

Twitter Thread by Dr Supradip Ghosh



Dr Supradip Ghosh

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Some thought about DVT prophylaxis in ICU.
Part of my presentation on the same topic.

Question 1: What is the incidence of DVT and PE in current era of widespread thrombo-prophylaxis?

#FOAMed

DVT IN ERA OF PROPHYLAXIS

- **Setting:** Single center. 1-Year, prospective observational study.
- **Inclusion Criteria:** 261 Adult patients with expected stay of >72 hours.
 - Protocolized universal thromboprophylaxis.
- **Intervention:** Bilateral lower limb compression US within 48 hours of admission and twice weekly thereafter or on clinical suspicion.
- **Result:**
 - Prevalence: 2.7% on admission. 42.9% Clinically suspected.
 - Incidence: 9.6%. 12% Clinically suspected.
 - 4-Independent Risk Factors: (a) Personal or family history of DVT, (b) ESRD, (c) Vasopressor and (d) Platelet Transfusion.

Deborah Cook et al. Crit Care Med 2005; 33:1565-71.

Question 2: How do you diagnose DVT in ICU?

■■■ I think, the best evidence is available for CUS with limited scope for Venography.

And no role of D-Dimer.

#FOAMed

D-DIMER IN ICU

- Negative result rules out low probability DVT in non-critically ill patients.
- No of different reasons for raised D-dimer in ICU:
 1. Atrial Fibrillation.
 2. Acute Coronary Syndrome.
 3. Stroke
 4. UGI bleeding
 5. Infection
 6. Disseminated Intravascular Coagulation.
 7. Renal dysfunction.
- Does not predict critically ill patients at risk of DVT. Not to be used in ICU.

ALL COMMON IN ICU

Crowther MA et al. *J Crit Care.* 2005;20:334–40

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Question 3: Is there any evidence supporting Heparin thrombo-prophylaxis in ICU?

#FOAMed

Yes.

1■ Number needed to prophylax to prevent 1 DVT - 20

2■ Number needed to prophylax to prevent 1 PE - 52

3■ Overall no major bleeding. But bleeding risk need to be individualised.

Heparin Thromboprophylaxis in Medical-Surgical Critically Ill Patients: A Systematic Review and Meta-Analysis of Randomized Trials*

Waleed Alhazzani, MD¹; Wendy Lim, MD¹; Roman Z. Jaeschke, MD^{1,2};
Mohammad Hassan Murad, MD³; Jack Cade, MD⁴; Deborah J. Cook, MD^{1,2}

Crit Care Med 2013; 41:2088–98.

- Systematic review and meta-analysis of RCTs.
- **Population:** Adult Critically Ill Patients.
- **Intervention:** Any Heparin versus other strategies.
- **Outcome:** DVT or PE, Major Bleeding, HIT and Mortality.

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Question 4: Is there any evidence of LMWH over UFH in VTE Prophylaxis?

#FOAMeYes.

