SK group (17 cardiac), with $P=0.12$ and $P=0.03$ respectively.

In addition there were four non-fatal reinfarctions in the PTCA group vs 25 in the streptokinase group, presumably all necessitating readmission to hospital. Patients randomized to PTCA had a higher initial and follow-up left ventricular ejection fraction than those randomized to streptokinase ($48 \pm 12\%$ vs $43 \pm 13\%$, $P=0.006$). It is asserted that this small superiority of the interventional group over streptokinase is a direct result of early more complete and more sustained reperfusion than those patients randomized to streptokinase. Although we are not given a breakdown of hospital stay, drug treatments, work status, physical activity, or symptom status in this paper, the Zwolle group assert a total saving of Dfl.0-288 per patient, or Dfl.1-793 per survivor, or Dfl.9086 per event-free survivor in those assigned PTCA. Multivessel coronary artery disease and a previous myocardial infarction were associated with increased costs.

Neither in this paper nor in the original reports of the three comparative trials cited above are we told what proportion of all suspected or eventually proven infarctions are represented by those patients randomized to PTCA or thrombolysis. This, I believe, is an important omission when trying to budget for the totality of admitted acute myocardial infarction patients rather than just those suitable for PTCA or thrombolysis.

The modest individual savings reported from Zwolle, when multiplied over a whole country, imply that PTCA might not be so financially daunting as first thought. But the initial outlay in terms of plant and sufficient trained personnel will, in my view, restrict such an enterprise to areas of high enthusiasm in countries either with generous health care budgets or those with an acceptance that other medical activity will inevitably suffer financially.

Finally, in order to compete favourably with thrombolysis, interventional treatment must be close at hand — not restricted to distant tertiary referral units with the inevitable delay in arranging and effecting patient transfer. This would mean that each district hospital would need at least two (perhaps three or four) experienced invasive teams in order to offer a round the clock service. Members of such teams will need to maintain dexterity and competence by engaging also in diagnostic coronary work — and perhaps elective coronary angioplasty. Such extension of activity will enter the debate of surgical cover, not for acute myocardial infarction work necessarily, but for the inevitable creeping development.

Providing an acute PTCA service for patients with AMI, should it prove to be the superior strategy, may thus have logistic consequences way beyond the coronary care unit.

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The importance of reducing delay in acute myocardial infarction

See page 429 for the article to which this Editorial refers

The study by Ottesen et al. in this issue[1] highlights one of the most important aspects of early heart attack care. The interval between the onset of an acute myocardial infarction and the initiation of infarct-limiting therapy is important, since the effect of such treatment is inversely related to this interval[2]. Despite the fact that this is well-known in the
medical community, only a minority receive treatment at a sufficiently early stage. Analyses of the various components of the delay between onset of symptoms and the start of infarct-limiting therapy indicate that patient decision time constitutes the dominant part.

Many studies have looked at the link between patient decision and factors such as medical history, age, gender, race, socio-economic status, education, personality factors, witness, whether a physician was consulted, time of day, day of week, degree of physical activity, place, self treatment and clinical status. However, many of these studies were based on small sample sizes.

The current study, which represents 20-25% of all the patients hospitalized in Denmark with an acute myocardial infarction, thus makes an important contribution to our knowledge of the clinical factors associated with delay in acute myocardial infarction. The results focus on the total delay between onset of pain and admission to hospital and not just the patient decision time. Thus, the factors significant in this study might have been slightly under-scored, due to the dilution of the data caused by transport time which is probably not influenced by these factors.

The study confirms what has been shown in many previous studies that old age, female gender, and a history of diabetes mellitus and angina pectoris are related to prolonged delay. Although there might be several explanations for this observation, it is tempting to believe that elderly people, females and patients with a history of diabetes mellitus more frequently have atypical symptoms, which are difficult to interpret correctly. Similarly, patients with a history of angina pectoris might have difficulty distinguishing symptoms of angina from symptoms of an acute myocardial infarction.

Probably one of the most important observations in the present study was that patients with a previous history of myocardial infarction experienced a shorter delay than those without such a history. Many studies have shown the opposite, i.e. that patients who already have a heart disease have a longer delay. Two conclusions can be drawn from this time-related trend. The first is that, nowadays, patients who have suffered an acute myocardial infarction may perhaps have received better information from their physicians and nurses as to the importance of delay in acute myocardial infarction. If this is true, this means it is possible to change people's behaviour in a life-threatening situation. Such speculations are supported by the observations of Ridker et al. who found that well informed patients experienced a significantly shorter delay.

Such findings emphasise the importance of educating people in the community about the need for prompt action when confronted with acute chest pain. The authors suggest that their investigation may help in directing attention towards those patients with the highest risk of excessive patient delay. However, one group who are just as important as the patients are the relatives and neighbours of those who suffer a heart attack. Educational campaigns targeting the total community rather than individual patient groups might therefore be a realistic alternative.

One disturbing factor is that none of these campaigns, despite being successful in terms of reducing delay in many cases, has demonstrated an increase in survival. In the current study, there was a clear relationship between delay and survival; i.e. the longer the delay, the lower the survival. Previous studies dealing with this issue have produced conflicting results. However, the current study is based on a far larger sample than the previous ones, and the impact of delay on mortality is probably under-scored since, as the authors very effectively demonstrate, patients who experienced a short delay more frequently suffered from congestive heart failure, hypertension and cardiogenic shock, thereby indicating more severe infarcts.

Perhaps the most important observation in the present study was that, despite increased awareness of the problem, delay in acute myocardial infarction is still far too long. The strong association between delay and long-term survival supports the notion that more effort must be directed towards shortening patient decision time.

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