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VTE prevention in the operating room: a multimodal approach

Davide Imberti
Haemostasis and Thrombosis Center
Internal Medicine Department
PIACENZA HOSPITAL

My talk today

- Introduction
- Evidence and guidelines
- Clinical practice
- Conclusions

Table 4—*Absolute Risk of DVT in Hospitalized Patients

Patient Group	DVT Prevalence, %
Medical patients	10–20
General surgery	15–40
Major gynecologic surgery	15–40
Major urologic surgery	15–40
Neurosurgery	15–40
Stroke	20–50
Hip or knee arthroplasty, hip fracture surgery	40–60
Major trauma	40–80
Spinal cord injury	60–80
Critical care patients	10–80

*Rates based on objective diagnostic testing for DVT in patients not receiving thromboprophylaxis.

Falck-Ytter, Chest , 2012

ACCP thrombosis risk factor assessment adated from the Caprini model

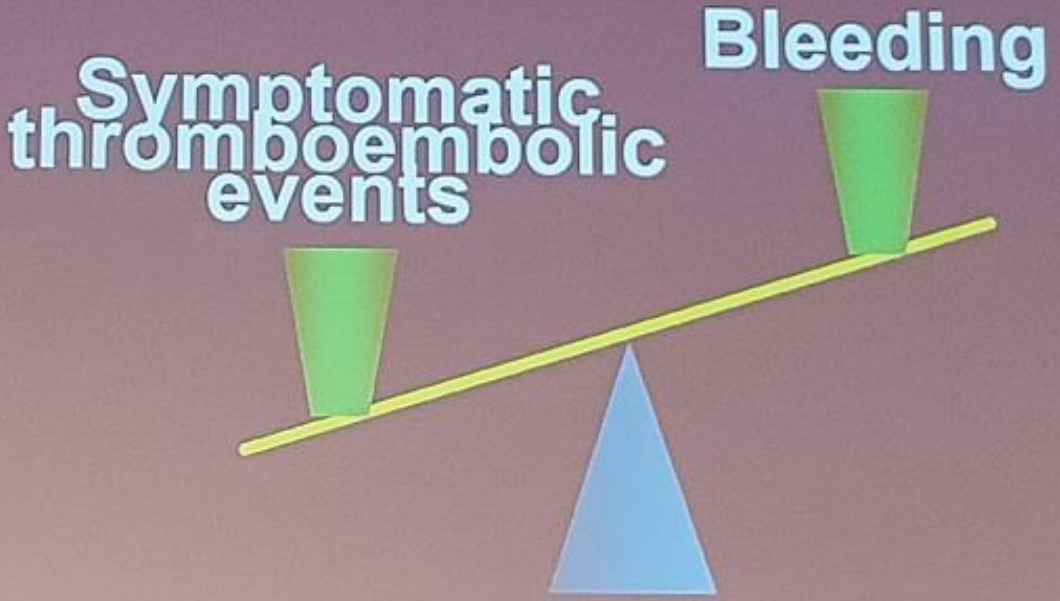
1 POINT	2 POINTS	3 POINTS	5 POINTS
Age 41–60 years	Age 61–74 years	Age ≥ 75 years	Stroke (< 1 month)
Minor surgery	Arthroscopic surgery	History of VTE	Elective arthroplasty
BMI > 25 kg/m2	Major open surgery (> 45 minutes)	Family history of VTE	Hip, pelvis, or leg fracture
Swollen legs	Laparoscopic surgery (> 45 minutes)	Factor V Leiden	Acute spinal cord injury (< 1 month)
Varicose veins	Malignancy	Prothrombin 20210A	
Pregnancy or postpartum	Confined to bed (> 72 hours)	Lupus anticoagulant	
History of unexplained or recurrent spontaneous abortion	Immobilising plaster cast	Anticardiolipin antibodies	
Oral contraceptives or hormone replacement	Central venous access	Elevated serum homocysteine	
Sepsis (< 1 month)		Heparin-induced thrombocytopaenia	
Serious lung disease, including pneumonia (< 1 month)		Other congenital or acquired thrombophilia	
Abnormal pulmonary function			
Acute myocardial infarction			
Congestive heart failure (< 1 month)			
History of inflammatory bowel disease			
Medical patient at bed rest			

