Thrombocytopenia

Prepared by
Mrs Reshma V S
Department of medical surgical nursing
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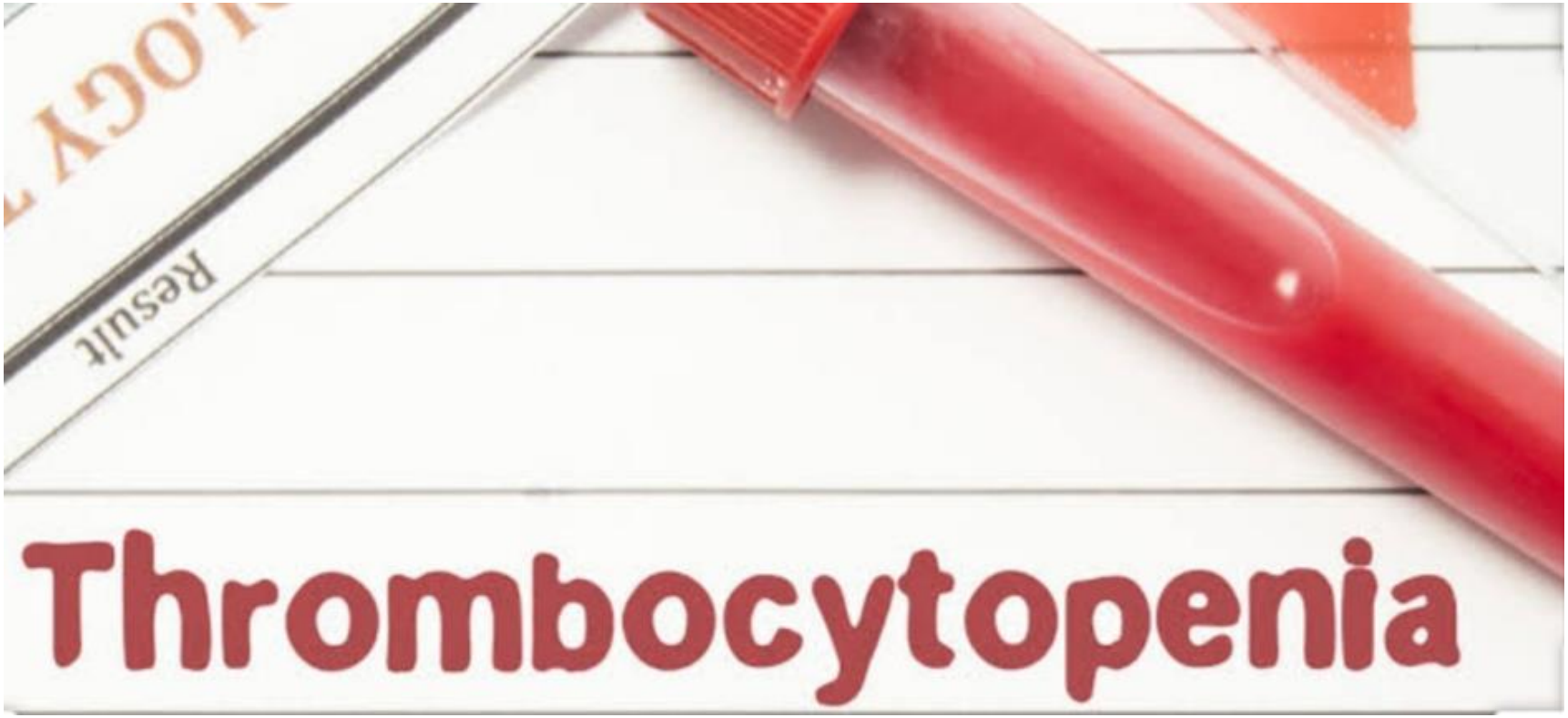

Result
Thrombocytopenia

Thrombocytopenia

- Defined as a subnormal amount of platelets in the circulating blood.
- Normal platelet count : 150,000 to 450,000/microL. Thrombocytopenia is defined as a platelet count less than 150,000/microL (150 x 10(9)/L).
- Not usually clinically detected until the platelet count falls to levels below 100,000/microL . However, a recent fall in the platelet count by 50%, while still in the normal range, may herald severe clinical problems → requires active follow-up. eg: HIT .
- 1/3 of platelets are sequestered in the spleen.
- Half life of a platelet is 9 to 10 days.
- Platelet production is the function of the multinucleated megakaryocyte.
- 15 to 45 K platelets are produced daily to maintain steady state

Thrombocytopenia

- Thrombocytopenia is a platelet count less than 150,000.
- There may be no symptoms and low platelets may simply found on routine CBC OR patients may bleed profusely
- Platelet counts at 20-50 are associated with mucocutaneous bleeding and less than 10 is associated with spontaneous intracerebral hemorrhage.

