SAWA UNIVERSITY

أسس العناية المركزة/الكورس الاول

DVT PROPHYLAXIS /LEC 5

جامعـــــــة ســـــــــاوة الاهلية — Sawa University

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.....المرحلـــــــــــــة ..الثالثة — .....3..... Stage

استاذ المادة : ....د ضي عبد الكريم.....

نظـــــــري — Theoretical

محاضرة رقم ...3.... — Lecture No. .....3..

DVT PROPHYLAXIS IN ICU

Contents:

- Definition
- Incidence
- Pathogenesis and risk factors
- Risk assessment
- Methods of prophylaxis
- Protocol

Definition:

- **VTE**

deep vein thrombosis [DVT] and/or pulmonary embolus [PE]

Incidence:

- VTE is the 3rd most common cause of cardiovascular death after myocardial infarction and ischemic stroke in all patients.

- occurs in 4 to 15% of patients admitted to ICUs despite the routine use of pharmacological prophylaxis.

- VTE prophylaxis does not eliminate the risk of VTE or VTE-related death in hospitalized patients.

High risk populations:

■ICU patients

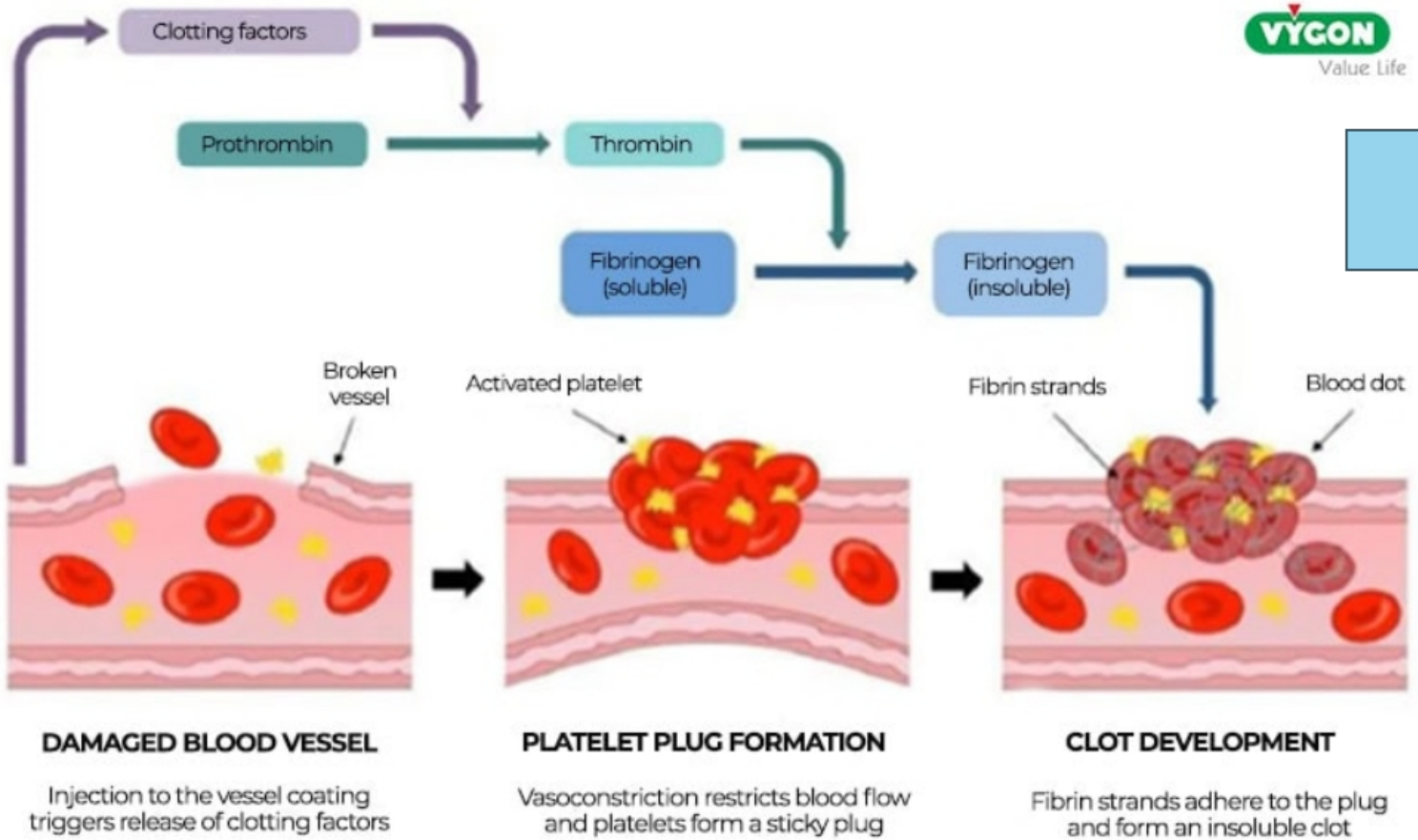
- Especially neurocritical ICU due to :