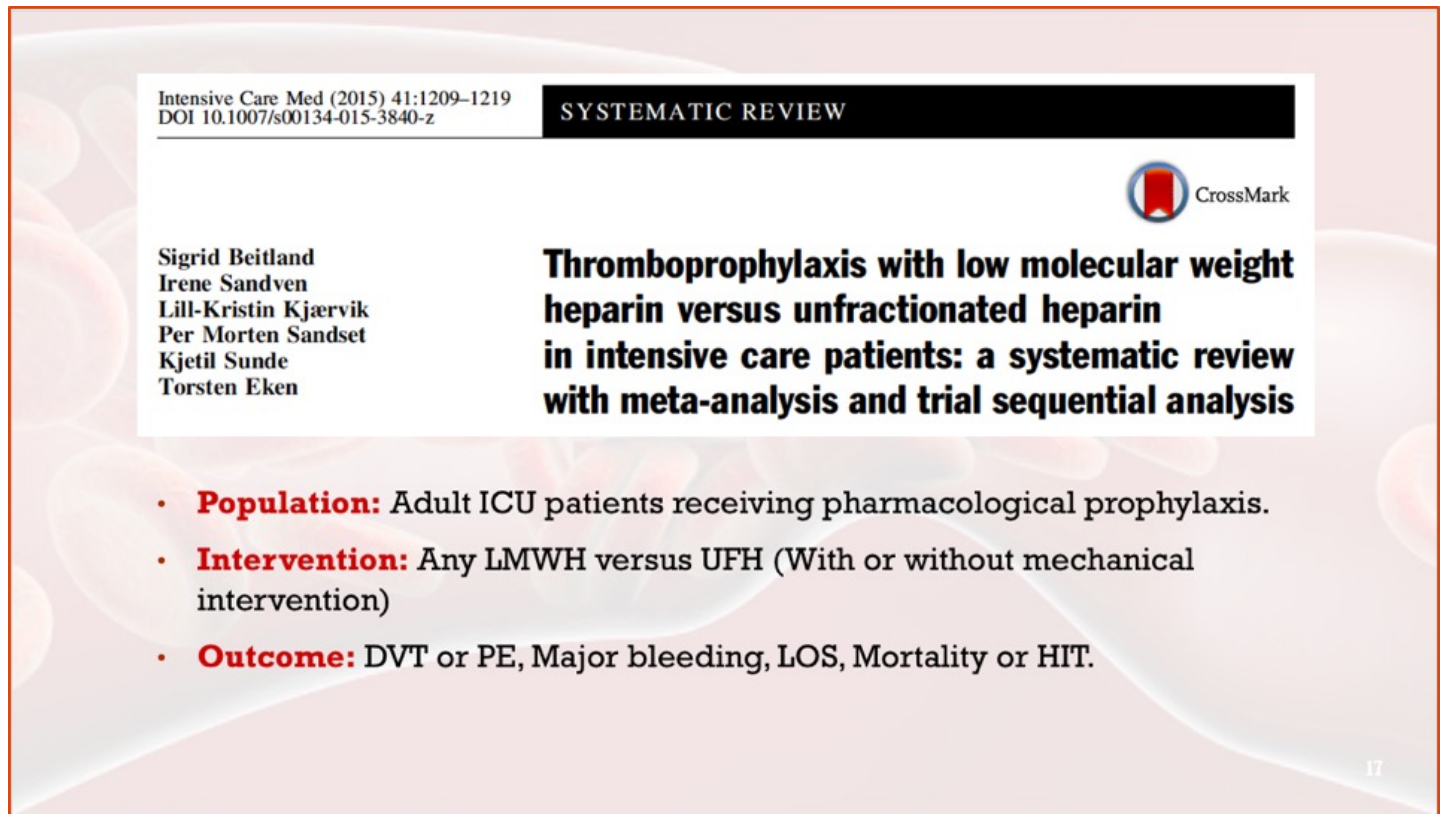
1■LMWH decreases DVT. But no difference in Proximal DVT.

2■No difference in PE.

3■No difference in major bleeding.

4■Lower incidence of HIT in LMWH (PROTECT Trial).

5■Overall advantage LMWH.



The slide features a background with a light pink and white abstract pattern. At the top left, it displays the journal information: 'Intensive Care Med (2015) 41:1209–1219' and 'DOI 10.1007/s00134-015-3840-z'. To the right of this is a black box with the text 'SYSTEMATIC REVIEW' in white. Further right is the CrossMark logo. Below the journal information, the authors' names are listed: 'Sigrid Beitland', 'Irene Sandven', 'Lill-Kristin Kjærvik', 'Per Morten Sandset', 'Kjetil Sunde', and 'Torsten Eken'. The main title of the review is 'Thromboprophylaxis with low molecular weight heparin versus unfractionated heparin in intensive care patients: a systematic review with meta-analysis and trial sequential analysis'. Below the title, three bullet points describe the study's parameters: Population (Adult ICU patients receiving pharmacological prophylaxis), Intervention (Any LMWH versus UFH, with or without mechanical intervention), and Outcome (DVT or PE, Major bleeding, LOS, Mortality or HIT). The slide number '17' is located in the bottom right corner.

Intensive Care Med (2015) 41:1209–1219
DOI 10.1007/s00134-015-3840-z

SYSTEMATIC REVIEW

CrossMark

Sigrid Beitland
Irene Sandven
Lill-Kristin Kjærvik
Per Morten Sandset
Kjetil Sunde
Torsten Eken

Thromboprophylaxis with low molecular weight heparin versus unfractionated heparin in intensive care patients: a systematic review with meta-analysis and trial sequential analysis

- **Population:** Adult ICU patients receiving pharmacological prophylaxis.
- **Intervention:** Any LMWH versus UFH (With or without mechanical intervention)
- **Outcome:** DVT or PE, Major bleeding, LOS, Mortality or HIT.

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Question 5: Is there any role of Mechanical Thromboprophylaxis?

#FOAMed

MECHANICAL PROPHYLAXIS

- Multiple studies have shown benefit to reduce risk of DVT.
 - No studies large enough to show reduction in PE or mortality.
 - Less effective than medical prophylaxis
- Must be properly fitted, applied, and worn almost continuously
- Patients with high bleeding risk (or as adjunctive therapy to medical prophylaxis in certain high-risk patients).
- Contraindication: Severe PVD. Active DVT. Amputated leg. Leg ulcer or trauma.

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Question 6: What is the evidence for Pharmacological Thromboprophylaxis in patients with low CrCL?

