VTE PROPHYLAXIS : TRAUMA
Literature Limitations Trauma Prophylaxis

- Variability in patient type
- Variability in screening procedures
  - choice, timing, frequency
- Lack of blinded outcome assessment
- Lack of gold standard diagnostic test*
  - venography
  - CUS (62% sensitivity asymptomatic)
- Study methodology (levels of evidence)

⇒ TRUE RATE VTE UNDER-ESTIMATED?
Methodology Issues: Trauma Prophylaxis

- Study design (RCT; prospective cohort)
- Consecutive patient enrolment
- Completeness of follow-up
- Use of venography (confirmation non-invasive test)
- Blinding of outcome assessment.
Incidence DVT : Trauma

- 4 RCT
- 11 cohort studies
- 3 routine venography studies.
Incidence Venographic DVT : Trauma

- 3 studies with venographic endpoint
  \( N = 716; 39; 54 \) pts

EVENT RATE : 28-63\% (1/2 -1/3 proximal)
Prospective Cohort Study: Trauma

N = 716

349 adequate venograms (days 14-21)

- 58% positive (N = 201)
- 17% proximal (N = 60)
- 3 DVTs only symptomatic
- 3 fatal PE during surveillance.

Incidence CUS DVT : Trauma

- 5 studies (N = 20 - 458 pts)

EVENT RATE : 6 - 30%
## Incidence PE: Trauma

<table>
<thead>
<tr>
<th></th>
<th>Fatal</th>
<th>Non Fatal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autopsy studies</td>
<td>3.8-15%</td>
<td>14-20%</td>
</tr>
<tr>
<td>No prophylaxis</td>
<td></td>
<td>0.7-2%*</td>
</tr>
<tr>
<td>Some prophylaxis</td>
<td></td>
<td>0-1.4%*</td>
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</tbody>
</table>

(* symptomatic; no systematic screening)
Incidence PE: Trauma

- Single study with systematic screening

<table>
<thead>
<tr>
<th>No prophylaxis</th>
<th>Mechanical prophylaxis</th>
</tr>
</thead>
<tbody>
<tr>
<td>6% (9/156)</td>
<td>4% (6/145)</td>
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</tbody>
</table>

Fisher J Orthop Trauma 1995;9:1-7
Risk factors VTE: Trauma

Highest risk (meta-analysis)

- Spinal fractures: O.R (95% ci) 2.26 (1.42 – 3.01)
- Spinal cord injury: 3.0 (1.79-5.38)

Velmatios J Trauma 2000;49:140-144
Risk Factors VTE: Trauma

Higher Risk
- Lower extremity fracture
- Pelvic fracture
- Head injury

Contributing risk
- Older age
- Prolonged immobilisation
- Blood transfusion
- Venous repair/cannulation

(multiple studies)
LDH Prevention: Trauma

- DBRCT (Level I); routine d.10-14 venogram
- N = 344
- Venogram interpretable 77% (N = 265)

Enoxaparin 30mg SC bd v. UFH 5,000 u SC bd

# LDH Prevention: Trauma

<table>
<thead>
<tr>
<th></th>
<th>LMWH</th>
<th>LDUFH</th>
<th>RRR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DVT (ALL)</strong></td>
<td>31% (40/129)</td>
<td>44%* (60/136)</td>
<td>30% (p=0.014)</td>
</tr>
<tr>
<td>(proximal)</td>
<td>6.2%</td>
<td>14%</td>
<td>58% (p=0.012)</td>
</tr>
<tr>
<td><strong>BLEEDING</strong></td>
<td>2.9% (N=5)</td>
<td>0.6% (N=1)</td>
<td>(p=0.12)</td>
</tr>
<tr>
<td>(major)</td>
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</table>

* historical placebo 58%

<table>
<thead>
<tr>
<th>LDH</th>
<th>PCD</th>
<th>OR</th>
<th>RRR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.2%</td>
<td>4.2%</td>
<td>0.46</td>
<td>32%</td>
</tr>
<tr>
<td>(5/220)</td>
<td>(14/333)</td>
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</tbody>
</table>

Knudson; pooled. UFH x 2; LMWH x 1
Mechanical Prophylaxis: Trauma

- GCS v PCD: no direct comparisons
- Footpumps? Less effective GCS, PCD (n.s.)
- Mechanical v. Placebo (N = 2; n.s.)
IVC Filters: Trauma

No prospective RCT using prophylactic filters

- 14 studies
- 5 studies; PE reduced v. historical controls (h.c)
- 1 retrospective review (N = 299); PE not reduced v. h.c.
Retrievable IVC filters: Trauma

- Canadian registry 2/98-12/200
- Gunther Tulip retrievable IVC filter
- 91 filters (90 pts) mean 49 yrs (17-88 yrs)
- VTE with anticoagulant contraindication (N = 84)

J Vasc Interv Radiol 2001;12:1053
Retrievable IVC Filters: Trauma

- 52 filters retrieved (51 pts); 1 attempted unsuccessful retrieval implantation mean 9 days (2-25 days)
- 37 pts followed up 5-420 days (mean 103 days);
  4 reinsertions permanent IVC filter (bleeding, further surgery);
  1 DVT recurrence day 230 post retrieval; no PE.
- 25/39 non-retrievals followed up (mean 85 days; 7-420 days). 2 filter occlusions.

J Vasc Interv Radiol 2001;12:1053
VTE in Trauma: Summary

1. Trauma related DVT incidence 50-60% (Level I evidence)
   - CUS 25-35% (insensitivity of technique)

2. Approximately ½ proximal with embolic potential (Level I)

3. UFH reduces incidence ≈ 20% v. placebo (Level II, III)
VTE in Trauma: Summary

4. LMWH 30% more effective than UFH (Level I)
5. LDH (pooled studies) gives RRR 32% v. mechanical devices
6. Heparin related major bleeding 0.5% (Level II)
7. Insufficient evidence to confirm mechanical methods > placebo.
What to do: Trauma Prophylaxis

1. Non-high risk - ? Mechanical (PCD)
2. High risk without contraindication: LMWH
3. High risk with contraindication to anticoagulants
   • Retrievable filter?
   • Permanent filter?
   • Mechanical with surveillance?
4. Early prophylaxis essential
   • 50% of trauma related VTE occurs ≤ 7 days