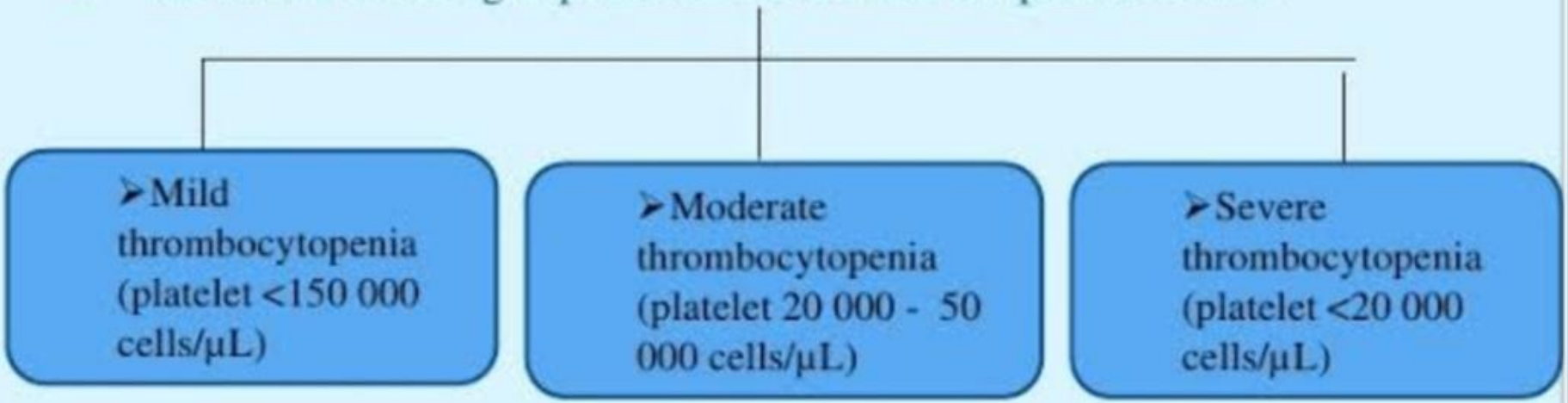
What is thrombocytopenia?

