Mechanical Thrombectomy systems: The cost effective way to manage clot?

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Disclosure

Speaker name: Stephen D’Souza

I have the following potential conflicts of interest to report:

- [x] Consulting for Penumbra
- [ ] Employment in industry
- [ ] Stockholder of a healthcare company
- [ ] Owner of a healthcare company
- [ ] Other(s)

- [ ] I do not have any potential conflict of interest
Background

• At present no cost effective data available for clinical trust and the patient.

• No data on the cost implications of typical methods used to managed acute clot such as lysis and surgery.
Background

• No standard pathway established to manage acute clot which is used by most clinicians.

• No NICE guidance for peripheral acute clot (venous or arterial).
Background

• Neuro-Intervention Stroke management has moved on to standard care pathway using mechanical thrombectomy for acute stroke secondary to clot.

• In the U.K this is in current NICE guidance.
Cost-Effectiveness

• Cost
• Outcome
• Complications
• Consequences of Intervention
• Tariff
Sites of Thrombosis

- Arterial
  - Peripheral
  - Intra-cerebral

- Venous

- AVF or Grafts
Types of clot clearance

• Surgical

• Thrombolysis

• Aspiration – simple catheter aspiration

• Mechanical – balloon maceration, Treratola

• Pharmaco-mechanical - Angiojet

• Mechanical aspiration – Rotarex, Indigo
Thrombolysis - costs

- Need at least overnight stay
  - ICU Bed: £900+ per night
  - TPA: £185 per 10mg vial (2-3 over 24hrs)

- Bleeding complications even after discontinue Thrombolysis

- Greater risk with arterial thrombolysis (10-12% major bleeding complication)
Pharmaco-Mechanical - costs

• Often need overnight stay £500

• Cost of catheter/system:
  Angiojet Zelante £2200

• Pulse spay and wait (30min) extending duration of procedure

• TPA £185 per vial

• Increased risk of complications over mechanical alone
Mechanical Thrombectomy - costs

• Day case admission potentially

• Cost of catheter/system are all in similar price range

• With indigo and Rotarex no need for lysis/rTPA
MAT vs Thrombolysis

- Systematic literature review
- Complication difference
- Potential cost savings
Systematic literature review

~2500 papers

Records identified through database searching:
- Medline (PubMed): 682
- Embase: 1874
- Cochrane: 140

Records identified in other sources: 6

Records after combining results: 2702

Records screened

Records excluded: 2464

Full-text articles assessed for eligibility: 238

Full-text articles excluded (with reasons): 227
- conference abstract: 51
- no results for population of interest: 55
- other treatment: 82
- chinese language: 1
- case reports: 38

Studies included in qualitative synthesis:
- studies: 11
  - RCT: 0
  - observational: 11 (include 2 unpublished studies)
  - systematic review: 0

11 observational studies
Mechanical Thrombectomy Vs Thrombolysis

Risk of complications:
- Rotarex 17.7% (11.9%;24.4%) [3 studies]
- Thrombolysis 48.1% (28.7%;68.1%) [1 study]
- Rotarex 71.6% (48.3%;89.9%) vs thrombolysis 62.5%(56.8%;68.1%)

Amputation at 30 days:
- Rotarex 1.9% (0.8%;3.3%)
- Thrombolysis 7.6% (3.7%;12.7%) [Include Grip 2014], 9.8% (6.9%;13.1%) [include Grip 2017]

Amputation at 12 months:
- Rotarex 4.5% (0.0%;15.8%) vs Thrombolysis 12.5% (3.9%;24.9%)
Mechanical Thrombectomy Vs Thrombolysis

Bleedings complications risk:
Rotarex 3.1% (0.8%;7.0%) Vs Thrombolysis 11.4% (1.6%;53.2%)
[include Grip 2017] 12.7% (2.2%59.1%) [include Grip 2014]

Death at 30 days:
Rotarex 1.2% (0.4%;2.3%) Vs Thrombolysis 3.7% (2.1%;5.7%)
[include Grip 2017] 3.6% (2.0%;5.6%) [include Grip 2014]

Death at 12 months:
Rotarex 5.2% (0.6%;13.9%) Vs Thrombolysis 13.9% (10.8%;17.4%)
Mechanical Thrombectomy Vs Thrombolysis

Re-intervention long term
Rotarex 59.2% (47.2%;70.6%) vs thrombolysis 33.3% (9.9%;65.1%)

Secondary patency
Rotarex 75.0% (56.6%;88.5%) vs thrombolysis 77.4% (72.0%;82.2%)
Potential savings due to reduced complications
MAT vs TPA

Complications:
- bleeding risk 12.7% (2.2%;59.1%) (1)
- amputation risk 12.5% (3.9%;24.9%) (1)

Costs:
- cost of bleeding £2005 (NHS tariffs YR23A and YR23B) ~ £260pp
- cost of amputation £5721 (NHS tariffs YQ22B) ~ £720pp

## Potential saving (MAT vs TPA) based on LOS

### Mean length of hospital stay (days)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>LOS (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotarex</td>
<td>1.4±0.9 (1,2,3)</td>
</tr>
<tr>
<td>Thrombolysis</td>
<td>6.6±3.0 (1)</td>
</tr>
</tbody>
</table>

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Costs

- Surgical embolectomy £6-8000
- Thrombolysis £4-7000 + complications
- Pharmaco-mechanical £4000 + complications
- Mechanical aspiration £4000
moving FORWARD

• More data is required:
  Re-Open registry, and Indian trial results hopefully by the end of 2018. More collaboration between centers and further data is required, followed by establishing guidelines for clinical practice.

• Re-Review of the ATTRACT trial:
  Many faults highlighted with this study. Cannot fully relate to actual clinical practice and systems such as Indigo were not included.
Conclusion

- Data so far suggests significant benefits of Mechanical aspiration devices such as Indigo over Thrombolysis.
- Move towards the use of mechanical thrombectomy rather than direct catheter lysis and open surgery for the majority of straightforward ACUTE cases.
- When considering side effects and contraindications there are benefits of Indigo over PMT devices.
Conclusion

• Surgery, thrombolysis and pharmaco-mechanical devices still have role

• Further data and collaboration are required.

• Cost effectiveness should be reviewed further.
THANK YOU

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