Total:

Adaptation of the Caprini model by ACCP 2012

	Patient population						
	Patients undergoing major general thoracic or vascular surgery		Patients undergoing general surgery, including GI, urological, vascular, breast and thyroid procedures		Patients undergoing plastic and reconstructive surgery		
AT9 VTE risk category	Rogers score	Observed risk of symptomatic VTE, %	Caprini score	Observed risk of symptomatic VTE, %	Caprini score	Observed risk of VTE, %	Other surgical populations in risk category
Very low	<7	0.1	0	0	0–2	NA	Most outpatient or same-day surgery
Low	7–10	0.4	1–2	0.7	3–4	0.6	Spinal surgery for non-malignant disease
Moderate	> 10	1.5	3–4	1.0	5–6	1.3	Gynaecological non-cancer surgery Cardiac surgery Most thoracic surgery Spinal surgery for malignant disease
High	NA	NA	≥ 5	1.9	7–8	2.7	Bariatric surgery Gynaecological cancer surgery Pneumonectomy Craniotomy Traumatic brain injury Spinal cord injury Other major trauma

Risks and benefits of pharmacological VTE prophylaxis



Recognized risk factors for increased bleeding in surgical patients

- Bleeding disorders
- Concomitant use of anticoagulants or antiplatelet medications
- Renal failure (CC<30 mL/min)
- Severe liver failure
- Thrombocytopenia (<50,000/μL)
- High-risk situations
  - Multiple trauma, neurosurgery, spinal surgery…
  - Acute ulcerative gastrointestinal conditions

Muntz JE and Michota FAAm J Surg 2010; 199: 11s-20s

Surgical procedures associated with increased bleeding risk (ACCP 2012)

Procedure-specific risk factors
Abdominal surgery
Male sex, preoperative hemoglobin level <13 g/dL, malignancy and complex surgery defined as two or more procedures, difficult dissection, or more than one anastomosis[51]
Pancreaticoduodenectomy
Sepsis, pancreatic leak, sentinel bleed[57]
Hepatic resection
Number of segments, concomitant extrahepatic organ resection, primary liver malignancy, lower preoperative hemoglobin level and platelet counts[55]
Cardiac surgery
Use of aspirin[60]
Use of clopidogrel within 3 d before surgery[61]
BMI > 25 kg/m^2, nonelective surgery, placement of five or more grafts, older age[59]
Older age, renal insufficiency, operation other than CABG, longer bypass time[60]
Thoracic surgery
Pneumonectomy or extended resection[54]
Procedures in which bleeding complications may have especially severe consequences
Craniotomy
Spinal surgery
Spinal trauma
Reconstructive procedures involving free flap

CABG = coronary artery bypass graft.

Gould MK, *et al*. Chest. 2012;141 (2 Suppl):e227s-e277s

Use of risk-assessment models

- A risk-assessment model can be useful in
  - identifying the patients' risks of VTE
  - recommending appropriate prophylaxis
- The ideal risk-assessment model
  - accurately identifies patients at risk
    - highest-risk patients need the most protection
  - reliably excludes patients without a good risk/benefit ratio
  - is evidence-based and validated
  - has transparent methodology
  - is simple to use in clinical practice

VTE prophylaxis strategy

ACCP guidelines

1.2.1. For every general hospital, we recommend that a formal, active strategy that addresses the prevention of VTE be developed (Grade 1A).

1.2.2. We recommend that the local thromboprophylaxis strategy be in the form of a written,institution-wide thromboprophylaxis policy (Grade 1C).

