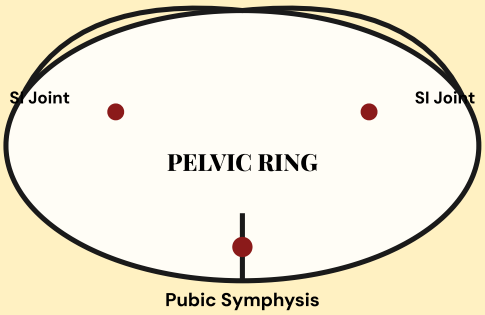
MUSCULOSKELETAL · TRAUMA

# Pelvic Fractures: Stable vs. Unstable

High-yield NGN NCLEX 2026 review covering pathophysiology, hemorrhage priorities, pelvic binder use, urethral injury red flags, and complete six-step Clinical Judgment scenario.

📌 *This topic was not included in the uploaded personal study notes. Content drawn from standard NGN NCLEX 2026 references (Saunders, ATI, Lippincott, ATLS, ENA TNCC protocols).*

## 1 Definition & Overview




### 🟢 STABLE Pelvic Fracture

- Single break in pelvic ring; ligaments intact
- Ring maintains structural integrity
- Includes: isolated pubic rami, iliac wing, avulsion, sacral fractures
- Lower-energy mechanism (falls in elderly)
- Mortality: < 5%
- Usually managed conservatively

### 🔴 UNSTABLE Pelvic Fracture

- Two or more breaks in pelvic ring
- Ligamentous disruption (SI joint or symphysis)
- Types: **Open Book** (AP), **Lateral Compression**, **Vertical Shear**
- High-energy trauma (MVC, falls >15 ft, crush)
- Mortality: 10–50% (up to 60% if open)
- Surgical fixation often required

## 2 Pathophysiology

1. High-energy trauma → pelvic ring disruption (anterior + posterior breaks)
2. Tearing of presacral & lumbar **venous plexus** (75% of bleeding) + branches of internal iliac artery
3. Loss of tamponade effect — pelvic volume expands → uncontained bleeding into retroperitoneal space
4. Concurrent injury to **bladder, urethra, rectum, vagina, lumbosacral plexus**
5. Massive blood loss (up to **4 L**) → hypovolemic / hemorrhagic shock → multi-organ failure / death

# 3 Signs & Symptoms

## 🟢 Early / Stable Findings

- Localized pelvic / groin / low back pain
- Ecchymosis over iliac crest or perineum
- Tenderness on palpation
- Inability or refusal to bear weight
- Pain with hip rotation or compression
- Mild abrasions or contusions

## 🟠 Late / Progressive Findings

- Pelvic deformity, leg length discrepancy
- Audible/palpable instability ("rocking")
- Decreased urine output
- Cool, pale, clammy skin (compensated shock)
- Worsening abdominal distension
- Anxiety, restlessness — early hypoxia cues

## 🚨 RED FLAGS — UNSTABLE / LIFE-THREATENING

- **Hemodynamic instability:** SBP < 90, HR > 120, narrowing pulse pressure
- **Blood at urethral meatus** → urethral injury (do NOT insert Foley)
- **High-riding / boggy prostate** on rectal exam → urethral disruption
- **Perineal, scrotal, or vulvar hematoma** ("butterfly" bruising)
- **Gross hematuria** → bladder or urethral injury
- **Rectal bleeding** → open pelvic fracture (consider it open until proven otherwise)
- **Absent / asymmetric femoral or pedal pulses** → vascular compromise
- **Lower extremity numbness, foot drop** → lumbosacral plexus injury
- **Grey Turner / Cullen sign** → retroperitoneal hemorrhage (late)

# 4 Priority Nursing Interventions

### A — Airway / C-Spine

Maintain c-spine precautions (high-energy mechanism). Suction, jaw thrust if needed. Anticipate intubation if GCS < 8.

### B — Breathing

High-flow $O_2$ via non-rebreather. Auscultate lungs (rule out associated chest trauma). Continuous $SpO_2$ & capnography.

