

DIANE'S NGN NCLEX 2026 STUDY SERIES

Polycythemia Vera

Hematology / Oncology — Myeloproliferative Neoplasm

A chronic, **JAK2-driven** bone marrow disorder where the marrow makes **too many red blood cells** (often WBCs and platelets too). The result is **hyperviscous, sludgy blood** — and the #1 NCLEX priority is preventing **thrombosis**.

Chronic Myeloproliferative Neoplasm

JAK2 V617F mutation (~95%)

Priority: Clot Prevention

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Definition & Overview

What it is, who gets it, why it matters

- ▶ **Polycythemia Vera (PV)** = a chronic **myeloproliferative neoplasm** in which bone marrow produces excessive **RBCs**, and frequently increased WBCs and platelets.
- ▶ Caused by an acquired mutation of the **JAK2 (V617F)** gene in nearly all clients — drives autonomous, uncontrolled blood cell production independent of erythropoietin.
- ▶ **Why it matters:** excess cells cause **hyperviscosity** (thick, sludgy blood) → poor oxygen delivery, tissue hypoxia, and **life-threatening thrombosis** (DVT/PE, MI, CVA).
- ▶ Typically diagnosed in adults > **60 years**; slightly more common in men. Slow, progressive course but considered a chronic *cancer*.

Primary (PV)

- Marrow problem (JAK2 mutation)
- **Low erythropoietin (EPO)**
- ↑ RBC + ↑ WBC + ↑ platelets

Secondary

- Hypoxia-driven (COPD, smoking, altitude)
- **HIGH EPO** (compensatory)
- ↑ RBC only

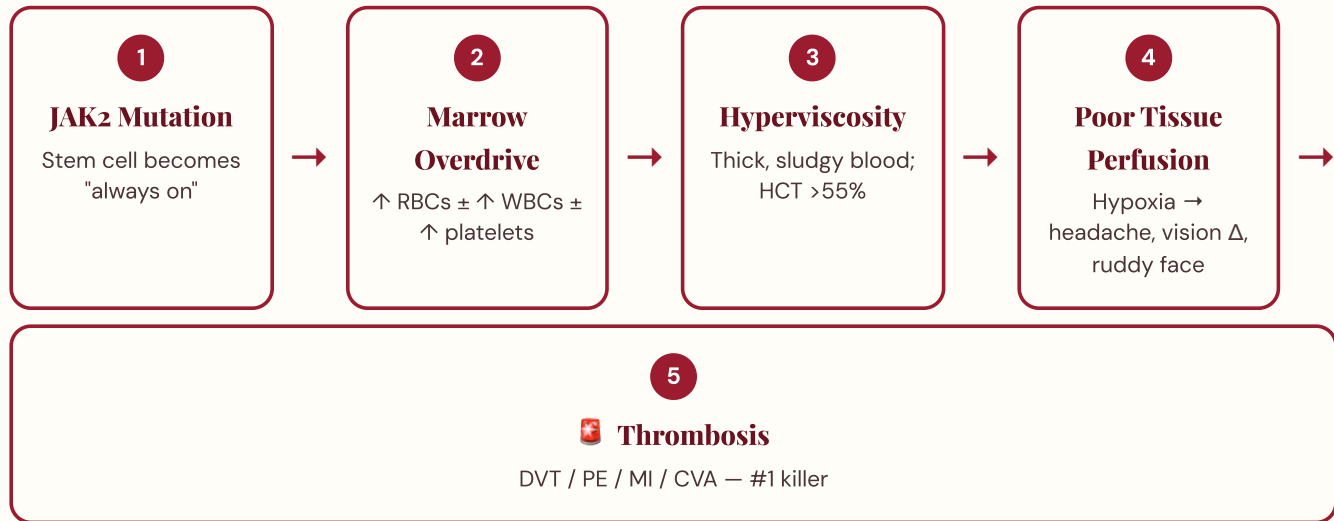
Relative

- Dehydration / fluid loss
- Normal RBC mass, ↓ plasma
- Resolves with rehydration

