# Early thrombolysis for the treatment of acute myocardial infarction. Who will provide this treatment in the UK? Part II.

**This is the second of two articles adapted from a submission to the National Institute for Clinical Excellence on behalf of the Primary Care Cardiovascular Society (PCCS) regarding general practitioner and paramedic thrombolysis. Part 1 of the article looked at the results of four studies on the delivery of early thrombolysis. In this second part, general practitioner Terry McCormack looks at unpublished experiences with pre-hospital thrombolysis, including those of general practitioners in his own area of Whitby, North Yorkshire. He also presents the results of a straw poll among PCCS members on their attitudes to the procedure.**


## Abstract

This article describes the successful provision of a thrombolysis service by general practitioners in the isolated rural area of Whitby, North Yorkshire, and also in rural areas of Sweden. It discusses the difficulties in providing such a service, particularly the rural/urban paradox whereby specialist pre-hospital thrombolysis services can be much more easily provided in urban areas than rural areas where the need is normally much greater.

The results of a small straw poll on thrombolysis amongst Primary Care Cardiovascular Society members show that rural general practitioners are much more interested in providing a pre-hospital thrombolysis service than their urban colleagues; paying a fee for such a service should be considered in future planning. The article also reviews the various thrombolytic agents favouring the use of fibrin-specific thrombolytic agents by bolus for pre-hospital thrombolysis.


**Key words:** acute myocardial infarction, early thrombolysis, primary care.

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## Experiences of pre-hospital thrombolysis

### Whitby, North Yorkshire

Whitby is isolated from the rest of the country by the North Yorkshire Moors and, since 1988, local general practitioners have provided a thrombolysis service in the local community hospital. There are 24 doctors in the area; some work part-time and some work a considerable distance from the town. Two general practitioners have also provided thrombolysis at patients' homes but have since stopped this service.

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Terry McCormack

For the procedure, we use streptokinase and reserve tenecteplase (and previously alteplase) for anterior myocardial infarctions, shocked patients or for patients with a previous history of streptokinase treatment. Diagnosis, based on a 12 lead ECG, is made by the general practitioner. A telemetric link with Scarborough Hospital has recently been installed. Each doctor normally gives one or two treatments a year; probably the bare minimum we require to maintain our skills and confidence.

The scheme has been a great success but there are difficulties. Some doctors are reluctant to perform the service – they lack confidence in their abilities and often find it difficult to decide when to treat. They also feel nervous that they will harm the patient. Should local ambulance paramedics also start to give thrombolysis, this would limit further the opportunities to administer thrombolysis now available to general practitioners locally. It is likely that many would withdraw from providing the service altogether.

The European Working Directive in August 2000 reduced our ambulance cover to one vehicle. The adoption of ORCON II in April 2001 means that one ambulance is now stationed between Whitby and Middlesbrough or Scarborough. Patients can sometimes wait 50 minutes for an emergency ambulance. Such a service could not cope with pre-hospital thrombolysis

without a major increase in resources. Every crew would have to offer thrombolysis and currently some ambulances are crewed by technicians only.

## Sweden

Experiences in Sweden with pre-hospital thrombolysis have been described by Dr Lars Engerstone of Falun Central Hospital, County of Darlana, Sweden, at a Joint Royal Colleges Ambulance Liaison Committee (JRCALC) seminar.[1] There are 85 emergency hospitals in Sweden: 65 have a telemetry capability and 38 have a pre-hospital thrombolysis protocol, mostly using reteplase. Two years ago, one fifth (about 100 cases) of all pre-hospital thrombolysis occurred in Dalecarlia County. Dr Engerstone's hospital serves a large rural area with poor roads and lengthy travel times. Before giving thrombolysis, paramedics have a three-year nurse training and one further year in hospital. Better ambulances, communications facilities and training were also required to deliver the service. The decision to give thrombolysis is made by hospital cardiologists.

## The urban/rural paradox

Ultimately, provision of pre-hospital thrombolysis in Britain will suffer from the urban/rural paradox. In urban areas, there is sufficient concentration of cases to offer a specialist service, which has a reasonable chance of gaining experience from the numbers able to utilise it. But in urban areas there is also a potentially shorter journey to hospital so less time is gained by pre-hospital thrombolysis. In isolated rural areas, the journey time to hospital is longer and so the potential gain derived from pre-hospital thrombolysis is greater. But ambulances are more spread out and there is little opportunity to concentrate the experience in the hands of specialist crews. In other words, a pre-hospital thrombolysis service is easy to provide in areas where it is not necessarily needed and difficult to provide where it is required.

**Table 1.** Results from the PCCS straw poll on thrombolysis

| | Rural GPs (number = 42) | | Urban GPs (number = 34) | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| Would you thrombolyse? | 28 | 14 | 14 | 20 |
| Would your colleagues? | 21 | 20 | 5 | 28 |
| | (+1 don't know) | | (+1 don't know) | |

## PCCS straw poll

We mailed all 483 general practitioner members of the PCCS to accumulate a straw poll attitude to their possible involvement in thrombolysis. All the general practitioners polled, being members of the PCCS, are enthusiasts for cardiovascular care. Any positive response would, therefore, have to be greeted with some caution; a negative response would be more informative.

> ***'66% of rural doctors said yes they would thrombolyse and, more importantly, 50% felt their colleagues would also say yes'***

The survey wording was: "One possible solution to rapid pre-hospital thrombolysis would be for general practitioners and ambulance crews to go to the patient's home together. The ambulance crew would bring the ECG equipment (telemetric) and the thrombolysis drugs. A specialist would advise if thrombolysis were required on the basis of the ECG telemetry. The general practitioner would receive appropriate training and be paid a fee to administer the drug."

