

Costs and benefits of treatment of myocardial infarction

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Few treatments have been introduced in recent decades which are as effective as the modern treatment of myocardial infarction, based on rapid diagnosis (often by ambulance personnel, before admission to a hospital), immediate referral for reperfusion therapy (preferably by PCI), early discharge and subsequent intensive medical treatment for secondary prevention. The need for immediate PCI places a great burden on the medical staff (interventional cardiologists, nurses, technicians) of the hospital since many procedures need to be performed outside ‘normal’ working hours. Nevertheless such treatment is offered to most patients in the Netherlands admitted with ST-segment elevation on the ECG (STEMI) because the benefits are undisputable. Long-term follow-up of the study of reperfusion therapy by the Interuniversity Cardiology Institute in The Netherlands (ICIN) revealed that the early benefits of reperfusion therapy were sustained during 20 years, with a gain in life expectancy of 2.8 years [1]! The additional costs of reperfusion therapy during the first year after hospital admission were estimated at Dfl 7000 (€ 3200) [2], which amounts to only Dfl 2500 (€ 1150) per life-year saved! Further improvement of therapy for myocardial infarction was achieved by primary PCI as developed in Zwolle [3]. Indeed, systematic application of primary PCI resulted in a major further improvement of survival. For example, survival after 3 years of patients admitted with STEMI to the Thoraxcentre improved from 75% in the last decade of the previous century to 87% thereafter [4]. This represents a 48% reduction in mortality!

In this issue of the journal Soekhlal et al. report an analysis of current treatment costs of myocardial infarction in the Netherlands [5]. According to their calculations treatment costs for STEMI including PCI are about € 5700 and for patients with STEMI treated without PCI about € 4300.

This is a modest difference of € 1400, well worth the benefits. Direct PCI is very cost-effective therapy. However, to my regret, the authors do not mention these benefits and present only costs. The authors indicate that their calculations may be used to support decision-making in health care, but such decision-making should also take into account the benefits of the treatment. Indeed, treatment of myocardial infarction carries a cost, but it should be seen as *investment*, an investment in health, an investment resulting in a significantly improved longevity and quality of life! Few interventions are as cost-effective as primary PCI.

Apart from the focus on costs alone, the report by Soekhlal has several other shortcomings. First, the authors describe four groups of patients: 8087 patients with STEMI undergoing PCI, 6765 STEMI receiving thrombolysis, 1800 non-STEMI undergoing PCI and 9005 non-STEMI receiving thrombolysis. This must be an error! Thrombolysis is indicated in patients with STEMI if timely direct PCI by an experienced team is not possible, but certainly not in patients presenting without ST-segment elevation (non-STEMI). Probably they refer to patients treated without PCI, or ‘non-invasively’, but throughout the text thrombolysis appears. Second, the reported treatment costs have a substantial variation, from € 34 to € 870,653. Both the low, as well as the high cost values are unusual to say the least. This requires some discussion and explanation. Probably this represents errors in the registration system, which should be sorted out if decisions in health care policy are to be based on these figures. With such extremes the means and standard deviations presented by the authors are not reliable and medians with 95% ranges would be more appropriate. In fact, mean treatment costs of € 5201 with a standard deviation of € 6906 implies that in about a quarter of the cases the costs were negative, which is obviously not true. Third, it is not clear whether the report concerns only the costs during the first hospital admission or also follow-up costs. The latter is suggested in the methods mentioning ‘outpatient and emergency room visits’ and in the results mentioning ‘PCI performed in a day-care setting’, although

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this might refer to patients admitted in a smaller hospital who are transported to a large centre for PCI and return to the smaller hospital immediately after the procedure. In that case it should be mentioned and the ambulance transportation costs should be included in the analysis. Finally, the report would have been improved and medical mistakes would have been avoided by cooperation with cardiology experts. A sentence like ‘Because PCI procedures are not believed to be beneficial to STEMI patients when the coronary artery is damaged.... STEMI patients received fewer PCI procedures and coronary stents than non-STEMI patients’ is not clear. In fact, in all STEMI patients the coronary artery is damaged and this is specifically the indication to perform PCI and place a stent. Furthermore PCI is indicated and performed more often rather than less frequently in STEMI than in non-STEMI, which is also evident from table 2 in the report: 54% of STEMI patients underwent PCI and only 17% of non-STEMI patients. Finally, the European guidelines [6] recommend participation in a rehabilitation program for all patients after myocardial infarction, not only for those treated without PCI as erroneously mentioned in the report.

Analysis of the efficacy, the costs and the efforts of medical care is important indeed, and it is likely that future decisions regarding allocation of scarce resources will be based on such analyses. Proper understanding of the economic implications of medical procedures, such as treatment of myocardial infarction, requires close collaboration of healthcare economists and medical scientists with a feeling for the economic aspects of their profession. It is to be regretted that the authors who report the treatment costs of acute myocardial infarction and the editors of this journal have not recognised the value of such collaboration. Nevertheless, and in spite of its shortcomings, the report supports earlier observations about the treatment costs of myocardial

infarction [2]. Indeed direct PCI is a bit more expensive than conventional treatment [5]. However, these costs, or rather this investment, and the personnel efforts are well spent, to the benefit of many patients.

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References

1. Van Domburg R, Sonnenschein K, Nieuwlaat R, et al. Sustained benefit 20 years after reperfusion therapy in acute myocardial infarction. *J Am Coll Cardiol.* 2005;46:15–20.
2. Vermeer F, Simoons ML, de Zwaan C, et al. Cost benefit analysis of early thrombolytic treatment with intracoronary streptokinase. Twelve month follow up report of the randomised multicentre trial conducted by the Interuniversity Cardiology Institute of The Netherlands. *Br Heart J.* 1988;59:527–34.
3. Zijlstra F, de Boer MJ, Hoorntje JC, et al. A comparison of immediate coronary angioplasty with intravenous streptokinase in myocardial infarction. *N Engl J Med.* 1993;328:680–4.
4. Nauta ST, Deckers JW, Akkerhuis M, et al. Changes in clinical profile, treatment, and mortality in patients hospitalised for acute myocardial infarction between 1985 and 2008. *PLoS One.* 2011;6:e26917. doi:10.1371/journal.pone.0026917.
5. Soekhlal RR, Burgers LT, Redekop WK, et al. Treatment costs of acute myocardial infarction in The Netherlands. *Neth Heart J.* 2013 Mar 1. [Epub ahead of print] doi:10.1007/s12471-013-0386-y.
6. Van de Werf F, Bax J, Betriu A, et al. Management of acute myocardial infarction in patients presenting with persistent ST segment elevation. *Eur Heart J.* 2008;29:2909–45.