"thrombocytes" – platelets ; "penia" – lack of something

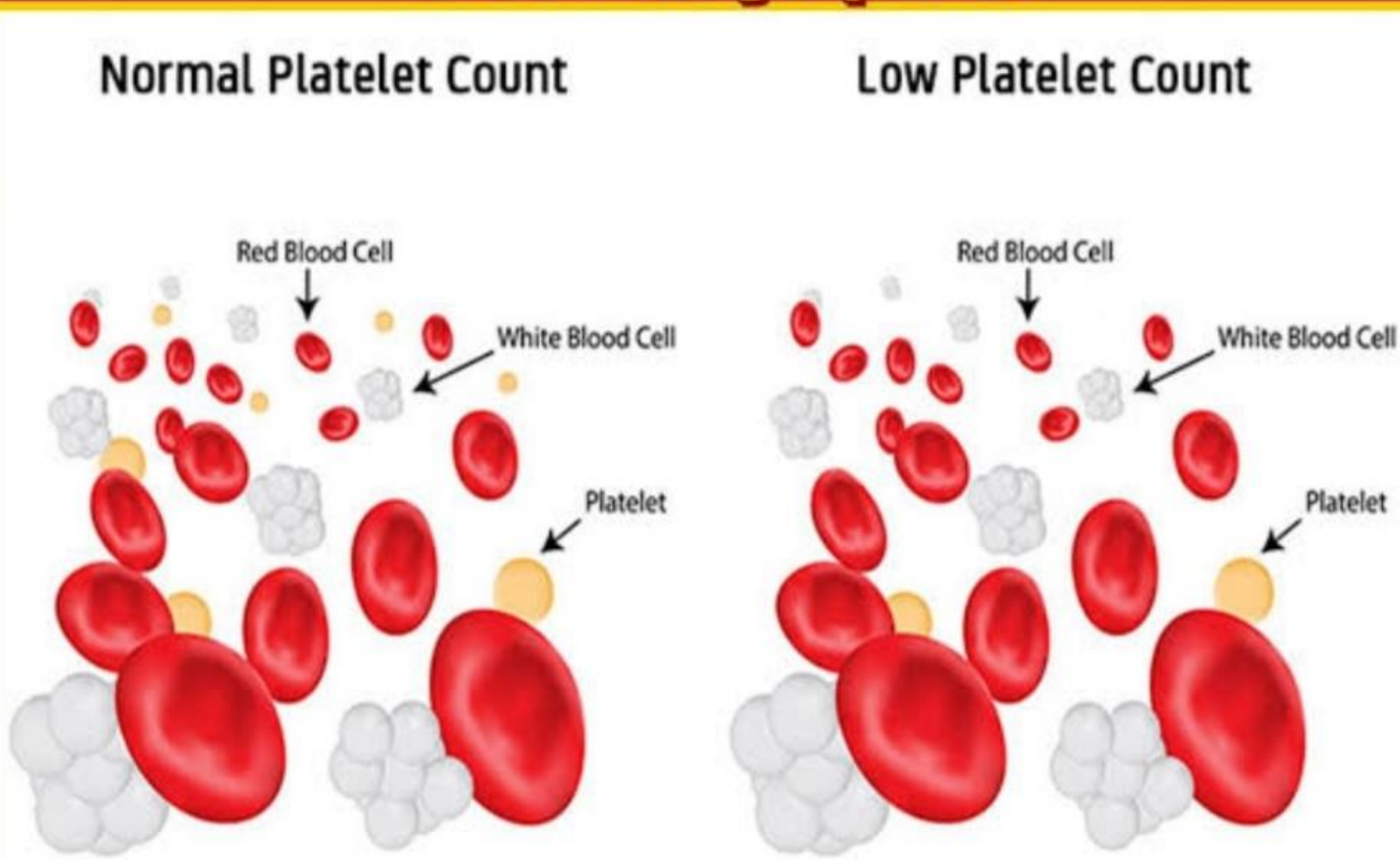
- Body attacks and destroys platelets
- Abnormally low amount of platelets
- Decreased platelet levels = blood cannot clot, and bleeding from minor injuries cannot be stopped
- Leads to nose bleeds, gum bleeds, and bruises

THROMBOCYTOPENIA

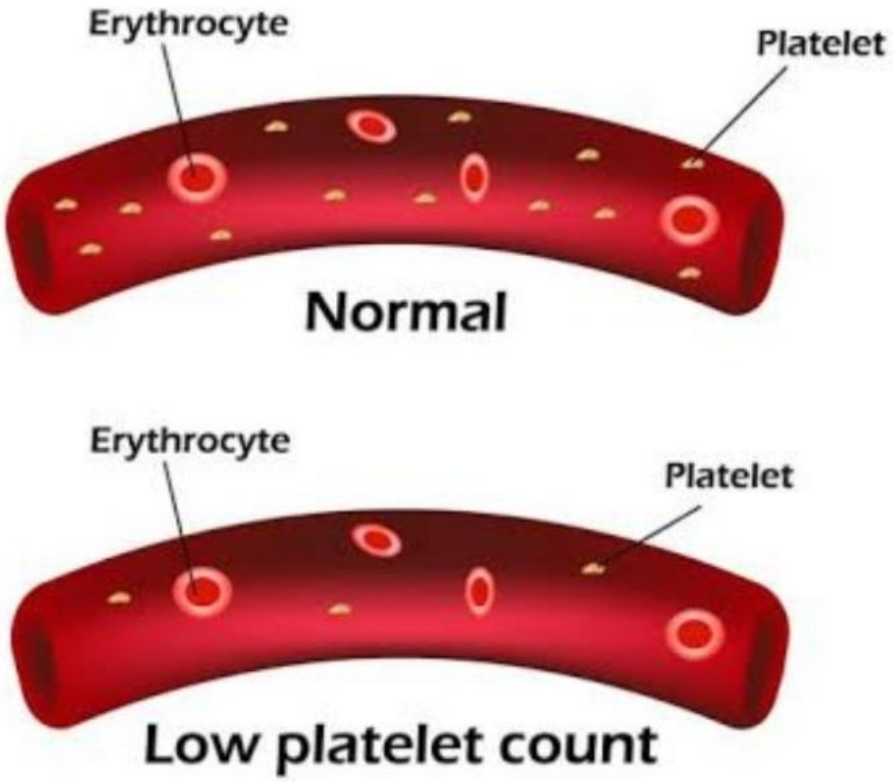
- Defined as reduced in the platelet count< 150, 000µL that characterized by spontaneous bleeding, a prolonged bleeding time, and a normal PT and PTT.
- The risk of bleeding depends on the level of the platelet count:



Thrombocytopenia



Thrombocytopenia



Causes of thrombocytopenia

increased destruction

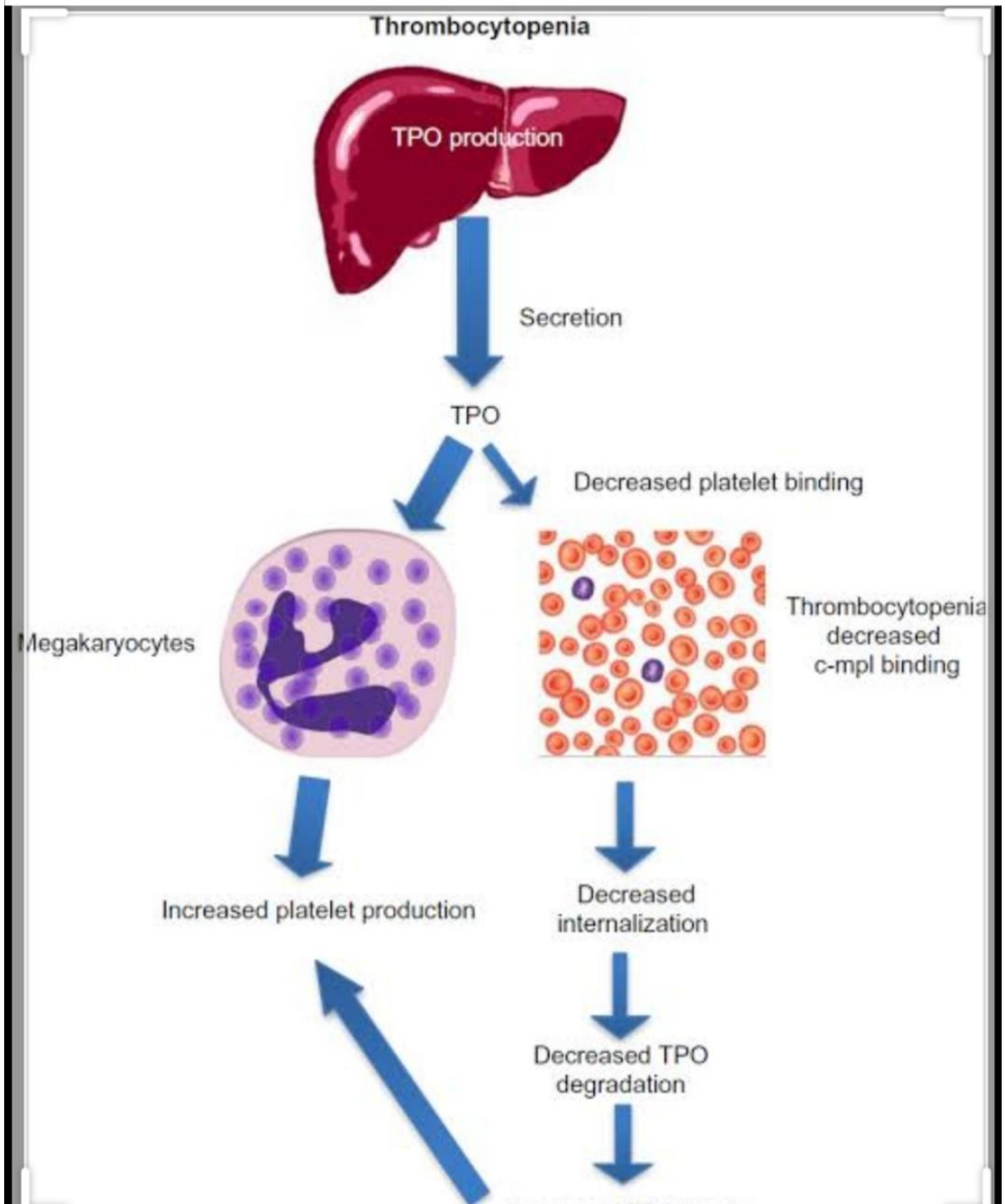
- Immune mechanism
  - ✓ Iodopathic (ITP)
  - ✓ Secodary to infection, drugs, SLE
- Non-immune mechanism
  - ➢ ⬆ platelet consumption
    - ✓ DIC ,HUS
    - ✓ microangiopathic hemolytic anemia
  - ➢ ⬆ platelet destruction
    - ✓ Hypersplenism , drugs
    - ✓ Prothetic heart valve
  - ➢ sequesteration
    - ✓ Large spleen

