HEMATOLOGY • PLATELET DISORDERS • NGN NCLEX 2026

# Thrombocytopenia *vs* Thrombocytosis *vs* Thrombocythemia

Three "thromb-o-" platelet disorders — same prefix, different problems. Master the differences for safe clinical judgment.

📊 Normal Platelets: 150,000–400,000/mm³ | 🩸 Bleeding vs. Clotting Risk | 🧠 NCJMM Integrated

## 1 Definition / Quick Compare

*Decode the suffix → understand the diagnosis*

### Thrombocyto-PENIA

*"-penia" = deficiency (too few)*

**< 150,000/mm³**

⬇️ **LOW platelets → BLEEDING risk.** Caused by destruction (ITP, HIT, DIC) or decreased production (chemo, leukemia, marrow failure).

### Thrombocyt-OSIS

*"-osis" = condition/state (reactive)*

**> 450,000/mm³**

⬆️ **HIGH platelets — REACTIVE / SECONDARY.** Body's response to infection, inflammation, iron deficiency, surgery, splenectomy, or malignancy. Usually *transient*.

### Thrombocyt-HEMIA

*"-hemia" = blood disorder (primary)*

**> 450,000/mm³ (often >1 million)**

⬆️ **HIGH platelets — ESSENTIAL / PRIMARY.** A myeloproliferative neoplasm (often JAK2 mutation). Platelets are *dysfunctional* → BOTH clotting AND bleeding risk.

# 2 Pathophysiology — Side by Side

*Why each condition behaves the way it does*

## Thrombocytopenia

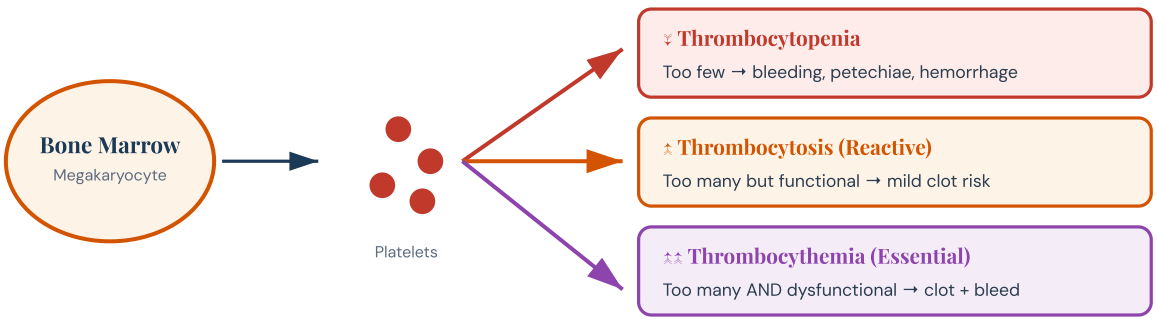
- Bone marrow makes too few OR spleen/immune system destroys platelets
- Platelet count drops < 150,000
- Inadequate clot formation at injured vessel
- → Petechiae, purpura, mucosal bleeding
- → Risk of intracranial / GI hemorrhage if < 20,000

## Thrombocytosis (Reactive)

- Trigger: infection, surgery, inflammation, iron deficiency, splenectomy
- Cytokines (IL-6) stimulate megakaryocytes
- Platelet production temporarily ↑
- → Platelets are *structurally normal*
- → Resolves when underlying cause is treated

## Essential Thrombocythemia

- Clonal mutation in megakaryocyte stem cell (often JAK2 V617F)
- Uncontrolled, autonomous platelet overproduction
- Platelets are *abnormal & dysfunctional*
- → Paradoxical THROMBOSIS (clotting) + BLEEDING
- → Risk: TIA, stroke, MI, DVT, GI bleed




*Platelet pathway: one origin (megakaryocyte) → three very different outcomes*

## 3 Platelet Count Danger Zones

*Memorize these numbers — they drive priority interventions*

### 150K – 400K

**NORMAL.** Routine monitoring; no special precautions.

### 50K – 150K

**MILD thrombocytopenia.** Increased bleeding with trauma/surgery; bleeding precautions begin.

### 20K – 50K

**MODERATE thrombocytopenia.** Bleeding with minor trauma; full bleeding precautions; avoid invasive procedures.

### < 20,000

🩸 **SEVERE — SPONTANEOUS BLEEDING RISK.** Platelet transfusion indicated; risk of intracranial / GI hemorrhage.

