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Title **Clinical Effectiveness and Cost Effectiveness of Immediate Angioplasty for Acute Myocardial Infarction: Systematic Review and Economic Evaluation**

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Aim

To review the evidence on clinical and cost effectiveness of immediate angioplasty after myocardial infarction.

Conclusions and results

The results consistently showed an advantage of immediate angioplasty (percutaneous coronary intervention; PCI) over hospital thrombolysis. The updated meta-analysis showed that mortality is reduced by about one-third, from 7.6% to 4.9% in the first 6 months, and by about the same in studies of up to 24 months. Reinfarction is reduced by over half, from 7.6% to 3.1%. Stroke is reduced by about two-thirds, from 2.3% with thrombolysis to 0.7% with PCI, with the difference attributed to hemorrhagic stroke. Caution is needed in interpreting some of the older trials since changes (eg, increase in stenting and the use of the glycoprotein IIb/IIa inhibitors) may improve the results of PCI. Little evidence compares prehospital thrombolysis with immediate PCI. Research on thrombolysis followed by PCI, known as 'facilitated PCI', is under way, but results were unavailable. Much of the marginal mortality benefit of PCI over hospital thrombolysis may be lost if door-to-balloon time were more than an hour longer than door-to-needle time. Conversely, within the initial 6 hours, the later patients present, the greater the relative advantage of PCI. Results suggest that PCI is more cost effective than thrombolysis, providing additional benefits in health status at some extra cost. In the longer term, higher recurrence and reintervention rates in thrombolysis patients are expected to reduce the cost difference.

Recommendations

If both interventions were routinely available, the economic analysis favors PCI. However, few units in England could offer routine, immediate PCI services at present. The resource implications of starting such services would be considerable, but cannot be quantified without a detailed survey. However, they include both capital and revenue: an increase in catheter laboratory costs. The greatest problem concerns staffing, which would take years to resolve. A gradual incrementalist approach based on clinical networks, with transfer to centers that offer PCI, could be considered. An option in rural areas might be to promote an increase in prehospital thrombolysis, with PCI for thrombolysis failures.

Methods

For clinical effectiveness, a comprehensive review of randomized control trials (RCTs) was used for efficacy. A selection of observational studies, eg, case series or audit data, was used for effectiveness in routine practice. RCTs of thrombolysis were used to assess the relative value of prehospital and hospital thrombolysis. Observational studies were used to assess the representativeness of patients in the RCTs and to determine whether different groups have different capacity to benefit. Clinical effectiveness was synthesized through a narrative review with full tabulation of results of all included studies and a meta-analysis to provide a precise estimate of absolute clinical benefit. Effects of the growing use of stents were considered. Economic modeling used an NHS perspective to develop a decision-analytical model of cost effectiveness, focusing on short-term (6 months) opportunity costs.

Further research/reviews required

There is a need for data on the long-term consequences of treatment, the quality of life of patients after treatment, and the effects of PCI following thrombolysis failure.

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