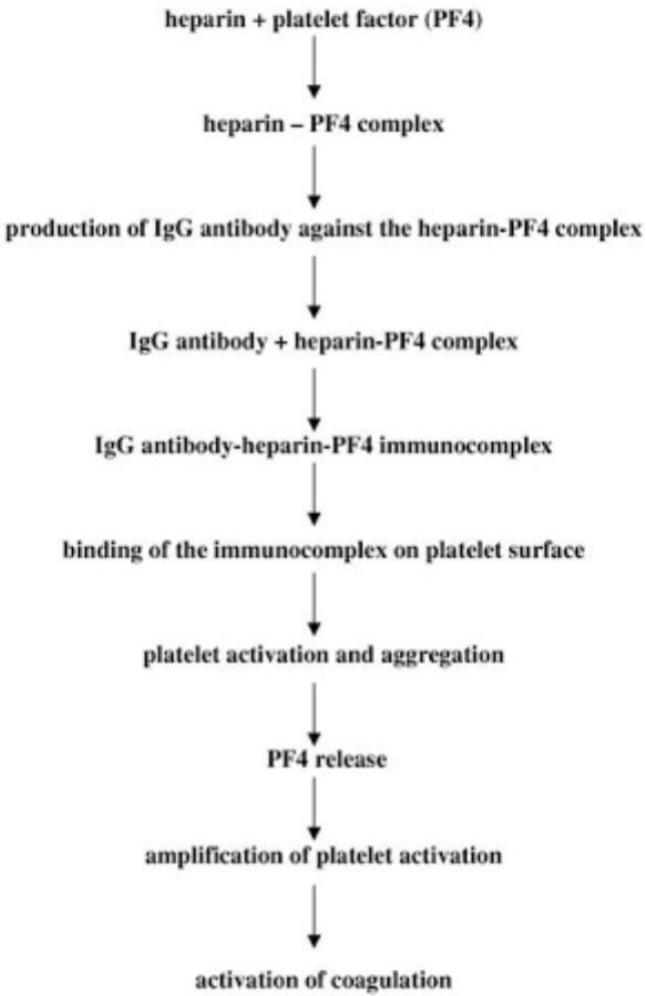
Decreased production

- Bone marrow depression
  - ➢ Hereditary
    - ✓ Fanconi anemia
    - ✓ TAR syndrome
  - ➢ Acquired
    - ✓ Drugs , chemotherapy
    - ✓ Inefction, hepatitis ,HIV ,EBV
- Bone marrow infiltration
  - ✓ Leukemia ,neuroblastoma
  - ✓ Storage disease

Medications that can induce thrombocytopenia[3]

