Comparison of primary coronary angioplasty and intravenous thrombolytic therapy for acute myocardial infarction


Authors' objectives
To provide a quantitative review of the treatment effects of primary coronary angioplasty versus intravenous thrombolysis for acute myocardial infarction.

Searching
Published and unpublished studies were searched for on MEDLINE from January 1985 through March 1996; the scientific session abstracts in three journals (Circulation, The Journal of the American College of Cardiology and the European Heart Journal) from January 1993 through March 1996. The primary investigator for each trial was contacted.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included.

Specific interventions included in the review
Coronary angioplasty; intravenous thrombolysis: streptokinase, tissue-type plasminogen activator (t-PA). T-PA may be administered by a 3 to 4 hours infusion or accelerated infusion over 1.5 hours.

Participants included in the review
Patients with acute myocardial infarction. The inclusion criteria were different across trials. Three trials restricted enrolment to subsets of patients, such as those with evidence of anterior infarction, patients with inferior infarction accompanied by ST-segment depression in the electrocardiogram precordial leads and only "low-risk" patients. The duration of symptoms was less than 6 hours or less than 12 hours.

Outcomes assessed in the review
Total mortality, nonfatal reinfarction, total stroke, haemorrhagic stroke and major bleeding (defined as requiring a blood transfusion) occurring during hospital stay or within 30 days.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
The included trials were randomised and controlled. No further critical appraisal was undertaken. The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

Data extraction
The primary investigator for each trial was contacted and provided definitions and exact data (published and unpublished) for outcome events.

Methods of synthesis
How were the studies combined?
Odds ratios and their 95% confidence interval were calculated using exact test for categorical data. All comparisons
were based on an intent-to-treat analysis according to randomised groups.

How were differences between studies investigated?
The Zelen test was used to test homogeneity of the odds ratios across primary studies. Studies were grouped according to thrombolytic drugs used (streptokinase, t-PA and accelerated t-PA). Possible heterogeneity of treatment effects within different subgroups were investigated using logistic regression analysis.

Results of the review
Ten RCTs (total number of patients, 2,606): 4 compared angioplasty with streptokinase (n=608); 3 compared angioplasty with a 3 to 4 hour infusion of t-PA (n=588); and 3 compared angioplasty with 'accelerated' administration of t-PA (n=1,410).

Mortality within 30 days was 4.4% for the 1290 patients treated with primary angioplasty compared with 6.5% for the 1316 patients treated with thrombolysis (odds ratio, 0.66; 95% CI: 0.46, 0.94; p=0.02). There was no significant difference between subgroups. The rates of death or nonfatal reinfarction were 7.2% in the angioplasty group and 11.9% in the thrombolytic group (odds ratio, 0.58; 95% CI: 0.44, 0.76). Angioplasty was associated with a significant reduction in total stroke (0.7% vs 2.0%; p=0.007) and haemorrhage stroke (0.1% vs 1.1%; p<0.001).

The odds ratio for mortality in the largest trial included (n=1138) was 0.8 (95% CI: 0.50, 1.29) compared with 0.54 (95% CI: 0.33, 0.88) in the other, smaller trials. More recently-completed trials and trials using all events within 30 days tend to show fewer difference between two groups as compared with earlier completed trials and trials using in-hospital events.

Authors' conclusions
Based on outcomes at hospital discharge or 30 days, primary angioplasty appears to be superior to thrombolytic therapy for treatment of patients with acute myocardial infarction, with the proviso that success rates for angioplasty are as good as those achieved in these trials. Data evaluating longer-term outcomes, operator experience and time delay before treatment are needed before primary angioplasty can be universally recommended as the preferred treatment.

CRD commentary
The methods for validity and relevance assessment were not reported. The authors discussed several limitations of the evidence reviewed: such as heterogeneity across individual studies, potential publication bias and short period of follow-up. It seems appropriate for the authors to indicate that further large trials with longer follow-up are required to compare optimal thrombolytic regimens with angioplasty in relative high risk patients.

Bibliographic details

PubMedID
9403425

Other publications of related interest
MeSH
Angioplasty, Balloon, Coronary; Cerebrovascular Disorders; Health Services Research; Humans; Infusions, Intravenous; Logistic Models; Myocardial Infarction /mortality /therapy; Outcome and Process Assessment (Health Care) /methods; Plasminogen Activators /administration & dosage /therapeutic use; Randomized Controlled Trials as Topic; Recurrence; Risk; Streptokinase /administration & dosage /therapeutic use; Survival Analysis; Thrombolytic Therapy; Tissue Plasminogen Activator /administration & dosage /therapeutic use; United States /epidemiology

AccessionNumber
11998008115

Date bibliographic record published
31/07/1998

Date abstract record published
31/07/1998

Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.