1■ Maximum evidence is for Dabigatran.

2■ But unfortunately even on Dabigatran with adequate Anti-factor Xa level maintained both DVT and bleeding risk remains high.

#FOAMed

THROMBOPROPHYLAXIS IN RENAL FAILURE

- Multicenter open level observational study.
- 138 patients with renal failure [Mean CrCl 18.9 ml/min/1.73m²].
 - Dalteparin 5000 Units SC OD.
 - Twice weekly CUS.
- **Result:**
 - Adequate anticoagulation. Median anti-factor Xa level at 2-H and 4-H [0.29 and 0.31 IU/ml].
 - **DVT incidence: 5.1%.** APACHE II Score only independent risk factor.
 - **Major Bleeding: 7.2%.** despite trough anti-Factor Xa level <0.18 IU/ml in all patients. Aspirin use and INR independent predictor of bleeding.

Deborah Cook et al. Critical Care 2008, 12:R32

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Question 7: Any evidence in TBI?

#FOAMed

Suggestions.

1■GCS 13-15. No bleed expansion at 48-H. Start.

2■GCS 13-15. Some expansion at 48-H. Start only after 72-H.

3■GCS 3-12. Not before 72 H. But before 7-days.

4■For DAI. No bleeding. Start after 72-H.

5■Consult Neurosurgery.

PHARMACOLOGICAL PROPHYLAXIS IN TBI

- **Low risk ICH:**
 - 99% Expansion occurs in first 48-Hours.
 - Reasonable to start after 48 h if no expansion.
 - Acceptable to start after day 3 if expansion occurs in 48 h.
- **Moderate and High risk ICH:** Should not be started in first 3 days.
- **Diffuse Axonal Injury:** Reasonable to start if no ICH in first 72 h.
- **Significant increase in DVT incidence after 7 days without chemoprophylaxis [Day 1-3, 2.6% to Day 8, 14.1%].**

Abdel-Aziz et al. Critical Care. 2015; 19:96

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Question 8: How to treat DVT in ICU?

#FOAMed

1■Standard anticoagulation.

2■Limited role for Catheter Directed Thrombolysis.

TREATMENT OF DVT

GOAL IS TO PREVENT.



Post-Thrombophlebitic Syndrome



Venous Ulcer



Pulmonary Embolism



Chronic Thromboembolic Pulmonary HTN

Question 9: How do I provide DVT prophylaxis in my ICU?

#FOAMed

- 1■ All ICU patients need DVT prophylaxis.
- 2■ Pharmacological preferred over Mechanical.
- 3■ If DVT prophylaxis not given for some reason, the reason must be documented.

MY SIMPLE RULE.

- All ICU patients need prophylaxis.
- Pharmacological preferred.
 - Either Dalteparin or Enoxaparin.
 - Fondaparinux only in patients with previous HIT.
- Mechanical (Intermittent Pneumatic Compression device) only if pharmacological is contra-indicated.
- Pharmacological PLUS Mechanical in High-spinal cord injury !
- **DOCUMENTATION.**

DVT PROPHYLAXIS :

Yes No

IF Yes :

PHARMACOLOGIC :

UFH

DALTEPARIN

ENOXAPARIN

FONDAPARINUX

MECHANICAL :

BOTH :

If No, Contraindications :

Contraindication to mechanical prophylaxis

- Perceived bleeding risk
- CNS bleeding
- Other active bleeding
- Anticoagulated coagulase

Contraindication to mechanical prophylaxis

- Lower limb fracture
- Lower limb amputated
- Abrasion/Ulcer on lower limbs
- Suspected/Confirmed DVT of lower limbs

Previous 24 hrs		TODAY	
TOTAL IN	0	TOTAL IN	0
TOTAL OUT	1069	TOTAL OUT	0
SALANCE	1570	SALANCE	0
	501		0

Question 10: Is there any evidence for DOACs?

#FOAMed

1■Yes. For several of them.

2■APEX supports Betrixaban for prophylaxis.

3■Xalia supports Rivaroxaban for treatment.

4■But will be cautious in using them in my patients. Limited evidence in ICU patients. Limited reversal agent.

APEX TRIAL

- Multicenter, double blind, double dummy, RCT.
- **Intervention:** Enoxaparin versus two different doses of Betrixaban (80 mg or 40 mg).
- **Result:**
 - 3759 Patients randomized to Betrixaban. 3754 Patients randomized to Enoxaparin.
 - Primary efficacy outcome (Asymptomatic proximal DVT, Symptomatic DVT, symptomatic nonfatal PE or VTE related death) significantly reduced in 80 mg Betrixaban group versus Enoxaparin.
 - No difference in 40 mg Betrixaban vs Enoxaparin.

Gibson CM et al. Am Heart J. 2017;185:93-100.