- Abciximab
- Captopril
- Cilastatin/imipenem
- Clopidogrel
- Dactinomycin/ actinomycin
- Digoxin
- Dipyridamole
- Drospirenone/ ethinylestradiol
- Eptifibatide
- Famotidine
- Fluconazole
- Furosemide
- Gentamicin
- Hydrochlorothiazide/ triamterene
- Meropenem
- Phenytoin
- Piperacillin
- Quinine
- Spironolactone
- Tirofiban
- TNF-alpha/INF-gamma
- Trimethoprim/ sulfamethoxazole
- Vancomycin
- Vaccines: Hepatitis B and influenza


Thrombocytopenia
TPO production
Secretion
TPO
Decreased platelet binding
Megakaryocytes
Thrombocytopenia
decreased
c-mpl binding
Increased platelet production
Decreased
internalization
Decreased TPO
degradation


heparin + platelet factor (PF4)
heparin – PF4 complex
production of IgG antibody against the heparin-PF4 complex
IgG antibody + heparin-PF4 complex
IgG antibody-heparin-PF4 immunocomplex
binding of the immunocomplex on platelet surface
platelet activation and aggregation
PF4 release
amplification of platelet activation
activation of coagulation

Thrombocytopenia

Clinical Manifestations

- Patients are often asymptomatic.
- Most common symptom is mucosal or cutaneous bleeding.
  - Petechiae – microhemorrhages
  - Purpura – bruise from numerous petechiae
  - Ecchymoses – larger lesions from hemorrhage

- Prolonged bleeding after routine procedures
  - Internal bleeding may manifest as weakness, fainting, dizziness, tachycardia, abdominal pain, or hypotension.
  - Hemorrhage is a major complication.
    - Insidious or acute
    - Internal or external

Clinical Manifestations-Thrombocytopenia

- Thrombocytopenia is usually mild-mod
- Often complicated by thrombosis
- Platelet count begins to fall 5-10 days after receiving heparin
- Median platelet count falls to 60,000/mcL
  - 60% moderate 30,000-100,000
  - 20% severe <30,000
  - 20% mild >100,000
- Typical drug-induced thrombocytopenia <20,000

THROMBOCYTOPENIA SIGNS AND SYMPTOMS

- Easy or excessive bruising (purpura)
- Superficial bleeding into the skin that appears as a rash on lower legs
- Prolonged bleeding from cuts
- Bleeding from your gums or nose
- Blood in urine or stools
- Unusually heavy menstrual flows
- Fatigue
- Enlarged spleen
- Jaundice

HEPARIN-INDUCED THROMBOCYTOPENIA

Clinical manifestations

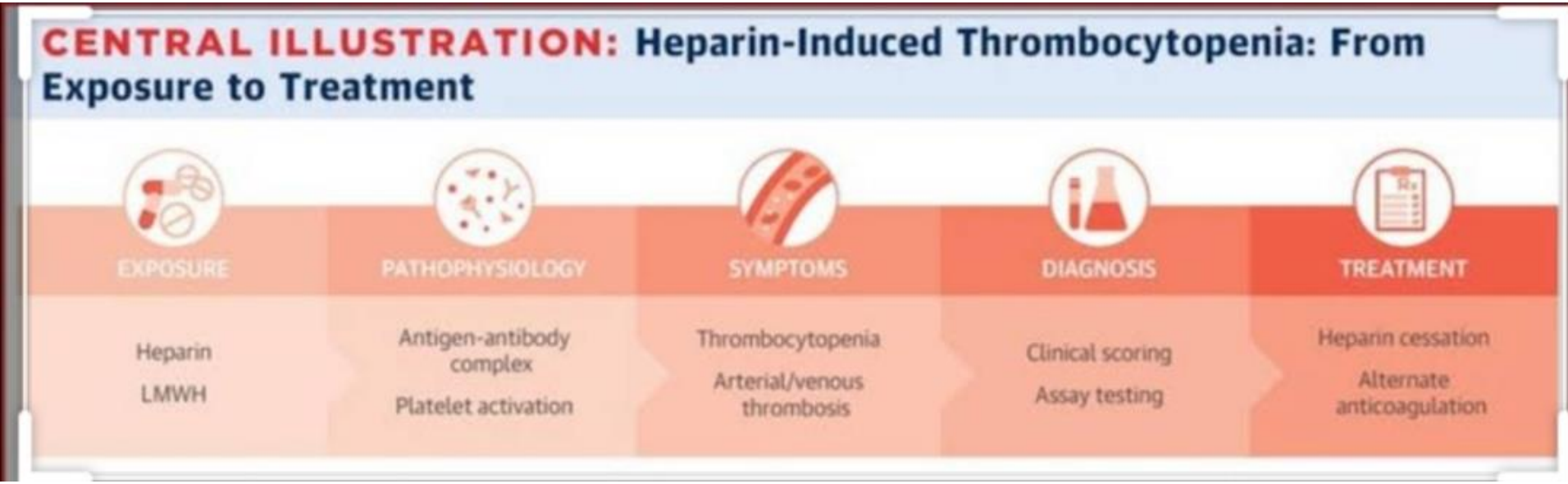
- Isolated thrombocytopenia ("Isolated HIT")
- Arterial or venous thrombosis (HITT)
  - DVT, PE, MI, stroke, peripheral arterial occlusion
- DIC, microangiopathic hemolytic anemia
- Skin necrosis (at injection sites or distant)
- Venous limb gangrene (? Role of warfarin)
- Sudden death
- ARDS
- Hemorrhagic adrenal infarction