### C — Circulation (Priority!)

2 large-bore IVs (16–18 g) above diaphragm. Type & crossmatch. Activate

**Massive Transfusion Protocol**

(1:1:1 PRBC:FFP:platelets). Target SBP 80–90 (permissive hypotension until bleeding controlled).

### Pelvic Binder / Sheet

Apply commercial binder or folded sheet centered over

**greater trochanters**

(NOT iliac crests) for suspected unstable fx. Reduces pelvic volume → tamponade.

### STOP — Genitourinary Caution

Do NOT insert Foley if blood at meatus, scrotal hematoma, or high-riding prostate. Anticipate

**retrograde urethrogram**

first; suprapubic catheter if urethral injury.

### Immobilization

Bed rest. Log-roll as a unit ONLY with provider order (may worsen unstable fx). Minimize movement until pelvis stabilized.

### Pain Management

IV opioids (morphine, fentanyl) titrated to RR & BP. Avoid NSAIDs initially (bleeding risk). Reassess pain q15–30 min.

### Neurovascular Checks

Bilateral pedal pulses, cap refill, sensation, motor q1h. Compare extremities. Document and report changes immediately.

### Monitoring

Continuous ECG, BP q5–15 min, hourly I&O via urethral-safe route, serial H&H, lactate, base deficit. FAST exam & CT.

### DVT Prophylaxis

SCDs immediately.

**Hold pharmacologic prophylaxis**

(LMWH) until bleeding controlled, then start within 24–48 hr per provider.

# 5 Pharmacology

| Drug / Class | Mechanism | Key Side Effects | Nursing Considerations |
|---|---|---|---|
| **Crystalloids** (NS, LR) | Volume expansion via isotonic fluid | Dilutional coagulopathy, hypothermia, acidosis if > 1.5–2 L | Use warmed fluids. Limit to 1–2 L; switch to blood products early. Avoid over-resuscitation (rebleeding). |
| **PRBCs / FFP / Platelets** (MTP 1:1:1) | Replace lost RBCs, clotting factors, platelets | Transfusion reactions, citrate toxicity (↓$Ca^{2+}$), TRALI, hyperkalemia | 2 RN identifier check. Vitals before, q15 min × 1 hr, then per protocol. Warm blood via central line. Monitor ionized $Ca^{2+}$. |
| **Tranexamic Acid (TXA)** Antifibrinolytic | Inhibits plasminogen activation → stabilizes clot | Thromboembolism, hypotension if rapid IV, visual changes | Give within **3 hours of injury**. 1 g IV over 10 min, then 1 g over 8 hr. Don't push fast. |
| **Morphine / Fentanyl** Opioid analgesics | μ-receptor agonist → CNS pain modulation | Respiratory depression, hypotension, sedation, constipation | Have **naloxone at bedside**. Monitor RR > 12, sedation score. Fentanyl preferred in hypotension (less histamine release). |
| **Enoxaparin (Lovenox)** LMWH | Inactivates factor Xa → prevents clot formation | Bleeding, thrombocytopenia (HIT), injection site hematoma | HOLD until hemorrhage controlled. SQ in abdomen, do NOT aspirate or rub. Monitor anti-Xa, platelets. |
| **Cefazolin / Pip-Tazo** Antibiotics | Cell wall inhibition / broad spectrum | Allergic reaction, C. diff, nephrotoxicity | For **open pelvic fx**. Give within 1 hr. Verify allergies, monitor renal function. |
| **Tetanus Prophylaxis** | Passive/active immunization | Local soreness, fever | Verify immunization status for any open wound or contaminated injury. |

