

# Unsatisfactory management of patients with myocardial infarction admitted to general medical wards

**ABSTRACT**—Patients admitted with acute myocardial infarction to general medical wards fared less well than those admitted over the same period to the coronary care unit. The median age of the 119 patients admitted to the general wards was 75 years, compared to 64 years for those on the coronary care unit. Although 13 of the 119 fulfilled the local guidelines for thrombolysis, none received it, only 64% were given aspirin and 49% nitrates. The death rate for these patients was 29% compared to 12% of those given thrombolysis on the coronary care unit and 26% of those who were ineligible for thrombolysis but had been admitted to the coronary care unit. Of the survivors on the general wards, 80% were given aspirin as secondary prevention, and 37% were given a beta-adrenergic blocker. None was referred to the hospital cardiac rehabilitation programme.

Survival after acute myocardial infarction has changed dramatically since the introduction of intravenous agents [1,2]. The benefits of thrombolytic drugs, and more recently of magnesium, are greatest when given in the first six hours from onset of symptoms, although benefit can be demonstrated up to 24 hours. There is no evidence of benefit when such treatment is given later than that. This means that patients with chest pain must be assessed and treatment started as soon as possible after the onset of symptoms. Delay in making the diagnosis of acute myocardial infarction restricts the use of these agents. All studies on these drugs have been carried out on coronary care units, where their use is now routine. But, for a variety of reasons [3], not all patients with acute myocardial infarction are admitted to a coronary care unit, and their management on general medical wards has received less attention. We have previously reviewed the management of patients

admitted to our coronary care unit over one year [4], and now compare their management with that of patients with a diagnosis of acute myocardial infarction admitted to general medical wards during the same 12-month period.

## Methods

The notes were reviewed of patients with a discharge or death diagnosis of acute myocardial infarction, ischaemic heart disease or unstable angina, who had been admitted to a medical ward other than the coronary care unit at the Royal Hallamshire Hospital between 1 August 1990 and 31 July 1991. These diagnostic categories were chosen to ensure that few patients with acute myocardial infarction would have been omitted from our search because of coding or diagnostic errors.

The diagnosis of acute myocardial infarction was confirmed by the presence of a typical history of chest pain plus new ECG changes of pathological Q waves and/or a twofold rise in 'cardiac' enzymes (creatinine phosphokinase, aspartate transaminase, alanine transaminase and lactate dehydrogenase). Blood for enzyme analysis was routinely taken on days 1–3 following admission with chest pain. To fulfil our diagnostic criteria, the peak level of creatine phosphokinase had to exceed twice the upper limit of our normal range on any of these samples. These criteria are similar to the 'definite' and 'probable' myocardial infarction groups in the GREAT study [5], and were used in our previous audit [4].

The time at which the diagnosis was made was recorded, and for those with a confirmed diagnosis of acute myocardial infarction the management of the case was reviewed, including details of discharge medication.

## Results

In the same 12 months, 119 patients with acute myocardial infarction according to our criteria were admitted to general medical wards, compared with 335 patients admitted to the coronary care unit [4]. Patients admitted to general wards were significantly older than those admitted to the coronary care unit (median age, 75 years (range, 43–91) vs 64 years (range, 36–88);  $p < 0.001$  Mann–Whitney). Twenty-nine per cent (34/119) of the former died compared

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with 12% (25/212) in the group that received thrombolysis on the coronary care unit and 26% (32/123) in the group that did not but were nevertheless managed on the coronary care unit. Of patients with a diagnosis of acute myocardial infarction recorded in the hospital notes, 32 (21%) did not fulfil our criteria. Errors in diagnosis were mainly misinterpretation of ECG changes, particularly T wave inversion (44%) and over-interpretation of minor or atypical enzyme changes (53%).

The diagnosis of acute myocardial infarction was made within 24 hours of admission in 47/119 patients (40%), with the second most common time of diagnosis on the third day of admission in 30/119 patients (25%), when the full enzyme activity results were reviewed.

Table 1 shows that 16 of the 47 patients diagnosed within 24 hours of admission to a general ward were actually admitted more than 24 hours after the onset of symptoms and were therefore ineligible for thrombolysis. In three other cases the reason for not administering thrombolysis was documented and acceptable by our criteria [4], but in another 13 patients no reason could be found why thrombolysis had been withheld (ie 11% of the 119 patients with definite acute myocardial infarction).

#### Management on general wards

No patients on the general wards received thrombolysis and only 76 (64%) were given aspirin. Fifty-eight (49%) had nitrates once acute myocardial infarction had been diagnosed. Of the 85 survivors, 68 (80%) were discharged on aspirin, in two it was contraindicated, 31 (37%) were discharged on a beta-adrenergic blocker and we judged this to be inappropriate in a further 26 patients (31%). This group included all patients taking a diuretic at the time of discharge. Overall, 17 patients (20%) received no secondary prevention agent. No patients were referred to the hospital cardiac rehabilitation programme run by a nurse specialist, which included exercise classes and psychological support.