The straw poll asked three questions:

- would the respondent be willing to provide this service?
- did the respondent think their local colleagues would be willing to provide this service?
- did the respondent have any rural patients?

From 483 general practitioners polled, there were only 79 replies, three of which were non-responsive. This was a low response in comparison to previous member surveys. Of the 76 replies remaining, 42 were rural general practitioners and 34 were urban general practitioners. Their answers are summarised in table 1.

There were a disproportionately high number of responses from rural general practitioners, probably indicating that urban general practitioners are not really interested in this subject. We can therefore be confident that the majority no vote of the urban doctors is accurate, particularly regarding the attitude of their colleagues. In contrast, 66% of rural doctors said yes they would thrombolyse and, more importantly, 50% felt their colleagues would also say yes. Comments from the general practitioners polled are shown in table 2.

Thus, if general practitioners are to be included in a pre-hospital thrombolysis service, this poll, together with the reason previously explained in these two articles, shows it should only be considered in rural areas.

## Which thrombolytic drugs?

Looking at thrombolytic drugs that general practitioners and paramedics should use, the following are the current options:

- Streptokinase – significantly cheaper than other agents but mobile teams would have to carry stocks of fibrin-specific thrombolytic agents too. Infusion must continue for 60 minutes.
- Alteplase – can be used as an isolated drug; initial infusion is rapid but

**Table 2.** Comments from general practitioners in the PCCS straw poll on thrombolysis

**Rural yes vote**

'The GPs in Guernsey run A&E. We are working on protocols for tenecteplase in A&E where there are always other ALS providers'
'In North Cumbria we are running a joint pilot project for early thrombolysis'
'We already thrombolyse (using urokinase, changing to tenecteplase next week) 20 miles from the DGH (Perthshire). Quite a few more rural practices do not thrombolyse. I feel your suggestion (ambulance co-operation and fee) is a good one'
'I am in process of asking 100 GP colleagues if they are willing to provide this service'
'It would take a considerable fee to make it work because our workload is so high'

**Rural no vote**

'More practical to train rapid response ambulance crews to administer the drug'
'No time'
'Time constraints preclude such a Rolls Royce service'

**Urban yes vote**

'Straw poll of my colleagues showed extremely uninterested views'
'If remunerated appropriately'

**Urban no vote**

'GP is reduced to pressing the plunger…., insulting…. menial task'
'Why not train paramedics to give this drug?'

**Key messages**

- General practitioners can successfully provide a pre-hospital thrombolytic service
- Telemetric links to the local hospital and the use of fibrin-specific thrombolytic by bolus speed up door-to-needle times
- Rural general practitioners appear more interested in providing thrombolysis than urban general practitioners
- There is an urban/rural paradox of need against ability to deliver

the follow-up dose requires continuous infusion for 90 minutes.

- Reteplase – this requires only two bolus doses; an advantage to Minor Injury Units and Community Hospitals as well as mobile units as it allows immediate, uncomplicated transfer to another hospital.
- Tenecteplase – this requires a single bolus; it has increased efficiency in late thrombolysis and causes less non-cerebral major bleeding.

Without taking cost into consideration, the choice of treatment for a mobile unit would favour reteplase or tenecteplase. The choice of Minor Injury Units and Community Hospitals would be reteplase or tenecteplase plus the option to use streptokinase in specific cases. The availability of bolus injections is likely to encourage more general practitioners to take part in thrombolysis.

## Discussion

Urban general practitioners, apart from a few enthusiasts, appear to be uninterested in taking on any more work. Rural GPs may be influenced by the offer of new payments for this work. The Grampian study showed that general practitioners could safely carry out pre-hospital thrombolysis in very isolated parts of the country, as far as 62 miles from the nearest hospital.[2] Protocols tend to default towards not giving the treatment and therefore deprive or delay treatment for some patients.

Using every ambulance crew puts too little experience in too many hands. There is an urban/rural paradox of need against ability to deliver. The services required in urban and rural areas differ greatly and this must be considered in planning. The service provider will occasionally harm or even kill the patient and ambulance paramedics should not be forced into taking this responsibility against their will. Other countries, which provide non-physician services on a large scale, have better qualified and better paid staff. A single person attending the patient whether a doctor, nurse or paramedic is less than ideal in providing safe and rapid treatment; they suffer greater personal stress if things go wrong. Treatment at home will tie up ambulances, which are already in short supply. We must always consider the weakest link and avoid basing services on the actions of enthusiasts.

The Myocardial Infarction Triage and Intervention Trial showed that the use of ambulance telemetry could significantly speed up door-to-needle time.[3] The use of fibrin-specific thrombolytic by bolus is an advantage; these drugs would reduce ambulance 'tie-up' time. They may also encourage uptake by general practitioners because they are less time-consuming. There is evidently a need for further research; ideally this would compare three methods of delivery; pre-hospital thrombolysis, 'scoop and run' and 'telemetry and run'.

## Conclusion

In conclusion, we must encourage early calls for help from patients. We should also introduce telemetry in all emergency ambulances with robust hospital links. All acute myocardial infarctions should be treated as an emergency on arrival at the hospital doors. We need to consider paying a fee to rural doctors to liaise with ambulance crews to provide thrombolysis where the transfer time exceeds 30 minutes. Paramedic thrombolysis should only be delivered

in areas where specialist crews who have extended training can respond within eight minutes to 100% of patients.

## Editors' note

Part 1 of this article, which looked at the results of four studies on general practitioners and ambulance paramedics providing thrombolysis, was published in last month's issue (*Br J Cardio*l 2002;**9**:549–52). The latest NICE guidance on thrombolytics can be found on pages 624–7 of this issue.

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