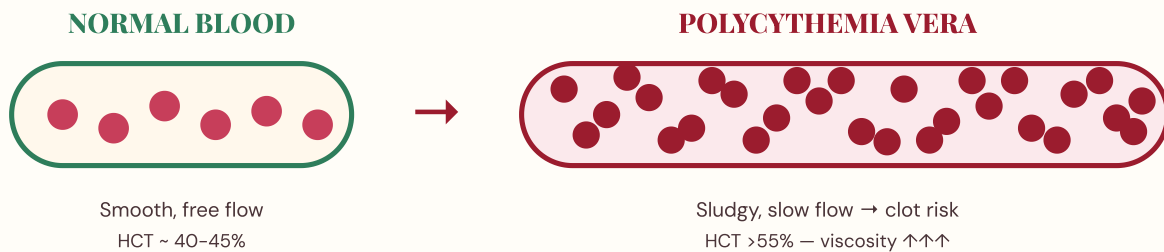
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Pathophysiology — Simplified

From mutation → mass to clot or bleed



Late stage: Marrow eventually "burns out" → splenomegaly, **myelofibrosis**, pancytopenia, and a small but real risk of transformation to **acute myeloid leukemia (AML)**.



Hyperviscosity is the engine driving every PV symptom.

Visual: how excess RBCs convert smooth flow into a thrombosis-ready environment.

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Signs & Symptoms

Early/mild → late/severe + 🚩 red flags

🟡 Early / Mild

- **Headache** & dizziness
- Fatigue, weakness
- **Pruritus** — classically after warm bath/shower (aquagenic itch)
- Tinnitus, blurred vision, "spots"
- **Ruddy / plethoric** face, neck, hands (purple-red)
- Hypertension
- Night sweats

🔴 Late / Severe — 🚩 Red Flags

- **Thrombosis:** DVT (calf pain/swelling), PE (sudden SOB), **MI, CVA/TIA**
- **Erythromelalgia** — burning, red, painful hands/feet
- **Splenomegaly** — LUQ fullness, early satiety
- Hepatomegaly
- **Bleeding** (epistaxis, GI, bruising) from dysfunctional platelets
- Angina, claudication (peripheral arterial)
- Confusion, seizures (stroke risk)

🔬 Classic Lab Picture

HGB

>16.5 ♂ / >16 ♀

▲ HIGH

HEMATOCRIT

>49% ♂ / >48% ♀

▲ HIGH

RBC MASS

↑↑

▲ HIGH

WBC / PLATELETS

often ↑

▲ HIGH

ERYTHROPOIETIN (EPO)

LOW

▼ key clue

JAK2 V617F

POSITIVE

▲ ~95%

O₂ SATURATION

≥ 92%

— normal

URIC ACID / LDH

↑

▲ cell turnover

★ **Test trick:** Low EPO + normal O₂ sat distinguishes primary PV from secondary polycythemia (where EPO is HIGH because the body senses hypoxia).

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Priority Nursing Interventions

ABCs first, then circulation, safety, comfort

PRIORITY	ACTION	RATIONALE
 Circulation #1	Therapeutic phlebotomy — remove 300–500 mL blood; goal HCT <45%. Monitor for orthostatic hypotension after.	Cornerstone treatment — directly reduces viscosity & clot risk.
 Hydration	Encourage 2–3 L/day fluids unless contraindicated.	Dilutes blood, prevents stasis & dehydration-driven viscosity spikes.
 Mobility	Ambulate frequently, leg exercises in bed, anti-embolism stockings, SCDs.	Prevents venous stasis → DVT/PE.
 Assess	Monitor for thrombosis : chest pain, SOB, calf tenderness, slurred speech, vision Δ, sudden weakness.	Stroke/MI/PE are the top causes of death in PV.
 Bleeding	Soft toothbrush, electric razor, no aspirin without order, fall precautions.	Platelets are <i>numerous but dysfunctional</i> — paradoxical bleeding risk.
 Itch	Cool baths (NOT hot), pat dry, antihistamines, oatmeal/cool cloths.	Heat triggers histamine release → aquagenic pruritus.
 Meds	Administer low-dose aspirin (81 mg) , hydroxyurea, ruxolitinib, interferon-α as ordered.	Reduces thrombosis risk; cytoreduction lowers cell counts.
 Nutrition	Avoid iron-rich foods/supplements ; small frequent meals if early satiety from splenomegaly.	Iron fuels RBC production — counter-therapeutic in PV.
 Spleen safety	Avoid contact sports, abdominal trauma, tight waistbands; assess LUQ pain.	Enlarged spleen ruptures easily.
 Mental status	Frequent neuro checks; new confusion = call HCP <i>now</i> .	Could signal CVA from hyperviscosity.

Call the HCP IMMEDIATELY if...

