

Direct fast track admission to a coronary care unit

ABSTRACT – An audit of thrombolytic therapy for acute myocardial infarction (AMI) in 1992–93 showed that door to needle time had a median delay of 100 min. After discussion, we devised a new ‘fast track’ procedure. General practitioners (GPs) were given minimum criteria for diagnosing probable AMI and advised how to admit patients directly to the coronary care unit (CCU) after discussion with a senior CCU nurse.

The hospital admitted 180 patients with MI between 1 July 1993 and 30 June 1994, 96 of whom received thrombolysis. Of the 11 admitted by the fast track procedure, eight received thrombolysis (median delay, 13.5 min; range, 5–30 min; $p < 0.05$ when compared with non-fast track patients). Four other patients were fast tracked to the CCU from other medical wards (time to thrombolysis, 6–12 min). In the following year to 30 June 1995 there were 158 admissions with MI, of whom 85 (54%) received thrombolysis. Four patients were admitted by the fast track procedure.

Although the fast track procedure shortened the time to thrombolysis, the service was underused. A postal audit of local practices showed that 18% of GPs were still unaware of the service, in spite of newsletters, post-graduate meetings and direct contact. Most GPs (90%) said they would use the service in the future, but 25% stated later that they would not use it. Twenty per cent of non-fast track AMI patients were admitted by deputising doctors.

Thrombolytic therapy must be administered quickly after acute myocardial infarction (AMI) to reduce morbidity and mortality¹. We have examined a scheme whereby general practitioners (GPs) could admit patients with AMI directly to the coronary care unit (CCU) for urgent consideration of thrombolytic therapy.

Methods and patients

An audit at Mount Vernon Hospital between 1992 and 1993 had shown an average delay of 100 min in administration of thrombolytic therapy after admission following AMI. Following the suggestion that direct admission to the CCU might improve this, the three non-cardiological firms at Mount Vernon agreed the following policy.

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In April 1993, all local GPs (67) would be informed, both directly at open days and indirectly by a newsletter, that a new ‘fast track’ admission policy to CCU was available for patients with a high probability of AMI. A printed card outlined the principles of the service.

A direct phone line to CCU was provided. Admission could be arranged by a senior CCU nurse, bypassing junior doctors.

GPs would be advised on suitability for thrombolysis by the specially trained CCU sister. The minimum criteria for admission were a history of typical chest pain for less than four hours, age up to 75 years, and 1 mm ST elevation if an ECG was available. Ideally, the medical registrars should have offered telephone advice to GPs, but they are not always immediately available to do this. Although patients over the age of 75 years also benefit greatly from thrombolytic therapy, for the fast track procedure we wanted to avoid flooding the CCU with too large a number of patients.

Ambulance control should transport patient directly to CCU, with controlled parking nearby.

A fax machine was available for urgent correspondence and ECGs.

Two beds were reserved on general medical wards so that space was always available on CCU.

After admission, CCU nurses took an immediate ECG and applied a simple protocol to determine whether thrombolytic therapy was appropriate². Streptokinase was immediately prepared and administered unless previously given, in which case tissue-plasminogen activator (t-PA) was used. The time of onset of chest pain, call to GP or 999 call, transfer time and door to needle time were recorded as carefully as possible.

In May 1996, we recirculated the admission criteria for the fast track service to all local GPs and deputising agencies, incorporating the direct line number for CCU on all correspondence from the medical unit. In July 1996, we reviewed the awareness and usage of the fast track procedure amongst the 44 GPs who had previously admitted patients with AMI to accident and emergency (A&E) and eight other local GPs who use the hospital regularly. Ten questionnaires were sent to each of the two principal local deputising agencies. The following questions were asked by postal audit:

1. Are you aware that there is a fast track procedure to coronary care?
2. Where did you hear about the fast track:
 - GP newsletter?
 - direct contact?
 - other?