### < 10,000

🩸🩸 **CRITICAL.** Life-threatening hemorrhage risk — transfuse immediately; strict bleeding precautions.

### > 450,000

**THROMBOCYTOSIS / THROMBOCYTHEMIA.** Investigate cause; clot risk rises with count, especially > 1 million.

# 4 Signs & Symptoms

*Bleeding cues vs. clotting cues — recognize the pattern*

## Thrombocytopenia (BLEED)

- **Petechiae** (pinpoint red spots)
- **Purpura** & ecchymosis (bruises)
- Bleeding gums, epistaxis
- Hematuria, melena, hematemesis
- Heavy menstrual bleeding
- Prolonged bleeding from puncture sites
- Fatigue (if hemorrhage → anemia)

🚨 RED FLAG: HA, confusion, ↓LOC, vision changes = possible intracranial hemorrhage

## Reactive Thrombocytosis

- Often **asymptomatic**
- Symptoms of underlying cause: fever, infection, post-op pain, iron deficiency fatigue
- Mild headache (rare)
- Resolves as trigger resolves (days–weeks)
- Thrombosis risk is *low* when platelets are normal-functioning

🚨 RED FLAG: Sudden splenectomy or surgical patient with new dyspnea or leg swelling = rule out DVT/PE

## Essential Thrombocythemia

- **Erythromelalgia** — burning, red, painful hands/feet
- Headache, dizziness, visual changes
- TIA / stroke symptoms
- Chest pain (MI), DVT, PE
- Splenomegaly
- Paradoxical bleeding: epistaxis, easy bruising, GI bleed (when count is very high)
- Numbness/tingling of extremities

RED FLAG: Both clot AND bleed at the same time — highest risk if platelets > 1.5 million

## 5 Priority Nursing Interventions (ABCs + Safety)

*Action verbs: assess, monitor, administer, protect*

### Bleeding Precautions (Thrombocytopenia)

- ✓ **Assess** for petechiae, ecchymosis, bleeding gums, melena, hematuria every shift
- ✓ **Monitor** platelet count, H&H, neuro status (intracranial bleed)
- ✓ **Use** electric razor — NO straight razors
- ✓ **Use** soft-bristled toothbrush; no flossing if < 50K
- ✓ **Avoid** IM injections, rectal temps, suppositories, enemas
- ✓ **Hold** aspirin, NSAIDs, anticoagulants
- ✓ **Apply** pressure ≥ 5–10 min after venipuncture
- ✓ **Pad** bed rails; remove fall hazards; non-skid footwear
- ✓ **Administer** platelet transfusion if < 20K or active bleed
- ✓ **Avoid** contact sports, straining (stool softeners PRN)

### Clot Prevention (Thrombocythemia / Thrombocytosis)

- ✓ **Monitor** for TIA/stroke symptoms (FAST), chest pain, DVT (Homans, leg swelling), PE (sudden SOB, chest pain)
- ✓ **Assess** peripheral pulses, skin color/temp, capillary refill
- ✓ **Encourage** ambulation and hydration
- ✓ **Apply** SCDs / TED hose as ordered
- ✓ **Administer** low-dose aspirin (ET) — paradoxically helps
- ✓ **Administer** hydroxyurea / anagrelide as prescribed
- ✓ **Treat** underlying cause (reactive thrombocytosis): infection, iron deficiency, post-op
- ✓ **Monitor** for paradoxical bleeding when platelets > 1.5 million
- ✓ **Educate** on smoking cessation, lifestyle clot risk reduction
- ✓ **Avoid** dehydration → ↑ blood viscosity

