patients with acute myocardial infarction demands a big increase in cardiac catheter facilities and staff. Treatment would need to be delivered by consultants because it requires a high level of training and experience, and consultants are in short supply. None of the regional centres has sufficient numbers to provide a 24 hour primary angioplasty service. The result will be patchy implementation and confusion among general physicians, who continue to supervise the management of most patients admitted with myocardial infarction. Thrombolysis will be delayed while negotiations with cardiologists about the most appropriate therapy take place.

The reality will be postcode primary angioplasty offered to those lucky patients who present to regional centres during the day. In other cases the benefits of early reperfusion by thrombolysis will be reduced.

Conclusion

The importance of time to reperfusion in reducing mortality cannot be overestimated. However, the absolute effect depends on when delays occur in the natural course of infarction. It is right to emphasise earlier thrombolysis because this has been shown to deliver larger mortality benefits. The benefits of angioplasty over thrombolysis are too small in patients presenting early not to be offset by the delays that occur with this approach. The same or bigger benefit would be achieved by prehospital thrombolysis.—Kevin S Channer

Contributors and sources: For 15 years I have supervised the care of patients on a coronary care unit and have overseen the rationalisation and standardisation of the treatment of acute myocardial infarction. We introduced the first chest pain specialist nurse in the region in my centre and have some of the best door to needle times. Part of my research has been in implementation strategies for evidence based medicine.

Competing interests: None declared.

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Primary angioplasty or thrombolysis? a topical parable

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Primary angioplasty is being touted as a revolutionary treatment that should supersede thrombolysis in modern management of acute myocardial infarction. Would our perspective be different if angioplasty had been developed first?

Myocardial infarction used to be a nasty scourge, with 15-25% mortality. Then came the breakthrough discoveries that thrombotic coronary occlusion caused myocardial infarction and that balloon catheters could cross the occlusion, squash the thrombus, and re-establish flow. Thus, it was possible to abort the progression of myocardial infarction and reduce mortality. Cardiologists became interventionists. Cardiac catheterisation laboratories grew like mushrooms. Balloons and hubris were inflated as many lives were saved. A gigantic industry sprang forth of catheters, sophisticated stents, and expensive adjunctive drugs. It seemed that all was now for the best "in the best of all possible worlds" and "that things in general were settled forever."

Creaking system

And yet there were downsides. In a substantial proportion of cases, myocardial perfusion was unsatisfactory, even when coronary artery flow seemed adequate.¹ It was speculated that this could be due to distal migration of thrombus secondary to mechanical intervention. This spurred an interest in lassoes, aspirators, and other devices designed to capture such debris during angioplasty. While increasing costs, these failed to satisfactorily resolve this vexing problem. Also, the (insatiable) demands of the mechanical approach were draining the healthcare system and exhausting cardiologists and support staff, who had to get up at

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Emergency scene; image removed at request of agency

Should he have thrombolysis now or be taken to the nearest angioplasty centre?

ungodly hours to open up people's arteries. A study even showed that mortality of patients treated out of hours was greater than when they were treated during the normal working day.²

Ambulances and helicopters were constantly transporting patients, sometimes over great distances and in difficult circumstances, to and from the nearest catheterisation laboratory to prevent the tertiary cardiac resources from getting clogged up. Although no expense was spared to support this interventionist approach, unfortunately no time or resources remained to assess the effect of these multiple transfers on continuity of care and long term outcomes. The healthcare system groaned and creaked under the rising strain. Some argued that time was (myocardial) muscle and that the inevitable delays before patients could be treated nullified much of the beneficial effect of mechanical intervention. Finally, primary angioplasty was simply beyond the capacities of poorer countries. Creative thinkers pondered an alternative.

New dawn

And then the astounding discovery was made that a bacterial enzyme, streptokinase, could dissolve human clots. The age of thrombolysis had dawned. Patients might now be treated at local hospitals by primary care physicians, a far more rapid and accessible and less expensive approach. Then, faster acting fibrin specific agents that could be given as intravenous boluses were developed. Some speculated that the lower success rate

of thrombolysis in opening arteries compared with primary angioplasty was counterbalanced, not only by faster treatment but also by the intrinsic superiority of an approach that created less debris than mechanical intervention.

Controversy ensued. Tertiary high tech versus decentralised simpler treatment? Many clinical trials were performed. A meta-analysis comparing angioplasty with fibrin specific thrombolytics showed that the 1.1% mortality advantage in favour of angioplasty was not significant (95% confidence interval -0.3 to 2.6).^{3,4} Some conciliatory cardiologists argued for facilitated angioplasty (first thrombolysis, then angioplasty for all) but could not show superiority for this approach that others berated as therapeutic overkill and (facilitated) financial ruin. Finally, a trial compared primary angioplasty with ultrarapid thrombolysis in the home or ambulance followed by rescue angioplasty in the 25% or so cases where thrombolysis seemed ineffective. This judicious strategy led to among the lowest mortality figures (3.8%) recorded in the treatment of myocardial infarction in a large clinical trial with a 1% mortality advantage (albeit not significant) in favour of thrombolysis.⁵ Enthusiasts proclaimed that the ideal therapeutic approach had been attained. The future will record whether this development truly marked the end of the history of the treatment of acute myocardial infarction.

With thanks to Voltaire and Dickens.

Contributors and sources: PB and JMB have long experience in treating patients with myocardial infarction in both community and tertiary hospitals. Their research interests encompass the pathophysiology of acute ischaemic heart disease and the evaluation of contemporary approaches in cardiac health care.

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One hundred years ago

The risks to life in London

The risks encountered by those who frequent London streets whether on duty or for pleasure must be sufficiently obvious to every one. They have probably been increased by the growing use of tramways and automobiles, and few people will be surprised to learn that the average number of serious accidents in London amounts to as many as 15,000 a year. It is probable that a large section of the public complacently supposes that when an accident occurs the sufferer is removed for treatment in a well-arranged ambulance and under as favourable and comfortable conditions as possible. They may possibly be

somewhat disturbed to learn that 70 per cent. of all cases of accident are as a preliminary to surgical treatment jolted in cabs or other unsuitable conveyances. It needs but little imagination to conceive how immensely the sufferings of a person with, for instance, a fractured limb must be increased by this process, while it requires no imagination at all, but merely a little common knowledge, to appreciate the fact that the chances of any given accident resulting in prolonged illness or in death are gravely and materially increased thereby.

(*BMJ* 1904;i:1093)