Angioplasty vs thrombolysis for acute myocardial infarction: a quantitative overview of the effects of interhospital transportation

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Primary angioplasty has been shown to be superior to thrombolytic therapy for treatment of patients with acute ST segment elevation myocardial infarction in randomized trials. However, even in countries where large numbers of percutaneous coronary interventions are performed, thrombolytic therapy is still used far more often, in daily practice. This is caused by issues such as logistical difficulties, reimbursement, variability of angioplasty results and safety and feasibility of interhospital transportation. As the large majority of patients with acute ST elevation myocardial infarction are presented to hospitals without the capability to perform acute coronary angiography and angioplasty, interhospital transportation plays a central role. Although safety and feasibility of transportation of patients with acute myocardial infarction has been documented in case series, many cardiologists have had doubts as to whether the potential benefits of angioplasty over thrombolysis would not be negated due to the additional time delay inherent in transportation.

In this issue, Widimsky et al. report the 30 day results of the PRAGUE-2 trial, a trial designed to compare nationwide the relative benefits and risks of thrombolysis on site, vs angioplasty after transportation, as treatment of patients with ST segment elevation myocardial infarction. The results of this important study, as well as the results of other randomized trials reconfirm the safety and feasibility of the strategy of interhospital transportation to perform primary angioplasty. To place these results in perspective it is necessary to look at all currently available evidence.

Angioplasty vs thrombolysis: a summary of the evidence

Currently data are available on 6478 patients randomized between primary angioplasty and thrombolysis. Of 3241 patients randomized to primary angioplasty, 179 (5.5%) died, compared to 251 (7.8%) of 3237 patients randomized to thrombolysis, relative risk 0.70 with 95% confidence intervals of 0.57 to 0.85, P<0.001. This represents an additional 23 lives saved per 1000 patients treated. Major adverse cardiac events (MACE) defined as the combination of death and non-fatal reinfarction or death, non-fatal reinfarction and non-fatal stroke, occurred in 258 of 3241 (8.0%) angioplasty patients compared to 454 of 3237 (14.0%) thrombolysis patients, relative risk 0.53 with 95% confidence intervals of 0.45 to 0.62, P<0.001. This represents 60 fewer events per 1000 patients.
patients treated, and translates into a number of patients needed to treat to prevent an event of 17 (see also Table 1 and Fig. 1).

**Angioplasty after interhospital transportation vs on-site thrombolysis: a summary of the evidence**

Currently, data are available on 2466 patients randomized between primary angioplasty after interhospital transportation and on-site thrombolysis.\(^2\)\(^{-}\)\(^{11}\) Of 1242 patients randomized to angioplasty, 84 (6.8%) died compared to 117 (9.6%) of 1224 patients randomized to thrombolysis, relative risk 0.69 with 95% confidence intervals of 0.51 to 0.92, \(P = 0.01\). This represents an additional 33 lives saved per 1000 patients treated. MACE defined as the combination of death and nonfatal reinfarction and stroke, occurred in 106 of 1242 (8.5%) angioplasty patients compared to 190 of 1224 (15.5%) thrombolysis patients, relative risk 0.51 with 95% confidence intervals of 0.40 to 0.65, \(P < 0.001\). This represents 70 fewer events per 1000 patients treated, and translates into a number of patients needed to treat to prevent an event of 14 (see also Table 2 and Fig. 1).

The explanation of the finding, that primary angioplasty compared to thrombolysis offers comparable advantages even after transportation, is complex and multiple factors may interact. The time delay of interhospital transportation seems not to be of paramount importance, probably due to the fact that clinical outcome after primary angioplasty is less dependent on the time delay between symptom onset and therapy, compared to thrombolytic therapy.\(^{15}\)\(^{-}\)\(^{16}\) Furthermore, as interventional centres treat large numbers of patients with acute myocardial infarction, these patients benefit from the fact that results of procedures as well as the optimal application of other therapies for acute myocardial infarction, are volume depended.\(^{17}\)\(^{-}\)\(^{20}\)

The PRAGUE-2 and DANAMI-2\(^{10}\)\(^{-}\)\(^{11}\) are especially important as they show that primary angioplasty therapy for acute myocardial infarction can be applied in large areas of partly urbanized Europe with good results. The time has come to implement these findings.

**Acknowledgements**

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**References**


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**Table 1** Pooled data from randomized trials\(^1\)\(^{-}\)\(^{11}\) of primary angioplasty vs thrombolysis

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Mortality and adverse events at 30 days or 6 weeks, adverse events defined as death and non-fatal reinfarction and stroke.\(^1\)\(^{-}\)\(^{11}\)

**Table 2** Pooled data from randomized trials\(^2\)\(^{-}\)\(^{9}\)\(^{-}\)\(^{11}\) of primary angioplasty after interhospital transportation vs on-site thrombolysis

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