Angioplasty at an invasive treatment centre reduced mortality compared with first contact thrombolysis


Clinical impact ratings

GP/FP/Primary care ★★★★★☆☆ IM/Ambulatory care ★★★★★★★☆ Internal medicine ★★★★★★☆☆☆☆ Emergency medicine ★★★★★★★☆☆☆☆

Is the transfer of patients with ST-segment elevation myocardial infarction (STEMI) to an invasive treatment centre (ITC) for primary angioplasty (percutaneous coronary intervention [PCI]) more effective than onsite fibrinolysis for reducing all cause mortality, reinfarction, or stroke?

METHODS

Design: randomised controlled trial (Danish trial in Acute Myocardial Infarction-2 [DANAMI-2]).

Allocation: concealed.*

Blinding: blinded (outcome assessors). *

Follow up period: 30 days.

Setting: 24 referral hospitals (RHPs) and 5 ITCs in Denmark.

Patients: 1572 patients ≥18 years age (median age 63 y, 73% men) who had STEMI. Exclusion criteria included contraindication to fibrinolysis and left bundle branch block.

Intervention: patients were stratified by hospital and allocated to PCI (n = 567 at RHPs and 223 at ITCs) or fibrinolysis (n = 562 at RHPs and 220 at ITCs). Patients in the PCI group received heparin, 10 000 U plus aspirin, 300 mg intravenously with immediate transportation to a catheterisation laboratory for acute angiography, angioplasty, and primary stenting. Fibrinolytic therapy comprised accelerated treatment with alteplase and was administered by ambulance crews.

Outcomes: composite endpoint of all cause mortality, clinical reinfarction, or disabling stroke.

Patient follow up: 100%.

*See glossary.

MAIN RESULTS

Analysis was by intention to treat. 96% of patients allocated to PCI at RHPs were transferred to an ITC (Analysis was by intention to treat. 96% of patients allocated to PCI at RHPs or RHPs were transferred to an ITC (Analysis was by intention to treat. 96% of patients allocated to PCI at RHPs or RHPs were transferred to an ITC (Analysis was by intention to treat. 96% of patients allocated to PCI at RHPs or RHPs were transferred to an ITC (Analysis was by intention to treat. 96% of patients allocated to PCI at RHPs or RHPs were transferred to an ITC).

Outcome Site of randomisation PCI Fibrinolysis RRR (95% CI) NNT (CI)

<table>
<thead>
<tr>
<th>Composite endpoint</th>
<th>All patients</th>
<th>8.0%</th>
<th>13.7%</th>
<th>42% (22 to 57)</th>
<th>18 (12 to 38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RHs</td>
<td>8.5%</td>
<td>14.2%</td>
<td>41% (17 to 58)</td>
<td>18 (11 to 48)</td>
<td></td>
</tr>
<tr>
<td>ITCs</td>
<td>6.7%</td>
<td>12.3%</td>
<td>45% (0.9 to 70)</td>
<td>19 (9 to 1153)</td>
<td></td>
</tr>
</tbody>
</table>

*Composite endpoint = all cause mortality, clinical reinfarction, or disabling stroke; RHs = referral hospitals; ITCs = invasive treatment centres. Other abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.

CONCLUSION

The transfer of patients who had myocardial infarction with ST-segment elevation to an invasive treatment centre for primary percutaneous coronary intervention was more effective than onsite fibrinolysis for reducing all cause mortality, reinfarction, or stroke.

Abstract and commentary also appear in ACP Journal Club.

Commentary

Primary PCI offers advantages over fibrinolytic therapy when done promptly in excellent PCI centres.1 However, the conclusion from DANAMI-2 that hospitals without PCI capability must withhold fibrinolytic therapy and transfer patients for primary PCI because of the reduction in the composite endpoint of death, reinfarction, or disabling stroke compared with onsite fibrinolytic therapy deserves further scrutiny because of study design.

The composite endpoint was driven by the reduction in reinfarction rates with primary PCI. Trends for mortality and disabling stroke reduction with PCI were statistically insignificant. It is important to note that in the fibrinolysis group, rescue PCI was only used in 2% of patients and reinfarction was treated with repeated fibrinolysis instead of angioplasty. With a 30 day mortality rate of 24% after reinfarction, approximately 7 excess deaths occurred in the fibrinolysis group because of this complication. The use of low molecular weight heparin instead of unfractionated heparin and a more liberal policy of permitting angioplasty to treat recurrent ischaemia in the fibrinolysis group probably would have decreased reinfarction rates and equalized mortality rates. Additionally, the stroke rate in the fibrinolysis group was higher than noted in previous fibrinolysis megatrials. Whether the higher than currently recommended unfractionated heparin dosing used in this study or the repeated fibrinolysis infusion in 26 patients contributed to this excess was not discussed. In transfer patients, time to PCI was only 90 minutes because of a superbly organised national MI triage system, compared with 185 minutes in the US in 2002.2

Unless local emergency transport programmes can deliver patients to PCI centres within the times observed in this study, fibrinolytic therapy should be the preferred treatment strategy for patients who present to hospitals without PCI capability. In such settings, emergency transfer to PCI centres should be reserved for moderate and high risk patients in whom reperfusion fails or for those who develop recurrent ischaemia.

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