- New chest pain, SOB, or hemoptysis (PE/MI)
- Unilateral leg swelling, warmth, pain (DVT)

- Slurred speech, facial droop, sudden weakness or vision loss (CVA)
- HCT > 55% on labs
- Severe LUQ pain or hypotension (splenic rupture)
- Black/tarry stools, hematemesis (GI bleed)

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Pharmacology

Drugs the NCLEX expects you to recognize

DRUG / CLASS	MECHANISM	KEY SIDE EFFECTS	NURSING CONSIDERATIONS
Aspirin (low-dose, 81 mg)	Antiplatelet — prevents clot formation	GI bleeding, bruising, tinnitus	Give with food; teach bleeding precautions; hold before procedures per HCP.
Hydroxyurea (Hydrea) — antineoplastic	Suppresses bone marrow → ↓ RBC, WBC, platelets	Bone marrow suppression, mouth sores, N/V, skin/nail Δ, teratogenic	Monitor CBC frequently; handle with chemo precautions ; reliable contraception; report fever, sore throat, bleeding.
Ruxolitinib (Jakafi) — JAK 1/2 inhibitor	Blocks the JAK2 signal driving cell overproduction	Anemia, thrombocytopenia, infection, ↑ cholesterol, headache	Monitor CBC; do NOT stop abruptly (rebound symptoms); avoid live vaccines; report bleeding/infection.
Interferon alfa (peginterferon)	Immune modulator; reduces marrow proliferation	Flu-like symptoms, depression, fatigue, ↑ liver enzymes	Often preferred in pregnant clients ; rotate SQ sites; screen mood (suicide risk); monitor LFTs.
Allopurinol	↓ Uric acid production	Rash (Stevens-Johnson), GI upset	Push fluids; monitor uric acid; report rash <i>immediately</i> .
Antihistamines (e.g., diphenhydramine, hydroxyzine)	Block histamine for pruritus	Sedation, anticholinergic effects, fall risk in older adults	Fall precautions; advise no driving; cool environment helps more than scratching.
⚠️ Avoid: Iron supplements	Would fuel RBC production	—	Teach client: NO multivitamins with iron, NO iron-fortified cereals as supplements.

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NCLEX Test Traps

What students confuse — wrong vs right

✗ **Trap:** "PV = anemia, give iron supplements."



✓ **Right:** PV is the *opposite* of anemia — too many RBCs. **Avoid iron**; it would worsen production.

✗ **Trap:** "Encourage warm baths to relieve pruritus."



✓ **Right:** Warm/hot water *triggers* the itch. Use **cool baths, pat dry, antihistamines**.

✗ **Trap:** "High RBCs = patient is healthy/well-oxygenated."



✓ **Right:** Hyperviscous blood actually *impairs* oxygen delivery and dramatically raises clot risk.

✗ **Trap:** "High platelets = no bleeding risk."



✓ **Right:** Platelets in PV are **numerous but dysfunctional**. Both *clotting AND bleeding* are risks.

✗ **Trap:** "Phlebotomy is for blood donation only."



✓ **Right:** **Therapeutic phlebotomy** is the *cornerstone treatment* in PV — goal HCT < 45%.

✗ **Trap:** "Restrict fluids — patient is fluid-overloaded."



✓ **Right:** The problem is *cell mass*, not water. **Encourage 2–3 L/day** to dilute blood and reduce viscosity.

✗ **Trap:** "Bed rest prevents complications."



✓ **Right:** Immobility *worsens* stasis and clotting. **Ambulate, leg exercises, SCDs**.

✗ **Trap:** "Confusion in PV client → call family."



✓ **Right:** New confusion in PV = possible **CVA** from hyperviscosity. **Notify HCP immediately**; perform stroke assessment.

✗ **Trap:** "Primary and secondary polycythemia are treated the same."



✓ **Right:** **Secondary** = treat the *cause* (hypoxia, smoking, COPD). **Primary (PV)** = phlebotomy + cyto reduction + ASA.