ETICHETTA PAZIENTE

SCHEDA DI DEFINIZIONE DEL RISCHIO TROMBOEMBOLICO/EMORRAGICO IN CHIRURGIA ELETTIVA

CLASSIFICAZIONE DELL'INTERVENTO RISPETTO AL RISCHIO DI TVP *(Da Bahl; Ann. Surg. 2010,mod)*

CHIRURGIA A RISCHIO MINORE = 1 CHIRURGIA A RISCHIO MAGGIORE = 2
CHIRURGIA ORTOPEDICA MAGGIORE ARTI INFERIORI ED ONCOLOGICA ADDOMINO-PELVICA = 5
Si considerano empiricamente come chirurgia minore tutti gli interventi di durata < 45 minuti

FATTORI DI RISCHIO AGGIUNTIVI PER MALATTIA TROMBOEMBOLICA

Deboli: assegnare 1 punto per ogni Fattore di Rischio
- □ età 41-60 anni
- □ IMA
- □ edemi arti inferiori
- □ obesità (BMI>30)
- □ vene varicose
- □ insufficienza respiratoria o cardiaca cronica
- □ BPCO
- □ gravi patologie polmonari, inclusa polmonite (< 30 gg)
- □ infezioni gravi (sepsi) < 30 gg
- □ malattia infiammatoria cronica dell'intestino
- □ uso di estro/progestinici o terapia sostitutiva ormonale*
- □ pregressa chirurgia maggiore (< 30 gg)
- □ gravidanza e puerperio (<40 gg)
- □ paziente recentemente allettato

* il rischio si annulla dopo un mese dalla sospensione del trattamento con estrogeni, o progesterone ad alta dose.

Moderati: assegnare 2 punti per ogni Fattore di Rischio
- □ età 61-74 anni
- □ prolungata immobilità (≥ 3 gg)
- □ neoplasie in fase attiva
- □ apparecchio gessato arti inferiori
- □ presenza di catetere venoso centrale

Forti: assegnare 3 punti per ogni Fattore di Rischio
- □ età ≥75 anni
- □ storia personale o familiare di TEV (TVP,TEP)
- □ diatesi trombofilica congenita o acquisita

Molto Forti: assegnare 5 punti per ogni Fattore di Rischio
- □ ictus < 30 gg
- □ frattura di anca, bacino, arti inferiori
- □ politrauma < 30 gg
- □ lesione midollare acuta < 30 gg

CALCOLO PER LA VALUTAZIONE GLOBALE DEL RISCHIO TROMBOTICO : RISCHIO GLOBALE

Per calcolare il rischio globale, è necessario sommare i punteggi dei singoli box
- □ PUNTEGGIO 1 = BASSO
- □ PUNTEGGIO 2 = MODERATO
- □ PUNTEGGIO 3-4 = ELEVATO
- □ PUNTEGGIO ≥ 5 = MOLTO ELEVATO

RISCHIO EMORRAGICO (Da LG NICE 2010, mod)

- □ Emorragia in atto
- □ peso < 50 kg
- □ piastrinopenia < 75.000/µl
- □ Grave diatesi emorragica nota -(per esempio malattia di Von Willebrand, emofilia)
- □ PT prolungato (INR > 1,5) oppure aPTT prolungato (ad eccezione della sindrome da anticorpi antifosfolipidi)
- □ insufficienza renale severa (clearance creatinina < 30 ml/min)
- □ ipertensione sistolica non controllata (≥230/120 mmHg)
- □ concomitante assunzione di farmaci interferenti con l'emostasi (es. antiaggreganti, FANS)

MISURE DI PREVENZIONE CONSIGLIATE (Da LG ACCP, 2008, mod)

RISCHIO TROMBOTICO BASSO Nessuna profilassi farmacologica
- □ DEAMBULAZIONE PRECOCE
- □ CALZE ELASTICHE ANTI-TROMBO (SOLO IN CASI SELEZIONATI)

RISCHIO TROMBOTICO MODERATO
FARMACO: □ FRAGMIN 2500 /CLEXANE 2000 1 fl s.c/24 ORE 1^ DOSE: □ OLTRE 6 ORE DOPO L'INTERVENTO
DURATA: □ ALMENO 7 GIORNI (PROSEGUENDO FINO A COMPLETA MOBILIZZAZIONE)