Table 1. Characteristics of patients (1993–94)

	Thrombolytic therapy		No thrombolytic therapy
	Fast track	Others	
No. of patients	11	85	84
Sex (male/female)	8/3	45/40	47/37
Age range (years)	34–75	34–90	34–93
GP visited	5	44	40
999 call:			
GP	11	44	44
Relative	NA	41	40
Median time (min):			
call to arrival (range)	23 (13–45)	38 (25–70)	35 (15–65)
door to needle delay (range)	13.5 (5–30)	74 (22–95)	NA
Myocardial infarction	8	85	84
Atypical chest pain	2	–	–
Pulmonary embolus	1	–	–
Death in hospital	–	5	15
Cardiogenic shock	–	1	10
Cardiac failure	–	3	3
Cardiac arrest VF/asystole	–	1	1
Acute abdomen	–	–	1

GP = general practitioner

NA = not applicable

VF = ventricular fibrillation

3. Have you used the fast track service?
4. Would you use the service if you had a suitable patient?
5. If a patient presented with a heart attack, would you:
 - make a 999 call?
 - phone CCU for a fast track?
6. Please comment.

Results

Between 1 July 1993 and 30 June 1994, 180 patients with AMI were admitted to Mount Vernon Hospital (Table 1), 102 (57%) of them between 8 am and 8 pm, 11 by the fast track procedure. Thrombolysis was given to 96 of these patients (streptokinase: 92; t-PA: 5 – one patient received both). Among the thrombolysed patients, 51 had anterior infarcts which did not differ significantly from the pattern in the non-thrombolysed group. The reasons for not giving thrombolysis to patients are listed in Table 2. There were no serious haemorrhagic episodes. Four other patients with AMI were fast tracked from medical wards to CCU for thrombolytic therapy (time to thrombolysis, 6–12 min). There were 20 deaths in hospital, two of them in patients fast tracked from medical wards. Among the GPs who had visited patients in the non-fast track

Table 2. Reasons for not giving thrombolytic therapy

Reason	No. of patients
Diagnostic uncertainty:	
non-diagnostic ECG	45
?dissection	1
Contraindications:	
recent bleeding or stroke	12
severe hypertension	10
chest pain for 24 hours	9
therapy stopped because of side effects	4
age over 90	2
severe diabetic retinopathy	1

group, nine (20%) were deputising doctors who did not work regularly in the district.

Between 1 July 1994 and 30 June 1995 there were 158 admissions with AMI via the A&E department, of whom 85 received thrombolytic therapy (t-PA: 2) with a median delay of 65 min (range, 25–126 min). Four patients with AMI were admitted via the fast track policy to CCU (median delay from arrival, 23 min; range, 10–40 min).

Results of the postal audit on GPs' awareness of the fast track service are shown in Table 3. There were 34 (66%) respondents and 30 questionnaires were

Table 3. Audit of awareness of the fast track service**General practice survey respondents (34; 66%)**

Question:

1. Yes: 28 No: 6
2. Newsletter: 22 Contact: 8 Meeting: 5
3. Yes: 12 No: 18
4. Yes: 30 ? : 4
5. 999 call: 7 CCU fast track call: 10 Both: 10

Comment: direct contact with admitting team preferred by 2

Deputising service survey respondents (1)

Question:

4. Yes: 1
5. CCU fast track call: 1

completed. Most GPs had heard of the service through the newsletter and some by several sources but, surprisingly, six (18%) of the responding GPs had not heard of the fast track service despite intense targeting of local practices. In question 5 we took positive responses for phone CCU fast track, and both questions answered, to be an appropriate use of the fast track procedure. Nine GPs preferred an A&E 999 call or direct contact with the admitting medical team. There was only one reply from the deputising agencies. When GPs met informally with our hospital liaison group they made the following comments:

- A&E is the usual hospital entry point.
- GPs have no cardiology training.
- It is the consultant's role to make the diagnosis.

A telephone audit asked practice managers in 10 local practices about their use of deputising services. Half the practices used deputising services at night and at weekends. GPs interviewed expected their use to increase.

Comment

A wide variety of ways has been suggested to provide thrombolytic therapy quickly to patients with MI. In remote areas, GPs have given anistreplase to patients in the community to avoid the delay necessitated by long transfer times to hospitals³, but this practice is unacceptable to most urban GPs. In Brighton, the cardiology team trained paramedics and A&E staff to work to a triage system, giving priority to patients who are most likely to have had an MI³. They, too, reduced median delay for door to needle time to 17 min for streptokinase therapy. In Edinburgh, median delay was reduced to 49 min when the admitting medical team was bypassed and cardiologists administered thrombolytic therapy before transfer to CCU⁴. At Newham General Hospital patients could be fast tracked from A&E to CCU where thrombolytics were given (median delay, 60 min)⁵.