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Patient & Family Education

Lifestyle teaching to prevent the next clot

✓ DO

- Drink **2–3 L water/day** (unless cardiac/renal restriction)
- Walk daily, **flex feet hourly** on long trips/flights
- Wear **compression stockings** as prescribed
- Keep **all phlebotomy & lab appointments** (CBC monitoring)
- Take low-dose aspirin **with food** as ordered
- Use **cool baths**, pat (don't rub) skin dry
- Use electric razor & soft toothbrush
- **Stop smoking** — it worsens hypoxia & viscosity
- Wear **medic-alert bracelet** identifying PV
- Report **FAST stroke signs**: Face droop, Arm weakness, Speech, Time

⊘ AVOID

- **Iron supplements** & iron-fortified vitamins
- **Hot** tubs, hot showers, saunas
- Prolonged **immobility**; crossing legs at the knee
- Tight waistbands, knee-high stockings, restrictive clothing
- Contact sports / abdominal trauma (splenic rupture)
- OTC NSAIDs/herbals without provider approval (bleeding risk)
- Smoking & secondhand smoke
- **Dehydration** — alcohol, hot weather without fluids
- Hot wax, scratching skin (can break dysfunctional skin)

📞 Call the Provider For...

- Sudden chest pain, SOB, coughing blood
- One leg swollen, hot, painful (calf especially)
- Sudden weakness on one side, slurred speech, vision loss, severe headache
- Black/tarry stools, vomiting blood, unusual bruising
- Severe LUQ pain or fall affecting the abdomen
- Fever > 100.4°F (immune suppression risk on hydroxyurea/ruxolitinib)

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Memory Boosters & Mnemonics

Anchor it, don't memorize it

"P.O.L.Y.C.Y.T.H.E.M.I.A."

- P** Plethora — ruddy red face, neck, hands
- O** Overproduction of RBCs (JAK2 mutation)
- L** Low EPO (key lab clue!)
- Y** Yawning fatigue + dizziness
- C** Clots are #1 killer — DVT, PE, MI, CVA
- Y** Yes to hydration, NO to iron
- T** Therapeutic phlebotomy — cornerstone tx
- H** HCT > 55% = hyperviscosity emergency
- E** Erythromelalgia — burning red hands/feet
- M** Mucous membrane bleeds (paradoxical)
- I** Itching after warm bath (aquagenic)
- A** Aspirin low-dose + Avoid heat

"3 H's of Hyperviscosity"

Headache

Hypertension

Hemorrhage *or* Hyperthrombosis

If you see all 3 → think PV.

"Hot Bath → Itch" Rule

Pruritus **after warm water** = classic PV finding (aquagenic pruritus).

Treatment: **cool** water, pat dry, antihistamines.

"Primary vs Secondary"

Primary = **P**oor (low) EPO

Secondary = **S**oaring (high) EPO

"FAST" for Stroke

Face droop · **A**rm weakness · **S**peech slurred ·
Time to call 911

Stroke risk in PV is high — teach every client.

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NCJMM Clinical Judgment Scenario

NGN 2026 — six-step measurement model

SCENARIO: A 68-year-old male is admitted with headache, blurred vision, and a deep ruddy color of the face and hands. He reports intense itching after his morning shower. Vital signs: BP 168/96, HR 92, RR 18, SpO₂ 96% on room air. Labs: **Hgb 19.2 g/dL, HCT 58%, RBC 7.4 ×10⁶/μL, WBC 14,000, Platelets 620,000, EPO low, JAK2 V617F positive.** He suddenly develops slurred speech and right arm weakness while talking with the nurse.

1 Recognize Cues

Plethoric face, headache, vision changes, aquagenic pruritus, HTN, ↑ Hgb/HCT/RBC/WBC/platelets, low EPO, positive JAK2, **new neuro deficits.**

2 Analyze Cues

Findings = Polycythemia Vera with **hyperviscosity.** New slurred speech + arm weakness = likely **acute CVA** from sludged blood — life-threatening.

3 Prioritize Hypotheses

#1 Acute ischemic stroke (highest priority — time-sensitive). #2 Hypertensive emergency. #3 Underlying PV requiring cytoreduction & phlebotomy.

4 Generate Solutions

Activate stroke alert; obtain stat CT head; maintain airway/IV access; establish time of last known well; prepare for therapeutic phlebotomy; anticipate orders for IV fluids, low-dose ASA (after CT rules out hemorrhage), hydroxyurea, neuro checks q15 min.

5 Take Action

Call **Rapid Response / stroke team immediately.** Position HOB flat or per protocol, NPO, IV NS access, neuro assessment q15 min, draw labs, transport for stat imaging, notify HCP for phlebotomy and cytoreductive therapy. Bleeding precautions on standby.

6 Evaluate Outcomes

Neuro deficits resolving, HCT trending toward < 45%, BP controlled, no new clots/bleeds, client/family verbalize understanding of hydration, no-iron rule, cool baths, FAST signs, phlebotomy schedule, & medication regimen.