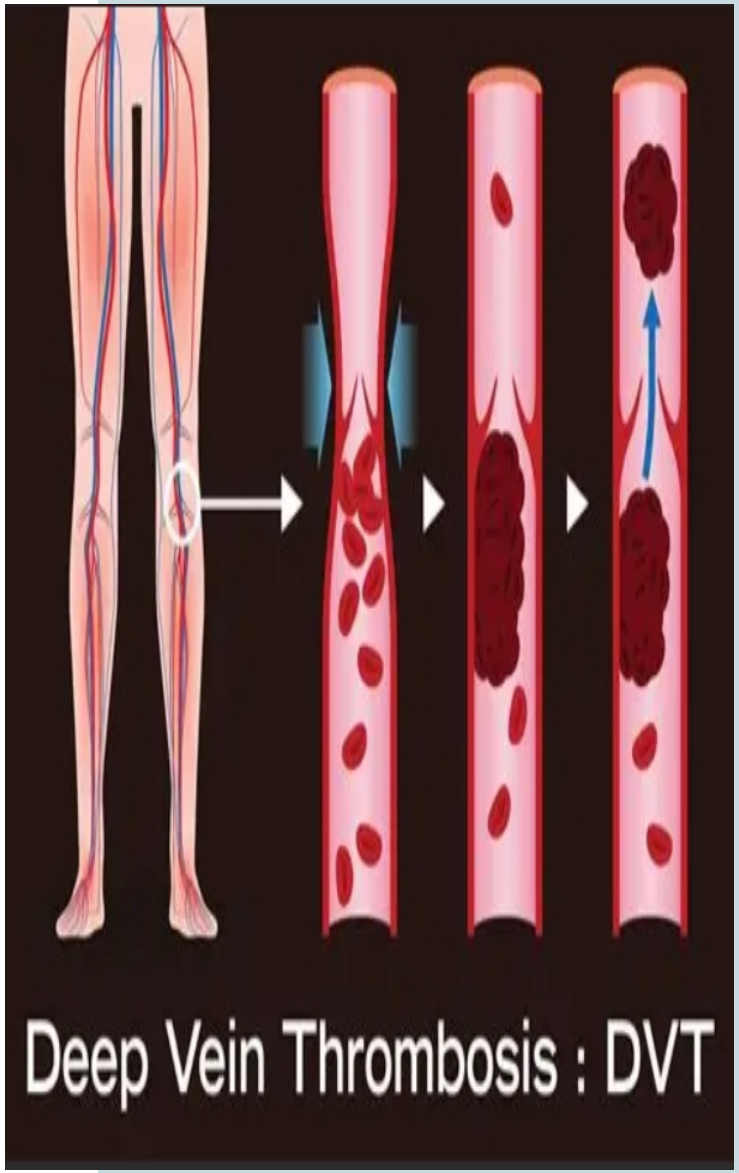
  -increased venous stasis from paralysis and prolonged coma.

  -Brain neoplasms and stroke can also cause endothelial activation and promote thrombosis.