#### Discussion

Although thrombolysis significantly reduces the mortality associated with acute myocardial infarction, this review of case notes suggests that about 10% of patients admitted to our hospital were deprived of this treatment for no obvious reason when they were first admitted to a general medical ward. In comparison, for the same period only 10/335 (3%) of patients admitted to the coronary care unit had thrombolysis withheld or given inappropriately [4]. In only three general medical case notes was the reason clearly stated, whereas in our previous review of patients admitted to the coronary care unit, the reasons why thrombolysis was or was not given were always stated. Why

**Table 1.** Reasons for not administering thrombolysis to patients admitted within 24 hours of acute myocardial infarction

Reason for withholding thrombolysis	No. of patients (n = 47)
> 24 hours post-myocardial infarction	16
Patient expected to die	8
Diagnosis made at cardiac arrest	3
Recent stroke	3
Haematemesis on admission	1
Thrombolysis considered	3
No bed on coronary care unit	1
No obvious reason	12

\*These reasons were decided by us after reviewing the case notes. Only three patients had documented reasons for withholding thrombolysis (one carcinoma of the rectum, one cardiogenic shock, one poor general condition).

was there this discrepancy? The two reviews covered the same period and the doctors were the same. The absence of documentation suggests that thrombolysis was not considered, and the management not challenged. On the coronary care unit, there are protocols outlining the management of acute myocardial infarction, to be carried out by junior medical staff from different firms but monitored on daily ward rounds by a cardiologist. We believe that all case notes should state the reason why thrombolysis was not used to make it clear that this important treatment had at least been considered.

Patients admitted to general wards were older than those admitted to the coronary care unit. There is no age-related policy for admission to the latter or for the administration of thrombolysis. Elderly patients have a higher mortality following acute myocardial infarction. Intervention with thrombolysis is as effective in them as in younger patients and offers a greater absolute reduction in mortality. Our own data [4] clearly showed lower mortality in the elderly given thrombolysis on the coronary care unit. There is no evidence that the elderly have more complications from thrombolysis [6]. We cannot directly control selection for admission to the coronary care unit or the management of patients who do not reach it. Audit can increase the prescription of thrombolysis for the elderly [6], but the shortage of coronary care unit beds encourages the selection of younger patients. Reluctance to give thrombolysis on a medical ward means that elderly patients continue to be disadvantaged.

This problem is not unique to our hospital. In a recent review from Nottingham [7] 24% (1,885/7,855) of patients with suspected acute myocardial infarction were admitted to general medical wards where thrombolysis was not given as a matter of policy. Birkhead [8] recently published an audit of the delays

in provision of thrombolysis in six district general hospitals. This also showed that some patients (6%) with suspected acute myocardial infarction were admitted to general wards because the coronary care unit was full, although thrombolysis was given in 30% of these cases. In one of the six hospitals thrombolysis was administered in the accident and emergency department. However, the audit did not state whether the treatment was appropriate. Although it may be quicker to give thrombolysis in the accident and emergency department, benefits from its early administration will occur only if the treatment is given appropriately—because thrombolytics are potentially dangerous drugs.

Careful selection of patients can best be achieved by the use of protocols and with the active involvement of senior clinical staff. In our hospital we have now partly addressed this problem by opening a well-staffed medical admissions ward where thrombolysis can be safely administered to all who require it even if the coronary care unit is full. However, acute coronary syndromes are best managed on a coronary care unit. More beds can be made available to admit more patients for thrombolysis by shortening the length of stay on the coronary care unit—but there are limiting factors. Our coronary care activity increased from 690 admissions in 1986 to 909 in 1991 (a 32% increase) and length of stay has been shortened, but in 1992 our activity fell by 10% yet our bed occupancy increased. This was caused by the shortage of general medical beds for patients once immediate cardiac care was completed. In patients with suspected myocardial infarction, rapid availability of confirmatory cardiac enzyme results on the day of admission to hospital may also make it more likely that thrombolysis is considered and given on general medical wards. The result of a creatine phosphokinase estimation can now be obtained within one hour of the sample being taken.

If we are to obtain the benefits from thrombolysis for our patients and succeed in reaching the targets for the reduction of cardiovascular mortality set out in the government's paper, *Health of the nation* [9], we need to ensure that all patients who can benefit from the treatment will get it and get it quickly enough to maximise those benefits.

This survey also showed that even if acute myocardial infarction is diagnosed and managed on a general medical ward, the use of drugs for secondary prevention remains variable. Although the prescription of

secondary prevention agents was better than in an earlier study [10], beta-adrenergic blockers (which are well tolerated by the elderly) were used in only 50% of patients for whom there was no contraindication to their use. An increasing number of interventions following acute myocardial infarction have been shown to reduce mortality, and it is important to employ them correctly in lower mortality from cardiac causes.

### Conclusion

By advocating the implementation of the coronary care unit guidelines on the management of acute myocardial infarction, highlighting the use of drugs for secondary prevention and introducing safe non-coronary care unit thrombolysis we expect that more patients of all ages will receive better treatment during and after acute myocardial infarction.

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