the time spent in the Accident and Emergency Department prior to admission averaged 76.5 min.

This study was conducted in the light of growing concern expressed at the delay in administering thrombolytic agents to those patients with acute myocardial infarction (AMI). The authors propose possible ways of reducing such delays.

INTRODUCTION

Since the introduction of intravenous thrombolytic therapy, the prognosis of patients with an acute myocardial infarction (AMI) has improved considerably. (Isam, 1986; Gissi, 1987; ISIS-2, 1988).

However, it is increasingly recognized that thrombolysis and antiplatelet treatment must be initiated early if they are to have optimal effect. (Rawles & Julian, 1989).

It would appear that, at present, the vast majority of patients with AMI in the United Kingdom will have thrombolysis initiated in hospital. Therefore, every

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effort should be made to deliver these patients to the coronary care units as soon as possible after the onset of chest pain.

Large numbers of patients with cardiac chest pain are seen in accident and emergency departments, and this workload has been said to be a cause for inordinate delay in initiating treatment (Richards, 1987). Therefore, the authors have performed a time-motion audit of all patients with chest pain of presumed cardiac origin, in order to identify those areas where delays occur. Suggestions for improvement are made in light of the findings.

SUBJECT AND METHODS

Patients with chest pain in whom a preliminary clinical diagnosis of AMI was made by a general practitioner were received in the Accident and Emergency Department. Because of the small number of Coronary Care beds in the Leicester Royal Infirmary, assessment is made in the Accident and Emergency Department. Trained staff then triage the patients for admission to the department's resuscitation room, as is normal policy for such patients in this hospital. The resuscitation room is a three-bay area close to the ambulance-entrance for the unit, and is well equipped for medical and surgical emergencies.

Analysis was made of ambulance-transfer times and the time the patient spent in the Department. Ambulance measured:

- (1) response time from receiving the '999' call to arrival at the scene of the incident.
- (2) time spent with the patient, including initial assessment and transfer of the patient into the ambulance and;
- (3) time taken to transport the patient to the hospital.

Irrespective of whether the Coronary Care Unit (CCU) physician had been contacted by the general practitioner or self-referred, all patients were seen initially by a casualty officer. Venous access was established, blood samples taken and an appraisal of the patients clinical condition was made. Oxygen was given by face-mask an ECG was recorded and analgesia established.

Patients with cardiac pain, and those referred by the general practitioner, were referred to the CCU physician, who examined them in the Accident and Emergency Department.

The length of stay in the resuscitation room was recorded and three categories identified:

Department Time 1 (DT1). Time from arrival at the department and initial management by casualty staff, to referral to the CCU physician;

Department Time 2 (DT2). Time from referral by casualty staff, to arrival of CCU physician.

Department Time 3 (DT3). Time taken by CCU physician to examine the patient and decide on disposal (CCU, ward, home).

Casualty staff and ambulance personnel were unaware of the time and motion study being carried out on the patients.

RESULTS

There were 248 patients (age range 26–87 years, mean 61 years), who met the criteria for entry into this study.

Table 1 lists the discharge diagnoses of the patients studied. Forty patients (16.1%), were discharged home from the department for follow-up as out-patients or by their general practitioner. Five patients had a cardiac arrest in the department, and were not resuscitated. The remainder were admitted to hospital. Sixty-five patients (25%), had an AMI confirmed by cardiac-enzyme studies. A total of 28.3% of patients had non-infarct chest pain. Twenty patients (8.1%) were admitted for observation and further investigation but no firm diagnosis was made.

Of the 248 patients in this study referred to the CCU physician by the casualty officer, 53.3% had a cardiac problem.

Of the 208 patients admitted to hospital, 92 were admitted to the CCU from the resuscitation room with a probable diagnosis of AMI. Fifty-four of these (58.7%) were shown to have had an AMI by serial cardiac enzyme studies. Of the 116 patients who were admitted to a general medical ward, eight patients had serological evidence of an AMI.

Ambulance transit-time

Ambulance transit-time included time to arrive on the scene (average 8 min), transfer of the patient into the ambulance with appropriate first aid (average 10 min), and transport to the Accident and Emergency unit (average 10 min).

The average time taken by the ambulance staff to reach hospital with the patient after the initial '999' call was therefore 28 min. Ninety per cent of patients were transported within 30 min. Three patients had times in excess of one hour but lived in remote rural areas.

Table 1. Discharge diagnosis of 248 patients involved in the study. (* = proven on serum cardiac enzyme analysis).