Drug induced thrombocytopenia

- Antibody against new epitopes of platelet glycoprotein.
- Moderate to severe thrombocytopenia.
- Drop in platelet count within 2-3 days upto 1-3 weeks.
- Recovery in 5-10 days after drug stoppage
- Should be suspected when patient has recurrent episodes of thrombocytopenia with prompt recovery.

Confirm true Thrombocytopenia	• If platelet clumps seen on smear, repeat blood draw in non-EDTA collection tube
Is the patient bleeding?	• Platelet goal > 50 x 10^9 cells/L in non-CNS bleeding
Consider a TMA	• Evidence of hemolysis and schistocytes? • If yes, consider both primary and secondary TMA syndromes
Careful medication review	• Typical platelet fall 5 - 7 days after medication initiation • Inquire about heparin exposure within the past 100 days
Is the patient septic?	• Contributing cause in up to 75% of ICU patients
Consider hemodilution	• Common in the setting of massive transfusion
Are support devices contributing?	• Present in ≅25% of patients on VV-ECMO and 50% on IABP

CENTRAL ILLUSTRATION: Heparin-Induced Thrombocytopenia: From Exposure to Treatment



Treatment of Thrombocytopenia

- Any precipitating cause should be treated appropriately
- All possible medications should be discontinued, including heparin, quinine, and other drugs known to be associated with thrombocytopenia
- Drugs that might interfere with platelet function (ie, aspirin) should be avoided
- If the thrombocytopenia is not severe and there is no evidence of bleeding, the patient may be observed
- Corticosteroids or intravenous immunoglobulin may be given for suspected immune thrombocytopenia
- If the patient is severely thrombocytopenic and there is evidence of bleeding, platelet transfusions can be given
- **The decision to treat a patient for thrombocytopenia should depend on the clinical condition of the patient, not the platelet count**

Nursing Management Thrombocytopenia

- Nursing Implementation
  - Avoid IM injections.
  - If subcutaneous injection is unavoidable, use small-gauge needles and application of pressure or ice packs after.
- Teach home self-care measures to reduce risks that could cause bleeding such as items around the house, kitchen, bathroom, etc.

- Ambulatory and home care
  - Monitor patients for response to therapy.
  - Teach avoidance of causative agents, trauma, and injury.
  - Teach clinical signs and symptoms of bleeding.
  - Encourage regular medical exams.
  - Manage quality of life issues.

Nursing Priorities w/Thrombocytopenia

chart 28-9 p.497

- Handle gently
- Avoid punctures
- Apply ice to trauma
- No rectal temps, lubricate suppositories
- Electric razor
- Mouth care –
  - no flossing, avoid dental work, avoid hard foods, check denture fit
- Avoid contact sports
- Shoes with firm soles

Nursing Interventions.

- Prevent infection and trauma by practicing meticulous asepsis and gentle handling of patients.
- Check patient's urine, stool and emesis for blood.
- Monitor potential sites for hemorrhage.
- Maintain comfort measures and bed rest.
- Always monitor vital signs.