The speed with which thrombolytic therapy is given is crucial, but the site of administration is also important. The CCU is a high priority area for doctors, with highly trained nursing staff and specialised equipment which is essential if complications occur. In one other report patients with suspected MI were admitted directly to a room adjacent to CCU for assessment. Burns *et al*⁶, reviewed 100 patients; 31 were kept on CCU with AMI, and 15 of them received thrombolytic therapy (median delay times are not available for comparison). Approximately half the patients with AMI received thrombolytic therapy. In other studies the proportion of patients eligible for thrombolytic therapy has varied between 16%⁷ and 79%⁸. The factors which influence eligibility are the time window⁹ and ECG or other criteria used to diagnose MI^{10,11}.

The main reason for not giving thrombolytic therapy in our study was diagnostic uncertainty with ECG criteria not fulfilled. The number of patients treated with thrombolysis could have been increased by accepting ST depression and a strong clinical suspicion as further criteria. Extending the time would have made relatively little difference. We did not consider age to be a specific contraindication as older patients do well with thrombolysis¹², but thrombolysis was not given to two patients aged over 90 with comorbid pathology.

Good door to needle times were achieved in our fast track patients (median delay, 13.5 min), and ambulance transit times were better than in central London¹³. However, we were surprised by the small number of patients referred, the main reason being that half the patients with chest pain bypassed GPs by making 999 calls. It is possible that difficulty in obtaining a doctor may have been a factor, or perhaps chest pain is perceived by patients as a hospital problem. GPs reported at a postgraduate meeting that AMI was a relatively rare emergency for individual doctors and that it was difficult to remember the admission procedure.

Our initial audit and subsequent postal audit showed that the GPs who used fast track also used 999 calls to the A&E department. In some instances this was because the CCU was full and fast track was not available. Twenty per cent of patients were admitted to A&E by doctors from deputising agencies. This is an important observation because half our local practices now use deputising services for out of hours work. Local GPs expect this trend to increase as more doctors work strictly to contract¹⁴. The postal audit also showed that deputising doctors are the hardest to reach, with only one response to the 20 questionnaires sent to them. Most GPs (90%) said they would use the fast track service – but then 25% of them stated they would choose a 999 ambulance to take patients to A&E, or first discuss the admission with the medical team, suggesting that they would not use the service as proposed.

At our informal GP liaison meeting senior GPs said

they did not receive adequate cardiology training and were not keen to change their practice which saw A&E as the traditional entry point to hospital. GPs who had used the fast track were under 45 years old.

Unheralded patients admitted to A&E with AMI sometimes had to wait for unacceptably long periods before the diagnosis was made (up to four hours). As a result, some patients passed the time window for thrombolysis. It was our impression that senior CCU nursing staff were often better at diagnosing AMI than junior doctors.

Limitations of the study

We set out to devise a system whereby patients with AMI could be admitted directly to CCU and bypass what appeared to be a bottleneck in the A&E department. Initial audit showed that door to needle time was far too long (100 min). Subsequent audit for the small number of fast track patients studied showed that door to needle times were often a quarter of those in patients admitted via A&E. Despite publicising the improved fast track thrombolytic times, GPs were reluctant to change their historical patterns of referral and often admitted patients to A&E direct.

Some of the reasons why GPs continue to use A&E may be guessed at from their comments. They see their role as making the provisional diagnosis, giving emergency treatment, and then getting the patient to hospital as quickly as possible. They perceive fast track as getting to *hospital*, not to *CCU*. Looked at from the outside, it seems to GPs that once the patient is in hospital, it is simple to transfer him to CCU for thrombolysis. Unfortunately, this is not always the case. It must seem strange to GPs that more than one portal of entry to hospital is necessary. Another consideration is that using the specialist fast track procedure raises the level of diagnosis required, which in turn might raise the fear of ridicule if the diagnosis is wrong.

Conclusion

The fast track CCU scheme worked well but was underused. It required medical and nursing staff to give absolute priority to assessing patients, and also meant setting aside two beds on medical wards to achieve efficient clearing of the unit. GPs found the scheme useful, but had to be constantly reminded of its existence.

We plan to improve the service by:

- supplying GPs with laminated 'credit cards' detailing the admission procedure and giving direct phone numbers;
- more effective targeting of deputising agencies and doctors;

- arranging for the London ambulance service to admit patients with suspected AMI directly to CCU; and
- devising a loyalty scheme whereby hospital patients with known ischaemic heart disease could admit themselves for assessment if they develop chest pain.

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