## 6 NCLEX Test Traps ⚠️

| ❌ WRONG | ✅ RIGHT |
| --- | --- |
| Insert a Foley catheter to monitor urine output in a trauma patient with pelvic fracture. | Assess for **blood at meatus, scrotal/perineal hematoma, high-riding prostate FIRST**. If any present, hold Foley — anticipate retrograde urethrogram. |
| Place pelvic binder over the iliac crests. | Center the binder over the **greater trochanters** — this compresses and reduces pelvic volume effectively. |
| Aggressively fluid-resuscitate to a normal SBP of 120 mmHg. | **Permissive hypotension** (SBP 80–90) until hemorrhage is controlled — over-resuscitation displaces clots and worsens bleeding. |
| Log-roll the patient routinely for skin care. | Avoid log-rolling unstable pelvic fx until **provider clearance and pelvis stabilized**. Movement worsens disruption and bleeding. |
| Start LMWH (Lovenox) immediately on admission for DVT prevention. | Start SCDs immediately. Pharmacologic prophylaxis is **held until bleeding controlled** (usually 24–48 hr). |
| Hematuria is just a sign the patient needs more fluids. | Hematuria in pelvic trauma = **bladder or urethral injury** until proven otherwise. Notify provider; anticipate imaging. |
| An elderly patient with isolated pubic rami fx is "stable" — no urgency. | Even stable fx in elderly carry **20–25% one-year mortality** due to immobility, PE, pneumonia. Aggressive early mobilization & DVT prevention required. |

# 7 Patient & Family Education

### Weight-Bearing & Mobility

- Follow exact weight-bearing orders (NWB, PWB, TTWB, FWB)
- Use walker or crutches per PT instruction
- No twisting, bending, or lifting > 10 lb for 6–12 weeks
- Sit on firm chairs; avoid soft sofas/low toilets

### DVT Prevention at Home

- Take anticoagulant exactly as prescribed
- Ankle pumps every hour while awake
- Adequate hydration; avoid prolonged sitting
- Report: calf swelling, redness, warmth, SOB, chest pain

### Wound & Hardware Care (Post-Op)

- Keep incision clean & dry; no soaking/swimming
- Watch for redness, drainage, fever, increasing pain
- Pin-site care for external fixator (saline as taught)
- Don't disturb pins/external frame

### Bowel & Bladder Changes

- Report blood in urine or stool, incontinence, retention
- Use stool softeners on opioids (prevent constipation)
- Sexual dysfunction is common — discuss openly w/ provider
- Follow-up urology if urethral injury

### Pain & Medication Safety

- Take pain meds before activity, PT, sleep
- Do not drive while on opioids
- Never combine opioids with alcohol or benzodiazepines
- Wean opioids as healing progresses

### When to Call 911 / Provider

- Severe new pain, deformity, inability to move leg
- Numbness, tingling, cold or pale extremity
- Heavy bleeding from wound or in urine/stool
- Sudden SOB, chest pain (PE), confusion, fainting

# 8 Memory Boosters & Mnemonics

## 🩸 "BLEED" — Unstable Pelvic Fx Priorities

**B** **Binder** over greater trochanters

**L** **Large-bore** IV ×2 + Labs

**E** **Estimate** blood loss / activate MTP

**E** **Evaluate** GU (NO Foley if blood at meatus)

**D** **Don't** log-roll until cleared

## 🚨 "BUTTERFLY" — Pelvic Trauma Red Flags

**B** **B**lood at urethral meatus

**U** **U**nable to void / urinary retention

**T** **T**achycardia + hypotension

**T** **T**enderness with compression

**E** **E**cchymosis (perineal/scrotal)

**R** **R**ectal blood / high prostate

## 📐 3 Patterns of Unstable Fx

📖 **Open Book —** AP compression; symphysis widens > 2.5 cm; vertical stable but rotationally unstable

🪨 **Lateral Compression —** side impact; inward rotation; most common (60–70%)

⬆️ **Vertical Shear —** fall from height; hemipelvis displaced upward; highest mortality