RISCHIO TROMBOTICO ELEVATO
FARMACO: □ FRAGMIN 5000/CLEXANE 4000 1 fl s.c/24 ore 1^ DOSE: □ 12 ORE PRIMA O 12 ORE DOPO L'INTERVENTO
□ ARIXTRA 2,5 mg/24 ore 1^ DOSE: □ 6-8 ORE POST-INTERVENTO
DURATA: □ ALMENO 7 GIORNI (PROSEGUENDO FINO A COMPLETA MOBILIZZAZIONE)
□ 4-5 SETTIMANE POST-OP. (PROTESI ANCA, GINOCCHIO, FRATT. FEMORE, CHIR. ONCOLOGICA ADDOME e PELVI

* Nei pazienti a RISCHIO TROMBOTICO MOLTO ELEVATO, UTILE ASSOCIARE PROFILASSI MECCANICA:
- □ CALZA ANTITROMBO
- □ COMPRESSIONE PNEUM. INTERM.
- □ FILTRO CAVALE

RISCHIO TROMBOTICO MODERATO/ELEVATO E CONTROINDICAZIONI ALLA TERAPIA ANTICOAGULANTE
- □ Utilizzo della sola profilassi meccanica
- □ Inizio post-operatorio della EBPM
- □ Utilizzo di dose ridotta di EBPM oppure di fondaparinux (1.5 mg in pazienti con clear.creatinina 20-50 ml/min)

Per i pz sottoposti a Chirurgia Oculistica, Dermatologica e Odontostomatologica (Grading chirurgico basso senza indicazione alla profilassi), si propone di profilassare solo i pazienti che mostrano criteri di rischio aggiuntivi specifici e che non si prevede siano mobilizzabili immediatamente. Altrettanto, per i pazienti sottoposti a chirurgia ORL, verosimile basso rischio tromboembolico e spesso non trascurabile rischio emorragico (pz interventi di tonsillectomia), si propone di sottoporre a profilassi solo gli interventi di tipo Oncologico o quelli per patologia traumatica di durata > 45 min. In caso di problematiche cliniche di particolare complessità o in caso di uso di dabigatran, rivaroxaban in protesi di anca e ginocchio, è indicata (a giudizio clinico) visita specialistica.

DATA_____ FIRMA_____

Prevention of VTE in Surgical Patients

- Optimal thromboprophylaxis in surgical patients will consider the risks of VTE and bleeding complications as well as the values and preferences of individual patients.

Falck-Ytter, Chest , 2012

VTE prophylaxis

- Pharmacological prophylaxis

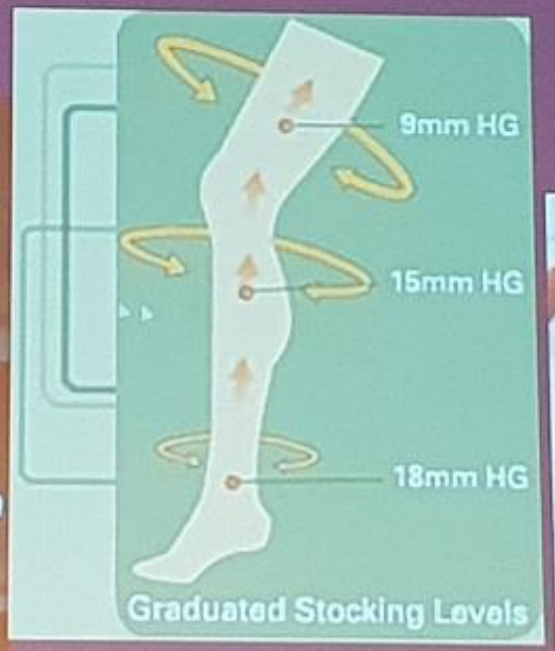
- Aspirin
- VKAs
- UFH
- LMWHs
- Fondaparinux
- New anticoagulants (dabigatran, rivaroxaban, apixaban, edoxaban)

- Mechanical prophylaxis

- Early deambulation
- ES, IPC
- IVCFs

VTE prevention: mechanical methods

Passive



Active

ESA guidelines on perioperative VTE prophylaxis

- In patients with contraindications to pharmacological prophylaxis, we recommend the use of mechanical thromboprophylaxis with IPC or GCS (Grade 1B) and suggest the use of IPC over GCS (Grade 2B).