# 6 Pharmacology

*Key medications by condition*

| Drug / Class | Used For | Mechanism (simple) | Key Side Effects / Nursing Considerations |
|---|---|---|---|
| **Platelet transfusion** | Severe thrombocytopenia (< 20K) or active bleeding | Replaces deficient platelets directly | 2 RNs verify; expect ↑ ~10K per unit; monitor for febrile/allergic reactions |
| **Corticosteroids** (prednisone) | ITP (immune thrombocytopenia) | Suppresses immune destruction of platelets | ↑ glucose, infection risk, GI upset, mood changes, give with food, taper — never stop abruptly |
| **IVIG** | ITP (rapid platelet ↑) | Blocks splenic destruction of antibody-coated platelets | Headache, hypersensitivity; pre-medicate with acetaminophen/diphenhydramine; monitor renal function |
| **Romiplostim / Eltrombopag** (TPO receptor agonists) | Chronic ITP | Stimulates platelet production | Monitor CBC weekly; thrombosis risk; LFTs (eltrombopag) |
| **Argatroban / Fondaparinux** | HIT (heparin-induced thrombocytopenia) | Non-heparin anticoagulants | **STOP all heparin!** Including flushes. Monitor aPTT (argatroban) |
| **Hydroxyurea** | Essential thrombocythemia (1st line) | Suppresses bone marrow platelet production | Myelosuppression, GI upset, skin ulcers; monitor CBC; teratogenic — avoid pregnancy |
| **Anagrelide** | Essential thrombocythemia (2nd line) | Inhibits megakaryocyte maturation | Headache, palpitations, fluid retention; cardiac monitoring; avoid in heart failure |
| **Low-dose aspirin (81 mg)** | ET — clot prevention | Inhibits platelet aggregation | Hold if platelets > 1.5 million (bleeding risk); GI upset; teach signs of bleeding |
| **Ruxolitinib** (JAK inhibitor) | High-risk MPN (incl. some ET cases) | Blocks JAK2 pathway | Anemia, infection risk; monitor CBC; do not stop abruptly |

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# ⚠️ NCLEX Test Traps

*Where students lose points — and how to avoid it*

### Trap #1: Confusing "-cytosis" with "-cythemia"

❌ **THINK**

They're the same thing — both = high platelets, no big deal.

✅ **KNOW**

Cytosis = reactive (functional, transient). Cythemia = primary clonal disease (dysfunctional platelets, lifelong, clot AND bleed risk).

### Trap #2: Giving aspirin to a patient with thrombocytopenia

❌ **WRONG**

"Aspirin is fine — it's just for pain."

✅ **RIGHT**

Aspirin permanently inhibits platelet function — never give to thrombocytopenic patients. Use acetaminophen instead.

### Trap #3: Heparin in a patient developing HIT

❌ **WRONG**

Continue heparin or switch to LMWH.

✅ **RIGHT**

STOP all heparin (including flushes & LMWH). Switch to argatroban or fondaparinux.

### Trap #4: Treating thrombocythemia like simple thrombocytosis

❌ **WRONG**

"Just hydrate and treat the underlying infection."

✅ **RIGHT**

ET is a chronic myeloproliferative disorder — needs cytoreductive therapy (hydroxyurea), aspirin, lifelong monitoring.

### Trap #5: Priority — patient with platelets of 8,000 vs. patient with platelets of 800,000

❌ **WRONG**

"The 800,000 is more abnormal — see them first."

✅ **RIGHT**

Platelets < 10,000 = imminent spontaneous hemorrhage risk → priority. The high-count patient needs management, but the low-count patient is at acute risk.

### Trap #6: Choosing IM injection in a thrombocytopenic patient

❌ **WRONG**

"Give the IM antibiotic as ordered."

✅ **RIGHT**

Hold; clarify with provider — IM injections cause hematoma in thrombocytopenia. Use IV or PO route.

# 8 Patient & Family Education

*Empower the patient to live safely with their platelet disorder*

### 🪥 Daily Self-Care (low platelets)

Use a soft toothbrush, electric razor, and avoid flossing. Blow nose gently; no Q-tips in ears.

### 💊 Medication Safety

Avoid aspirin, NSAIDs (ibuprofen, naproxen), ginkgo, garlic, fish oil. Read OTC labels — many cold meds contain aspirin.

### ⛹️ Activity (low platelets)

Avoid contact sports, lifting > 10 lbs, straining at stool. Wear shoes, prevent falls; no heating pads.

### 🚨 When to Call 911 (low platelets)

Severe headache, vision changes, confusion, unstoppable bleeding, blood in urine/stool, vomiting blood.

### 💧 Lifestyle (high platelets)

Stay hydrated, no smoking, walk daily, manage cholesterol/BP — all reduce clot risk on top of meds.

### 🚨 When to Call 911 (high platelets)

Sudden weakness/numbness on one side, slurred speech, chest pain, leg pain/swelling, sudden SOB → stroke/MI/DVT/PE.

### 📋 Wear Medical ID

Bracelet stating diagnosis (ITP, ET, HIT) and current medications. Inform all providers (dental, surgical) before any procedure.

### 👶 Pregnancy & Hydroxyurea

Hydroxyurea is teratogenic — use reliable contraception. Discuss family planning with hematologist.