## 🎯 Quick Associations

**Greater trochanters** — NOT iliac crests — for binder placement

**4 liters** — max retroperitoneal blood loss potential

**3 hours** — TXA must be given within this window

**1:1:1** — MTP ratio (PRBC : FFP : platelets)

**80–90 mmHg** — permissive hypotension SBP target

**25%** — elderly 1-year mortality even with "stable" fx

# 9 NCJMM Clinical Judgment Scenario

📋 **Scenario:** A 34-year-old male is brought to the ED by EMS after a motorcycle crash at highway speed. On arrival: alert but anxious, complaining of severe pelvic pain. **Vitals:** BP 88/54, HR 132, RR 26, $SpO_2$ 94% on 4 L NC, T 36.1°C. Pelvic compression elicits crepitus and pain. Blood is noted at the urethral meatus. Perineum is ecchymotic. Abdomen is soft but distended. Pedal pulses 1+ bilaterally.

## 1 Recognize Cues

- High-energy mechanism (motorcycle crash)
- Hypotension (88/54), tachycardia (132), tachypnea (26) → **compensated hemorrhagic shock**
- Pelvic crepitus + pain → **unstable pelvic fracture**
- Blood at urethral meatus + perineal ecchymosis → **urethral injury suspected**
- Diminished pedal pulses, mild hypothermia, abdominal distension → ongoing internal bleeding

## 2 Analyze Cues

The mechanism, pelvic instability, and shock vital signs together indicate **life-threatening unstable pelvic fracture with active hemorrhage**. Blood at the urethral meatus and perineal hematoma signal urethral disruption — **Foley insertion is contraindicated**. Retroperitoneal bleeding (up to 4 L) is the most likely source. Hypothermia worsens coagulopathy ("lethal triad" with acidosis & coagulopathy). Cluster: **shock + pelvic instability + GU injury**.

## 3 Prioritize Hypotheses

1. **#1 — Hemorrhagic shock from unstable pelvic fracture** (immediate threat to life)
2. #2 — Urethral disruption with risk of further GU injury if Foley inserted
3. #3 — Coagulopathy from hypothermia/dilution/acidosis
4. #4 — Lumbosacral plexus or vascular injury (diminished pulses)
5. #5 — Pain management & psychological distress

## 4 Generate Solutions

- Apply **pelvic binder at greater trochanters** immediately
- Establish **two 16-gauge IVs** above diaphragm; draw type & cross, CBC, coags, lactate, ABG
- Activate **Massive Transfusion Protocol (1:1:1)**; give TXA 1 g IV within 3 hr of injury
- Permissive hypotension target: SBP 80–90 mmHg until surgical control
- Warm fluids, warm blankets, raise room temp — combat hypothermia
- **DO NOT insert Foley**; notify urology; prepare for retrograde urethrogram
- Prepare for IR embolization or OR for external fixation
- Continuous monitoring: ECG, BP q5 min, $SpO_2$, capnography, serial H&H
- Fentanyl in titrated small doses for pain (less hemodynamic effect than morphine)

## 5 Take Action

- ✅ Binder applied over greater trochanters at minute 0
- ✅ Two large-bore IVs established; MTP activated; TXA bolus running
- ✅ Foley deferred; urology consulted; retrograde urethrogram ordered

- ✅ Warming measures initiated; rapid infuser warming blood
- ✅ Trauma surgery + IR + orthopedics paged for definitive control
- ✅ Family notified; spiritual support offered
- ✅ Documentation: time of binder, MTP start, TXA, vital trends, all interventions

### 6 Evaluate Outcomes

**Reassess every 5–15 minutes:**

- 🎯 **Improving:** SBP rising to 90–100, HR < 110, mentation clear, lactate trending down, pedal pulses 2+, no further hematuria progression, hemoglobin stabilizing post-MTP
- ⚠️ **Worsening / Escalate:** SBP < 80 despite MTP → emergent angio-embolization or pelvic packing; new altered mental status; rising lactate; absent pulses → vascular surgery
- 📊 **Long-term goals:** hemodynamic stability, definitive pelvic fixation, prevention of VTE/infection/pressure injury, urology follow-up for urethral repair, early mobility, psychological recovery from trauma