- We suggest combined mechanical and pharmacological prophylaxis in selected patients at very high risk for VTE (Grade 2B). We suggest the use of IPC rather than GCS in selected high risk patients in addition to pharmacological prophylaxis Grade 2B).

Afshari, Eur J Anaesthesiol, 2018

Prescribe pharmacologic prophylaxis to all patients or to selected patients with major trauma

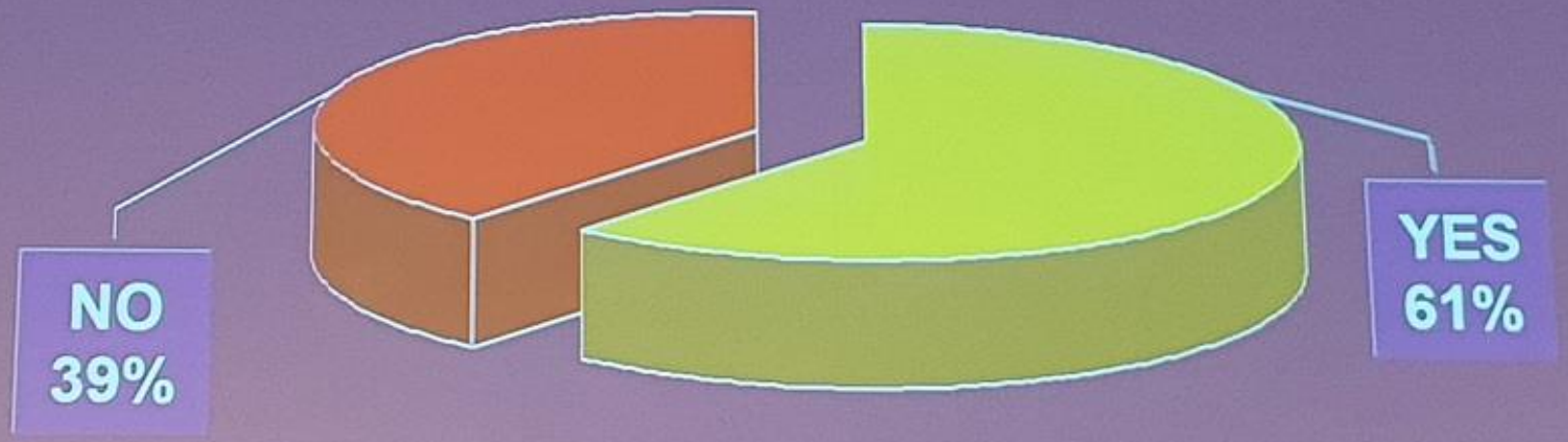
Imberti, Pathophysiol Haemost Thromb, 2005

Conditions considered to be relevant to decide the prescription of anticoagulant prophylaxis in patient with major trauma

Concomitant diseases at risk for VTE	64.1%
Age > 40	46,9%
Previous episode of VTE	46,9%
Varicose veins	46,9%
Obesity	37,5%
Absence of haemorrhagic contraindications	34,4%
Known thrombophilia	28,1%
Surgical intervention associated	20,3%
Oestrogen therapy	17,2%
Other	17,2%

