THROMBOLYSIS AUDIT RESULTS

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INTRODUCTION

Thrombolysis still remains a treatment of choice for acute myocardial infarction. Early treatment is essential if a patient is to derive maximum benefit from intravenous thrombolytic therapy. It is, therefore, constantly important to monitor the speed with which these treatments are delivered, to identify major causes of delay and to see where improvements in standards can be made.

A patient register is used on the coronary care unit to keep a record of admission details, treatments, the date and time thrombolysis is given and reasons for any delays. Information for this study was collated both from this register and directly from patients' medical records. This study investigated the delays that preceded the treatment of 149 patients with intravenous streptokinase or tissue-plasminogen activator (TPA).

Similar to the study done last year, door-to-needle (D/N) times were used to monitor how quickly treatments were being administered. The relative benefits of using this measure have been discussed earlier (Lancaster and Westmorland Medical Journal 1998;3(1):32-33) but it was considered important to use the same methodology as last year in order to discover if any improvements had taken place.

The study comprised 239 patients with a definite diagnosis of myocardial infarction. D/N times were established for each patient who received thrombolytic therapy. These D/N times were expressed initially by mode of admission and then combined to give a total D/N time.

All delays were documented and given a figure which represented the total time wasted due to each kind of delay. This was expressed in total number of minutes. Numbers in parentheses represent the corresponding result from last year's survey.

Since last year's survey there have been major changes within the medicine directorate. The two main differences which have had a direct effect on D/N times are the opening of the medical assessment unit in December 1997 and the appointment of a staff grade doctor whose remit was to see, where possible, all admissions. This appointment was, in part, the result of last year's survey which showed that waiting for assessment by senior medical staff was the main cause of delay in starting thrombolysis. The figures below show the total number of admissions, how many patients were thrombolysed and which thrombolytic agents were used.

- Of the definite diagnosis of myocardial infarction, 90 did not receive thrombolysis, 40 had recognised contra-

myocardial infarction	male	150	(129)
	female	89	(83)
	TOTAL	239	(212)
patients receiving thrombolysis	male	89	(84)
	female	60	(62)
	TOTAL	149	(146)
thrombolytic agent	streptokinase	116	(126)
	RTPA	33	(20)
	TOTAL	149	(146)

Figure 1 Total cases and treatment 1998 (last year's figures in brackets)

indications, 10 were diagnosed outside the thrombolytic 'window' by their AST/CK results as their ECGs were equivocal, and it was considered that 30 would not benefit from thrombolysis as they were outside the time limit of 24 hours

- The British National Formulary of September 1998 states that "prolonged persistence of antibodies to Streptokinase may reduce the effectiveness of subsequent treatment and therefore should not be repeated beyond four days of first administration". This was recognised last year as having significant cost implications, due to the common usage of the more expensive thrombolytic agent RTPA for any re-infarctions after the four-day limit. As can be seen from this year's results, over a third more RTPA was used. This trend is expected to continue as more people are re-thrombolysed having previously received streptokinase.

The following figure looks at the main sources of admission to the CCU: GPs, direct paramedic referral, A&E, the MAU and ward transfers. They highlight the best, worst and mean D/N times. Notes following the figures give a breakdown of where and by how long the delays in administering thrombolysis occurred. For the purpose of this study transfers from Ward 3 and the MAU have been grouped when calculating the overall D/N time.

	GP	A&E	999	Ward 2	MAU
total number of patients	51 (61)	41 (36)	19 (13)	11 (20)	27(16)
number outside national average D/N time	4 (11)	8 (13)	0 (3)	2 (11)	3 (5)
best D/N time in minutes	10 (10)	20 (5)	10 (10)	5 (25)	10 (10)
worst D/N time in minutes	120 (370)	180 (600)	90 (1090)	110 (230)	160 (155)
mean D/N time in minutes	42 (70)	59 (103)	38 (154)	47 (112)	53 (82)

Figure 2 Source of patients and D/N times (last year's figures in brackets)

NOTES

GP: Total number of patients = 51 (61)
Total number of delays = 4 (11)
mean D/N time = **42 minutes**

All four delays were the result of patients waiting to be reviewed by an SHO

A&E: Total number of patients = 41 (36)
Total number of delays = 8 (13)
mean D/N time = **59 minutes**

Five delays due to problems in transfer
One delay due to late senior review
One delay due to the need to introduce a central line prior to thrombolysis
One delay due to A&E not stocking RTPA, necessitating patient transfer to CCU

999: Total number of patients = 19 (13)
Total number of delays = 0 (3)
mean D/N time = **38 minutes**

No delays recorded

Ward 2: Total number of patients = 11 (20)
Total number of delays = 2 (11)
mean D/N time = **47 minutes**

One delay due to problems with transfer
One delay due to late senior review

MAU: Total number of patients = 27 (16)
Total number of delays = 4 (5)
mean D/N time = **53 minutes**

Three delays due to late senior review
One delay due to problems in transfer

The driving force behind this survey has always been to maintain and, where possible, to improve standards where thrombolysis is used on patients with a definite diagnosis of acute myocardial infarction. The appointment in 1998 of a staff grade on the medical assessment unit was to try to avoid delays witnessed previously, where patients could wait for several hours to receive a senior medical review. This made it necessary to compare last year's '9-5' vs 'on-call' results with those during this study. Figures 4 and 5 show last year's and this year's results.

Figure 3 The combined reasons for delay in thrombolysis

Figure 4 The number of delays by category 1996/1997

Figure 5 The number of delays by category 1997/1998

CONCLUSIONS

The main causes of delay, similar to last year, continue to be associated with review by a senior doctor before thrombolysis is begun, and problems in the transfer of patients to the coronary care unit. Since last year the A&E department has begun to stock tissue-plasminogen activator – too late, unfortunately, for one patient who still needed to be brought to the CCU in order to receive RTPA. Another patient in A&E required central i/v access because of complete heart block and the possibility of temporary cardiac pacing.

It is encouraging to note that the actual number of delays in thrombolysis dropped dramatically from last year. There was a 66% fall in delays during working hours and a 58% drop out of hours.

The drop during normal working hours was wholly attributed to the appointment of a senior staff grade doctor working on the MAU and attending patients in casualty, which greatly reduced the length of time before each patient received a senior review.

The D/N time has fallen from **65 minutes** during the period 1996-1997 to **48 minutes** during 1997/1998.

FURTHER IMPROVEMENT

There is more that could be done to improve this service yet further. All departments and staff need to understand the importance of prompt action in patients admitted with chest pain. Raised awareness and training are essential.

There are several operational matters which could contribute to early and accurate diagnosis of infarction and better case selection for thrombolysis:

- The need for more specific cardiac markers (ie Troponin or myoglobin levels) is presently under review and will hopefully be resolved very soon
- The delay caused by late reporting of blood results by laboratory staff will be eliminated shortly, when the CCU

installs its own PC which will have a direct link to biochemistry and haematology

- The need for a direct fax link for GPs to fax ECGs is currently under review
- The large number of patients admitted to the CCU who do not undergo thrombolysis raises the question whether there should be coronary care assessment beds. These could be made available using the side ward on the MAU.