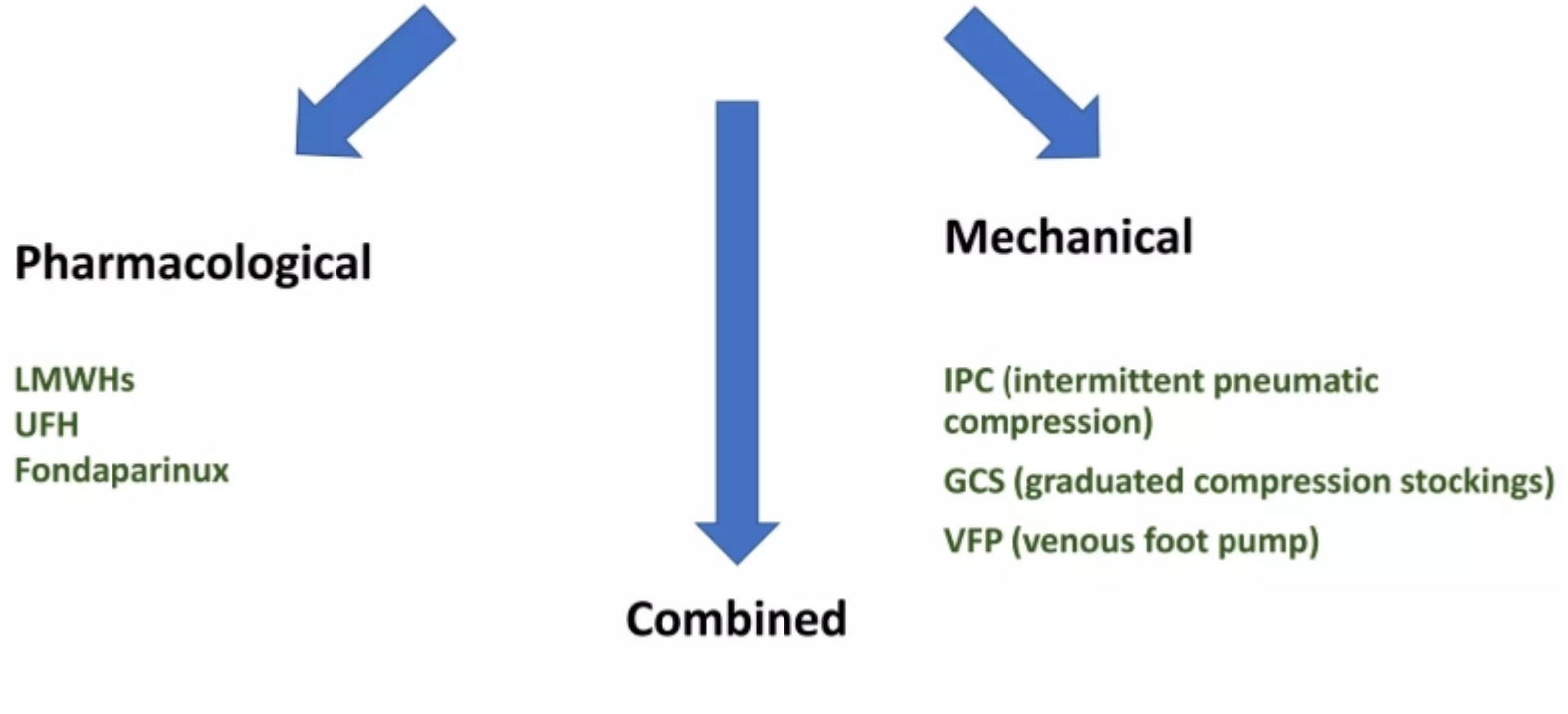
■Others : Cancer , Stroke, Pregnancy.

Pathogenesis , Causes and risk factors:


Clotting factors
Prothrombin
Thrombin
Fibrinogen (soluble)
Fibrinogen (insoluble)
VYGON
Value Life
Broken vessel
Activated platelet
Fibrin strands
Blood dot
DAMAGED BLOOD VESSEL
Injection to the vessel coating triggers release of clotting factors
PLATELET PLUG FORMATION
Vasoconstriction restricts blood flow and platelets form a sticky plug
CLOT DEVELOPMENT
Fibrin strands adhere to the plug and form an insoluble clot


Deep Vein Thrombosis : DVT

METHODS OF THROMBOPROPHYLAXIS



Selection of method of prophylaxis:

Depends on:

- Risk of thrombosis
- Risk of bleeding
- Underlying comorbidities
- Institutional policy
- Preferences and values of the patient
- Cost

Thrombosis risk assessment:

Medical patients:

-Padua
-IMPROVE
-Geneva

Surgical patients:

-Modified Caprini

Thrombosis risk assessment:

Geneva score:

Calculator: Geneva risk score for venous thromboembolism in hospitalized adult me patients