Diagnosis	Number	(%)
Myocardial Infarction	* 62	(25)
Ischaemic Heart Dis.	50	(20.2)
Acute Arrythmia	16	(6.5)
Cardiac Arrest	5	(2)
Acute LVF	4	(1.6)
Chest Infection	5	(2)
Musculoskel+GIT	42	(16.9)
Pulmonary Embolus	4	(1.6)
Others+No Diagnosis	60	(24)
Total	248	(100%)

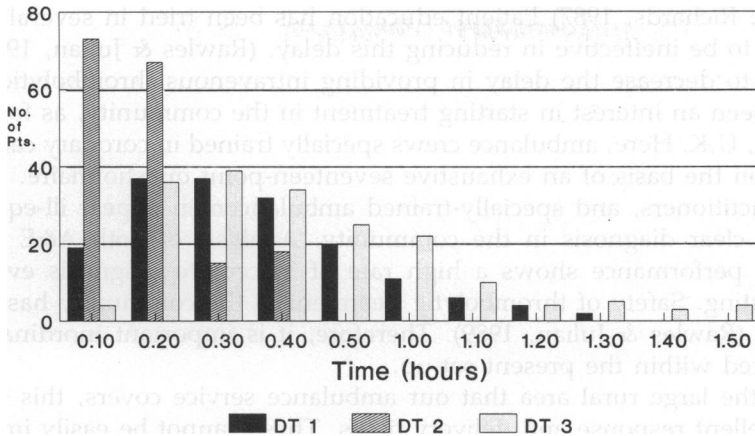


Table 2. Department transit-time

Department transit-time

DT1 – A total of 31.9% of patients were referred by A&E staff within 30 min: 94.8% of patients had been referred within 1 h. The average time before referral to the CCU doctor was 28.5 min.

DT2 – The time it took the CCU doctor to arrive in the department was short with a mean of 8 min range 2–40 min).

DT3 – A total of 68.1% of patients were still in the department 30 min after the arrival of the CCU physician. At 1 h, 35.5% of patients were still in the department.

The average total duration in the department was 76.5 min.

There was no statistical difference in time taken to process those patients who were referred by their General Practitioner to the CCU physician, and those who referred themselves.

Patients with serum enzyme-positive AMI had similar transit times through the Accident and Emergency department to those with chest pains from other causes.

DISCUSSION

There are several studies which impress upon us the importance of early intravenous thrombolysis, and imply that this should be given as close as possible to the time when the coronary artery occludes. The impact upon survival is greatest in those patients who are given therapy within 6 h of the coronary occlusion. Aspirin, analgesia, oxygenation and prompt treatment of dysrhythmia may further reduce the mortality rate.

There is an important delay at the onset of the attack when patients and their relatives take a median of 1 h and 30 min to summon medical help. (Armstrong

et al., 1972; Richards, 1987) Patient education has been tried in several countries and seems to be ineffective in reducing this delay. (Rawles & Julian, 1989).

In order to decrease the delay in providing intravenous thrombolytic therapy, there has been an interest in starting treatment in the community, as for example in Brighton, U.K. Here, ambulance crews specially trained in coronary care, initiate treatment on the basis of an exhaustive seventeen-point questionnaire. However, general practitioners, and specially-trained ambulancemen appear ill-equipped to establish a clear diagnosis in the community. Analysis of both A&E and CCU physicians' performance shows a high rate of inaccurate diagnosis even in the hospital setting. Safety of thrombolytic treatment in the community has yet to be established (Rawles & Julian, 1989). Therefore, it is important inordinate delays are prevented within the present set-up.

In spite the large rural area that our ambulance service covers, this study has shown excellent response and delivery times. These cannot be easily improved.

A large proportion of patients seen in accident and emergency departments have chest pain. Starting thrombolytic therapy in the accident unit adds to the logistics of treating high risk patients in an overcrowded environment. We believe that the place for starting thrombolysis in hospital is not at its front door, but in the setting of the CCU where monitoring and trained staff are available for the complications of thrombolytic drugs and the treatment of patients with AMI. Although 'backdoor' admissions, bypassing the Accident and Emergency department have been shown to diminish delays in one study, (Burns *et al.* 1988) they may not be feasible when the number of CCU beds is limited.

The median time of 76.5 min between arrival in the Accident unit and admission, is similar to that reported elsewhere (Emerson *et al.* 1989).

We were concerned to find that transit times for AMI patients were the same as those for chest pain due to other causes.

The transit times were longer than expected. In the light of current opinion that thrombolytic therapy should be initiated at the earliest convenience, it has been proposed that general practitioners should have direct access to the CCU, bypassing completely the accident and emergency department. Direct admission policies are not new, and Burns *et al.* (1988) have recorded a twofold increase in patients suitable for thrombolytic treatment. There will still be patients who refer themselves or present under the guise of another disease. The problem of reducing delays in the A&E department must still be addressed. Possible solutions may include:

- (1) immediate attention of the patient with chest pain by A&E staff with prompt examination and investigation (12 lead ECG);
- (2) rapid referral for admission;
- (3) prompt diagnosis and treatment;
- (4) discouraging prolonged clearing by the admitting officer in the resuscitation room;
- (5) foregoing needless investigations (such as portable chest-radiography), unless it influences or alters the immediate management of the patient.

Since this study was completed, transit times in the department have become shorter, we would encourage other hospitals to analyse their own performance to eliminate unnecessary delays in securing thrombolytic therapy.

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