There Is No Advantage To Giving Heparin With Intra-arterial Thrombolysis: How To Prevent Clot Formation On Catheters And Sheaths

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Surgery versus thrombolysis for initial management of acute limb ischaemia (Review 2013)

- Rochester-trial (Ouriel K et al. JVS 1994)
- TOPAS-trial (Ouriel K et al. NEJM 1998)

- No overall difference in limb salvage / mortality
- Thrombolysis may be associated with a higher risk of hemorrhagic complications including stroke
- Must be balanced against risks of surgery in each patient

Continuous heparin during thrombolysis?

Potential advantage
- Amplify antithrombotic effect?
- Reduce pericatheter thrombus formation?

Potential disadvantage
- More bleeding complications?

Bleeding

<table>
<thead>
<tr>
<th>Relative risk of major bleeding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female (vs male)</td>
</tr>
<tr>
<td>Native vessel (vs graft)</td>
</tr>
<tr>
<td>Embolus (vs thrombus)</td>
</tr>
<tr>
<td>Heparin</td>
</tr>
<tr>
<td>Aspirin</td>
</tr>
</tbody>
</table>

Due to the high rate of intracranial hemorrhage, heparin use was stopped prematurely in the trial

RCT

- 30 patients with acute peripheral arterial thrombosis
- Randomized to t-PA with or without low-dose heparin (250 units/h)
- No significant difference in limb salvage, complications, or mortality between the group
- Conclusion: The addition of low-dose heparin does not produce any significant benefit

Disclosures?

I have no financial disclosure to declare
Systematic review

- 11 studies / 444 patients

<table>
<thead>
<tr>
<th></th>
<th>With heparin</th>
<th>without</th>
</tr>
</thead>
<tbody>
<tr>
<td>Successful thrombolysis</td>
<td>91%</td>
<td>85%</td>
</tr>
<tr>
<td>Major complication</td>
<td>0-17%</td>
<td>0-14%</td>
</tr>
</tbody>
</table>

- No conclusion could be drawn regarding safety or efficacy of rtPA with or without heparin

Semba et. al. J Vasc Interv Rad 2000

- Total 749 procedures

- Uppsala:
  - bolus 5000 IU heparin
  - no continuous heparin infusion
  - bolus 4mg rtPA → 0.5mg/h rtPA

- Malmö:
  - bolus 5000 IU heparin
  - continuous infusions of heparin according to APTT
  - 1–2mg/h rtPA for 4 hours → 0.5–1.0mg/h rtPA

With heparin without

Successful thrombolysis 91% 85%
Major complication 0-17% 0-14%

Grip et. al. BJS 2014; 101:1105-1112

Conclusions

- No consensus regarding the use of concomitant anticoagulation during thrombolysis
- Limited number of studies published in this area
- When analysing 749 thrombolytic procedures performed at two Swedish centres with different treatment algorithms, it was found that continuous heparin infusions resulted in no benefit, but more bleeding complications

Grip et. al. BJS 2014; 101:1105-1112

BJS

Outcome and complications after intra-arterial thrombolysis for lower limb ischaemia with or without continuous heparin infusion

O. Grip1, M. Kauppila1, S. Norström1, T. Wanhainen1, J. Åkesson1 and M. Björk1

<table>
<thead>
<tr>
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<th>Uppsala</th>
<th>Malmö</th>
<th>with continuous heparin</th>
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</thead>
<tbody>
<tr>
<td>rtPA</td>
<td>18 mg</td>
<td>24 mg</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Duration</td>
<td>27 h</td>
<td>23 h</td>
<td>0.001</td>
</tr>
<tr>
<td>Immediate success rate</td>
<td>80%</td>
<td>81%</td>
<td>0.595</td>
</tr>
<tr>
<td>30-d amputation-free survival</td>
<td>83%</td>
<td>84%</td>
<td>0.689</td>
</tr>
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Grip et. al. BJS 2014; 101:1105-1112

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<tr>
<th></th>
<th>Bleeding</th>
<th>Amputation</th>
<th>30-d mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graft occlusion</td>
<td>+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute arterial thrombosis</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Embolus</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>Popliteal aneurysm</td>
<td>++</td>
<td>+</td>
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Grip et. al. BJS 2014; 101:1105-1112

Any bleeding 21% 37% <0.001
Major bleeding 12% 16% 0.123
Discontinuation due to bleeding 5% 6% 0.473

Three patients (0.4%) suffered intracranial hemorrhage, all fatal

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2/3 femoral access site bleeding

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