- Heart failure (2 points)
- Respiratory failure (2 points)
- Recent (<3 months) stroke (2 points)
- Recent (<4 weeks) myocardial infarction (2 points)
- Acute infectious disease (2 points)
- Acute rheumatic disease (2 points)
- Active cancer (2 points)
- Myeloproliferative disorder (2 points)
- Nephrotic syndrome (2 points)
- Prior venous thromboembolic disease (2 points)
- Known hypercoagulable state (2 points)
- Immobilization (>3 days) (1 point)
- Recent travel (>6 hours duration) (1 point)
- Age >60 years (1 point)
- Body mass index (BMI) >30 kg/m^2 (1 point)
- Chronic venous insufficiency (1 point)
- Pregnancy (1 point)
- Hormonal therapy (estrogenic hormones) (1 point)
- Dehydration (1 point)

Total criteria point count: 0

Reset form

Geneva risk score interpretation

0 to 2 points:	Lower risk; 0.8 percent 30-day risk of symptomatic VTE or VTE-related mortality*
3 to 30 points:	Higher risk; 3.5 percent 30-day risk of symptomatic VTE or VTE-related mortality*

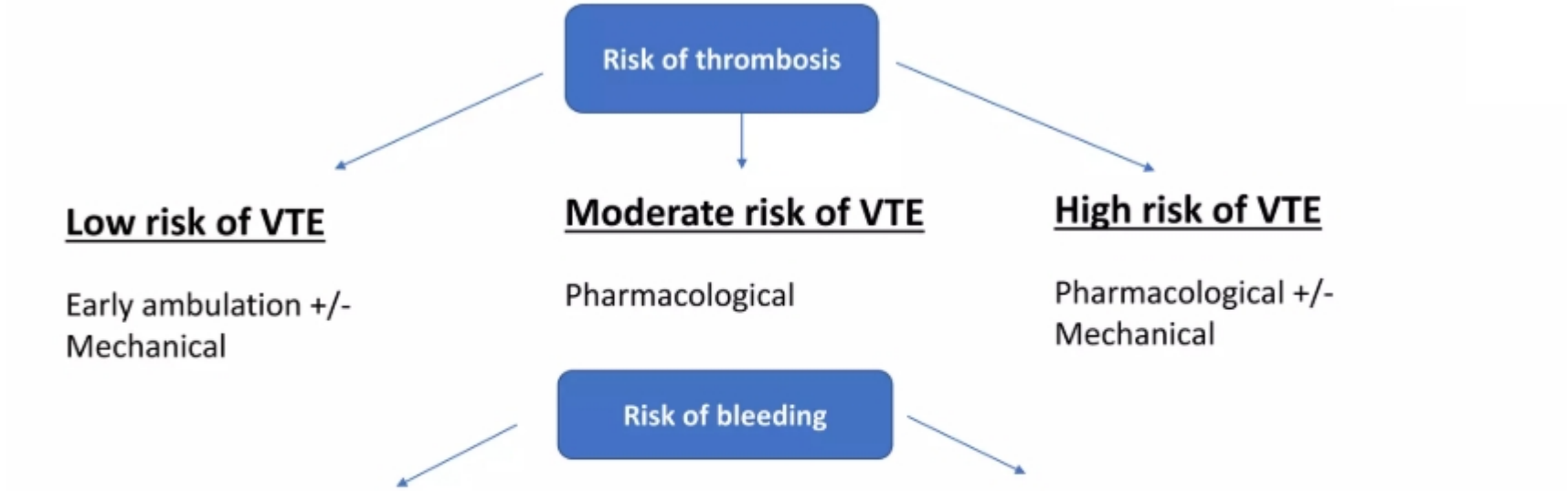
Bleeding risk assessment:

Examples of patients at high risk of bleeding (pharmacologic thromboprophylaxis is contraindicated):

-active bleeding.
-intracranial hemorrhage.
-thrombocytopenia (eg, platelet count <50,000/microL or < 100,000/microL plus additional risk factors for bleeding).
-moderate or severe coagulopathy.
-severe bleeding diathesis.
-surgical procedures with high bleeding risk.

(Epistaxis and menstrual bleeding are not contraindications to pharmacologic thromboprophylaxis).

