

VTE PROPHYLAXIS : TRAUMA

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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

	FATAL	NON FATAL
▪ Autopsy studies	3.8-15%	14-20%
▪ No prophylaxis		0.7-2%*
▪ Some prophylaxis		0-1.4%*

(* symptomatic; no systematic screening)



Incidence PE : Trauma

- **Single study with systematic screening**

No prophylaxis

6% (9/156)

Mechanical prophylaxis

4% (6/145)

Fisher J Orthop Trauma 1995;9:1-7



Risk factors VTE : Trauma

Highest risk (meta-analysis)

	O.R (95% ci)
Spinal fractures	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

	LMWH	LDUFH	RRR
DVT (ALL)	31% (40/129)	44%* (60/136)	30% (p=0.014)
(proximal)	6.2%	14%	58% (p=0.012)
BLEEDING	2.9% (N=5)	0.6% (N=1)	(p=0.12)
(major)			

* historical placebo 58%

Geerts N Engl J Med 1996;335:701



LDH v PCD Prevention : Trauma

LDH	PCD	OR	RRR
2.2% (5/220)	4.2% (14/333)	0.46	32%

Knudson; pooled. UFH x 2; LMWH x1



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)**



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.**



VTE in Trauma : Summary

1. Trauma related DVT incidence 50-60% (Level I evidence)
 - CUS 25-35% (insensitivity of technique)
2. Approximately 1/2 proximal with embolic potential (Level I)
3. UFH reduces incidence \approx 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