# 9 Memory Boosters & Mnemonics

*Lock these patterns into long-term memory*

## B-L-E-E-D

### Thrombocytopenia bleeding precautions

**B** – Brush soft (toothbrush)

**L** – Limit injections (no IM, no rectal)

**E** – Electric razor

**E** – Eliminate aspirin/NSAIDs

**D** – Don't strain (stool softeners)

## SUFFIX RULE

### Decode "thromb-o-_____"

**-PENIA** = "*poor*" / few → **BLEED**

**-CYTOSIS** = "*condition*" → reactive ↑

**-CYTHEMIA** = "*blood disease*" → primary, dysfunctional

*"-osis" responds; "-hemia" is hereditary-like clonal disease.*

## P-E-T-S

### Spot thrombocytopenia bleeding

**P** – Petechiae (pinpoint)

**E** – Ecchymosis (bruises)

**T** – Tarry stools (melena)

**S** – Saturated bandages / persistent bleeding

## "4 T's"

### HIT (heparin-induced thrombocytopenia) clinical score

**T** – Thrombocytopenia (drop > 50%)

**T** – Timing (5–10 days after heparin)

**T** – Thrombosis (paradoxical clotting!)

**T** – oTher causes excluded

## NUMBERS

### Platelet count cliff notes

**150K** – lower limit of normal

**50K** – bleed with trauma/surgery

**20K** – spontaneous bleed risk → transfuse

**10K** – critical hemorrhage risk

**450K** upper limit of normal

## F-A-S-T

### Recognize stroke in thrombocythemia

**F** – Face drooping

**A** – Arm weakness

**S** – Speech difficulty

**T** – Time to call 911

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# Rapid-Fire: Commonly Confused

*Last-minute clarifiers*

| Question | Quick Answer |
| --- | --- |
| ITP vs. TTP? | ITP = isolated low platelets, immune-mediated. TTP = pentad: fever, low platelets, hemolytic anemia, neuro changes, renal failure → emergency, plasma exchange. |
| HIT vs. ITP? | HIT = thrombocytopenia + clotting from heparin exposure. ITP = autoimmune, no clotting (just bleeding). |
| Reactive thrombocytosis vs. ET? | Reactive resolves with the trigger. ET is clonal, lifelong, JAK2 mutation common, requires cytoreduction. |
| Why does ET cause BOTH bleeding and clotting? | Platelets are too many AND dysfunctional — clot in some places, fail to clot in others. Worse risk if > 1.5 million. |
| Goal platelet count when transfusing for < 20K? | Generally > 50K for active bleeding; > 100K for neurosurgery / intracranial procedures. |
| Splenectomy & platelets? | Reactive thrombocytosis is expected post-splenectomy (loss of platelet pooling/destruction site) — usually transient. |

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# NCJMM Clinical Judgment Scenario

*Apply the 6-step Clinical Judgment Measurement Model*

**Scenario:** *A 62-year-old client admitted 7 days ago for a DVT on heparin infusion is found this morning with a platelet count drop from 240,000 to 88,000. The client now reports a swollen, painful right leg and a new dusky toe. Vital signs: BP 138/82, HR 102, RR 20, $SpO_2$ 96% on RA, T 37.6°C.*

STEP 1 — RECOGNIZE CUES

### What stands out?

Platelets dropped > 50% within 5–10 days of heparin start; new thrombosis (dusky toe, swollen leg) despite anticoagulation; mild tachycardia.

STEP 2 — ANALYZE CUES

### What's connecting?

Pattern fits the "4 T's" of HIT (Heparin-Induced Thrombocytopenia) — thrombocytopenia WITH paradoxical thrombosis, not just bleeding.

STEP 3 — PRIORITIZE HYPOTHESES

### Most likely?

HIT (Type II) is the leading hypothesis. Less likely: post-op reactive change, sepsis-induced consumption (DIC), drug-induced thrombocytopenia from another agent.

STEP 4 — GENERATE SOLUTIONS

### What needs to happen?

**STOP all heparin sources** (IV drip, line flushes, LMWH). Notify provider. Anticipate non-heparin anticoagulant (argatroban or fondaparinux). Send HIT antibody panel (PF4/heparin ELISA).

STEP 5 — TAKE ACTION

### First action?

**Discontinue the heparin drip immediately** and remove heparin flushes from the unit's care plan. Place "no heparin" alert on chart. Contact provider for argatroban order. Apply continuous cardiac/$SpO_2$ monitoring.

STEP 6 — EVALUATE OUTCOMES

### Did it work?

Platelets begin rising within 2–3 days off heparin; toe perfusion improves; no new clots; HIT antibody confirms; client educated to wear medical ID stating "HIT — no heparin lifetime."