Selection of method of thromboprophylaxis:



Pharmacologic thromboprophylaxis:

LMWH - UFH - Fondaparinux

- superior to placebo or mechanical devices.

- In general: LMWHs is superior to UFH particularly in high risk populations (ICU patient , cancer , stroke).

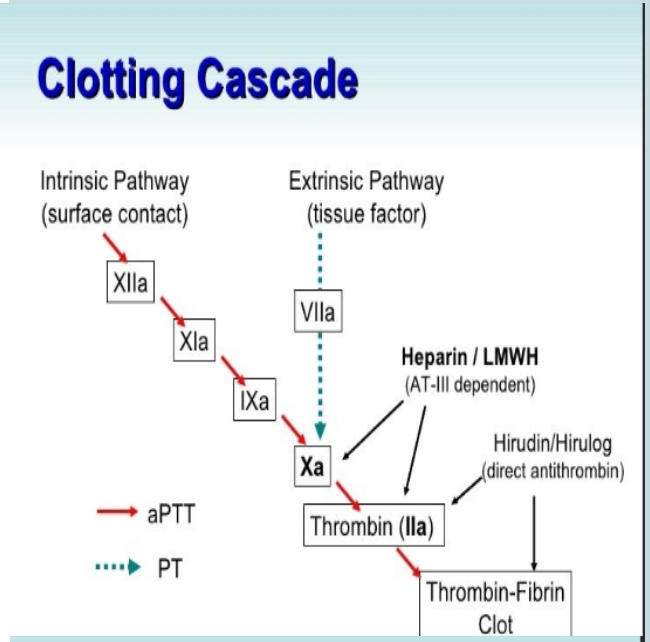
… BUT in aSAH patients UFH is considered to be safer regarding rates of bleeding.

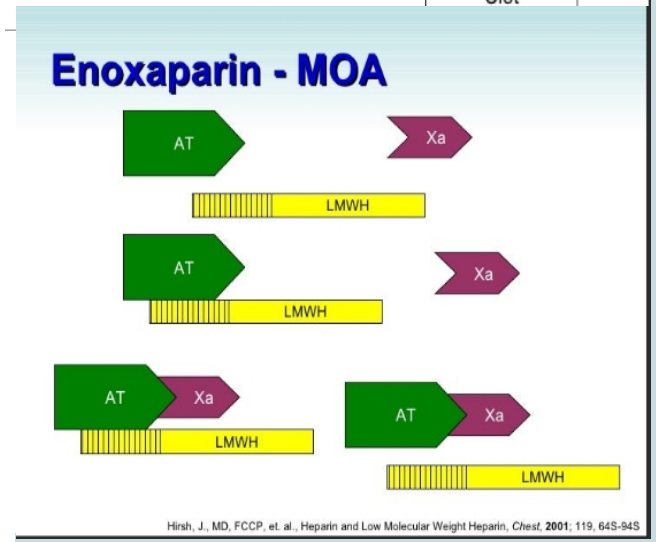
Pharmacologic thromboprophylaxis:
LMWH:

Dosing:

Suggested prophylactic doses: (creatinine clearance >30mL/minute and no extremes in body weight):

- Enoxaparin *(Clexane)* 40 mg S.C. OD.
- Dalteparin *(Fragmin)* 5000 units S.C. OD.
- Tinzaparin *(Innohep)* 4500 anti-Xa units S.C. OD.
- Nadroparin *(Fraxiparine)* 3800 anti-Xa units S.C. OD (≤70 kg)
  5700 units S.C. OD (>70 kg)





Pharmacologic thromboprophylaxis:

LMWHs:

Precautions:

HIT

- Contraindicated in HIT
- platelet count should be monitored regularly (eg, day 5 and 9) to detect the development of HIT.

Renal impairment: (creatinine clearance <30 mL/min)

- some experts prefer to avoid LMWHs.(as drug accumulation may occur)
- other experts use tinzaparin and dalteparin .
- Enoxaparin if used, dose reduction is needed.
- If severe renal insufficiency develop → discontinue LMWH & use UFH.
- If used → monitoring of anti-Xa activity (if >0.4 IU/ml means drug accumulation).