Imberti, Pathophysiol Haemost Thromb, 2005

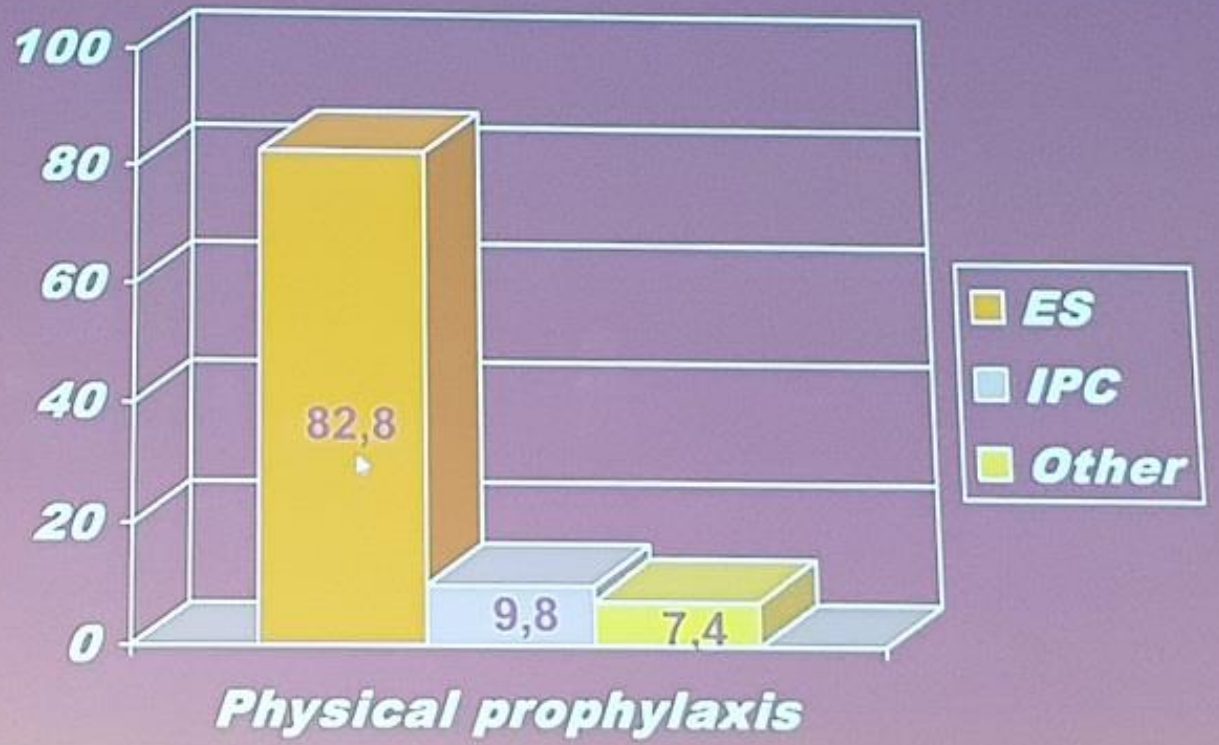
A survey of thromboprophylaxis management in patients with major trauma



Prescription of mechanical prophylaxis

Imberti, Pathophysiol Haemost Thromb, 2005

A survey of thromboprophylaxis management in patients with major trauma

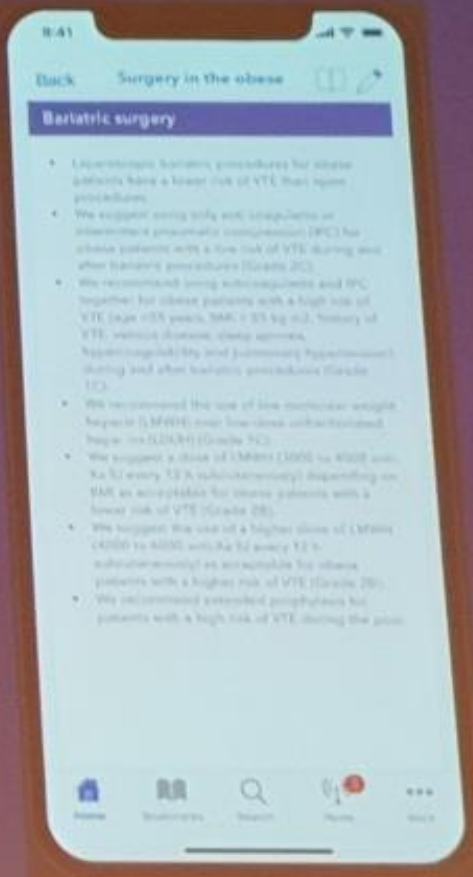


Imberti, Pathophysiol Haemost Thromb, 2005

Conclusions

- VTE is in important epidemiogical and clinical problem
- Surgical patients have a high VTE risk (and often an associated high bleeding risk)
- Overall guidelines adherence in the daily clinical practice is low (especially for mechanical methods)
- The use of mechanical thromboprophylaxis must be strongly encouraged by education, training and communication programs
- In all the hospitals a written, active strategy about the prophylaxis of VTE should be developed

The VTE risk assessment App by the ESA



Available soon