Pharmacologic thromboprophylaxis

Low dose unfractionated heparin

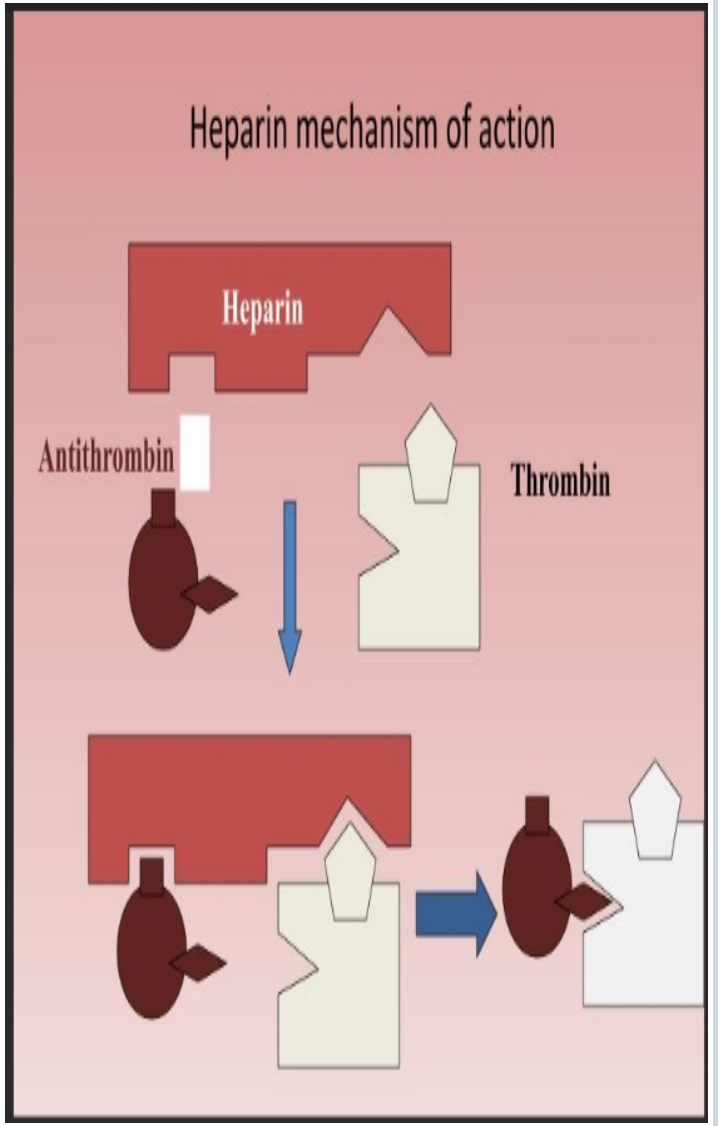
Dosing:

- 5000 units S.C. BD or TDS.
- Frequency of dosing may depend on:

  body weight - risk of bleeding - institutional policy.

Precautions:

- Contraindicated in HIT.
- platelet count should be monitored regularly (eg, days 5 and 9).
- No renal dose adjustment.



Pharmacologic thromboprohylaxis

Fondaparinux

Dosing:

- 2.5 mg S.C. OD.
- Very little data are available to support its routine use.

Precations:

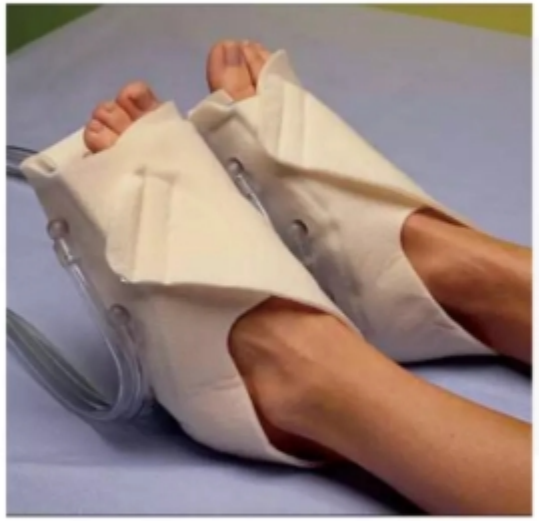
- **Renal impairment :**

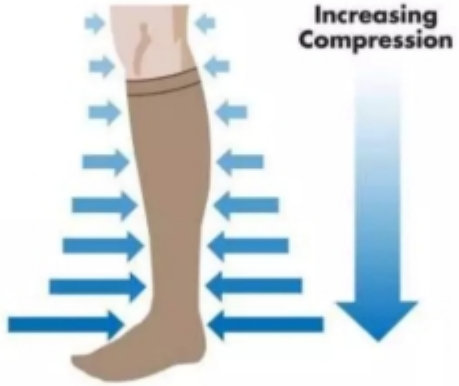
  Creatinine clearance 30-50 ml/min → reduce dose to 1.5 mg

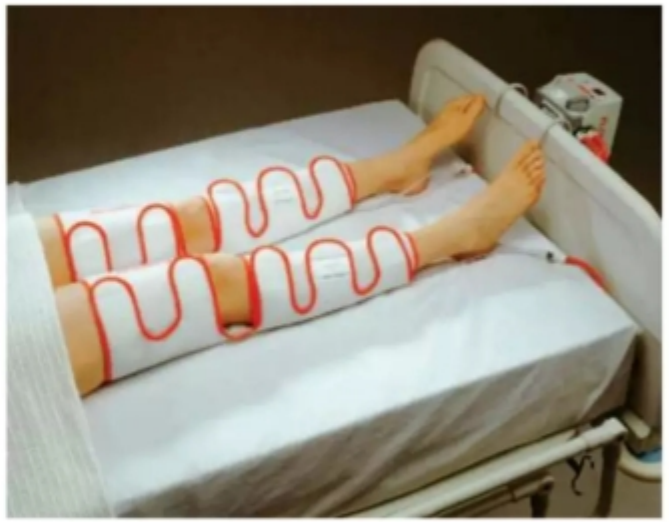
  Creatinine clearance < 30 ml/min → Avoid.

- Can be used in **HIT**.

Mechanical methods of thromboprophylaxis







Mechanical methods of thromboprophylaxis:

Uses:

- High risk of bleeding or if anticoagulation is contraindicated.

(eg, gastrointestinal or intracranial hemorrhage, perioperative)

- Transition to a pharmacologic agent should be considered as soon as the bleeding risk becomes acceptably low or has been reversed.

Contraindications:

skin : cellulitis, dermatitis, burns, ulcers, wounds, fragility.

vessels : ischemia, gangrene, recent vasular surgery, acute DVT.

others : leg malignancy, deformity, allergy.

Mechanical methods of thromboprophylaxis

Intermittent pneumatic compression

Mechanism of action:

- enhances blood flow in the deep veins of the legs, thereby preventing venous stasis.
- increases endogenous fibrinolytic activity by reducing plasminogen activator inhibitor-1 (PAI-1).

Mechanical methods of thromboprophylaxis

Graduated compression stockings and venous foot pump

- Evidence points to a reduction of DVT by GCS & VFP in **surgical patients**, whereas little evidence supports any indication for their use in **medical patients or patients in ICU.**

- GCS can lead to skin complications (ulcer / necrosis).

- Consequently, their routine use is questionable.
- In patients at low risk of VTE, no prophylaxis is preferred over GCS.

Combined methods:

Pharmacologic + Mechanical:

- reserved only for those considered to be at the **highest** risk of VTE only but not for routine use.
- Although there are a paucity of high quality studies comparing combined methods to pharmacologic prophylaxis alone, data in general suggest that combining methods of thromboprophylaxis offers additional protective benefit against the development of VTE.

2 Mechanical methods:

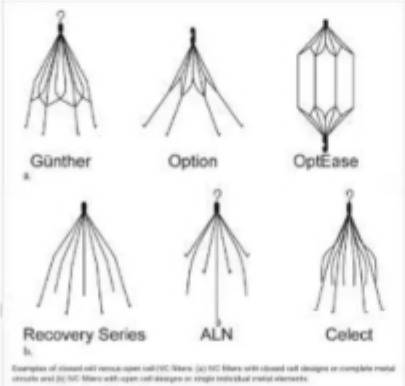
- IPC is the typical method used but data to support their use over graduated compression stockings or VFP devices are limited.

IVC Filters:

- No strong evidence support its efficacy and safety.
- Temporary IVC filter placement maybe considered in:

  - documented recent DVT + absolute contra-indication for full anticoagulation. (Grade 2C)

  - in patients at high risk of VTE + pharmacological and mechanical thromboprophylaxis are fully contraindicated (Grade 2C).



Any questions?

QUIZ