

NGN NCLEX 2026 · RENAL / GENITOURINARY

Peritoneal *Dialysis*

Renal replacement therapy that uses the peritoneal membrane as a semipermeable filter. The exam will reward the nurse who knows aseptic technique, recognizes cloudy effluent immediately, and never microwaves the dialysate.

TENCKHOFF CATHETER

CAPD · APD · CCPD

FILL › DWELL › DRAIN

PERITONITIS = #1 THREAT

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SOURCE TRANSPARENCY

This topic is **not present in your uploaded reference notes**. Content has been compiled from standard NGN NCLEX 2026 references: *Saunders Comprehensive Review for the NCLEX-RN (8th ed.)*, *ATI Adult Medical-Surgical Nursing*, *Lippincott Manual of Nursing Practice*, and the *International Society for Peritoneal Dialysis (ISPD) Guidelines (2022, peritonitis recommendations)*.

1

Definition & Overview

WHAT IT IS · WHO IT'S FOR · WHY IT MATTERS

THE CONCEPT

Peritoneal dialysis (PD) is a **renal replacement therapy** in which sterile dialysate is instilled into the peritoneal cavity through an indwelling **Tenckhoff catheter**. The richly vascularized peritoneum acts as a semipermeable membrane: solutes diffuse and water osmosis into the dialysate, which is then drained.

INDICATIONS

- End-stage renal disease (ESRD), CKD stage 5
- **Hemodynamically unstable** clients (gentler than HD)
- Pediatric, elderly, and difficult-vascular-access patients
- Acute kidney injury (in select cases)

PD MODALITIES

- **CAPD** — Continuous Ambulatory PD · 4–5 manual exchanges/day, dwell 4–6 h
- **APD / CCPD** — Cycler machine performs exchanges overnight
- **IPD** — Intermittent, hospital-based

WHY IT MATTERS ON THE NCLEX

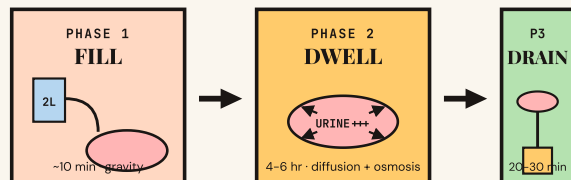
- **RED FLAG** Cloudy effluent = peritonitis until proven otherwise
- **SAFETY** Strict aseptic technique is the entire test
- **PRIORITY** Always assess respiratory status during dwell

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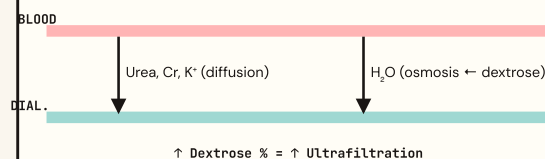
Pathophysiology (Simplified)

THREE PHASES · DIFFUSION + OSMOSIS THROUGH THE PERITONEUM

The PD Exchange Cycle



Mechanism at the Peritoneum



1

Fill (Inflow)

~10 MINUTES · BY GRAVITY

~2 L of warmed dialysate instilled into the peritoneal cavity through the Tenckhoff catheter. Patient supine or semi-Fowler's.

2

Dwell (Equilibration)

4-6 HR CAPD · SHORTER FOR APD

Diffusion moves urea, creatinine, and K⁺ from blood → dialysate.
Osmosis pulls water from blood → dialysate (driven by dextrose).

3

Drain (Outflow)

20-30 MINUTES · BY GRAVITY

Bag placed **below** the abdomen. Effluent should be **clear pale yellow**. Drain volume ≥ infused = ultrafiltration achieved.



Dialysate Concentrations

1.5% · 2.5% · 4.25% DEXTROSE

Higher % = more fluid removed + higher glucose absorption.
4.25% is reserved for fluid overload.

3

Signs & Symptoms

NORMAL FINDINGS VS. COMPLICATIONS YOU MUST CATCH FAST

Normal / Expected

- Effluent is **clear, pale yellow**
- Drain volume slightly ≥ infused (negative fluid balance)
- Mild fullness/pressure during fill
- Brief drainage at end (sigmoid colon sound)
- Small blood-tinge in first few exchanges or during menses (resolves)

Complications

- **Peritonitis:** cloudy effluent, abdominal pain, fever, N/V, rebound tenderness
- **Exit site / tunnel infection:** redness, warmth, drainage at catheter
- **Outflow obstruction:** drain < infused (constipation #1, fibrin, kink, malposition)
- **Respiratory compromise:** dyspnea, decreased lung sounds from elevated diaphragm
- **Hyperglycemia:** from dextrose absorption (esp. 4.25%)
- **Hypotension / dehydration:** from over-ultrafiltration
- **Protein loss:** 5-15 g/day in effluent → malnutrition
- **Hernia / dialysate leak** at catheter site

RED FLAG TRIAD - STOP & CULTURE

Cloudy effluent + abdominal pain + fever = PD-associated peritonitis. Send effluent for cell count + culture **before** giving antibiotics, then expect empirical intraperitoneal vancomycin + ceftazidime per ISPD guidelines.

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Priority Nursing Interventions

ABCS · SAFETY · ASEPTIC TECHNIQUE ABOVE ALL

1

Aseptic technique — every single exchange

Mask the nurse AND the patient. Hand hygiene before connecting/disconnecting. The peritoneum is a vast sterile cavity — break technique once and you cause peritonitis.

2

Warm the dialysate to body temperature (37 °C)

Dry heat only — warming cabinet or heating pad. *Never microwave* (uneven heating, scalding). Cold dialysate → cramping + vasoconstriction → poor exchange.

3

Inspect effluent every drain

Clear pale yellow = good. **Cloudy = peritonitis until proven otherwise** — culture effluent, notify HCP. Document color, clarity, volume.

4

Monitor fluid balance precisely

Strict I&O. **Daily weight** (same time, same scale, same clothes, empty cavity). Drain < infused = retention; investigate immediately.

5

Troubleshoot outflow before calling

If drain is slow: (1) check tubing for kinks · (2) **reposition** — turn side to side · (3) ambulate · (4) assess for constipation (#1 cause). Never apply suction.

6

Assess respiratory status during dwell

Dwelling fluid elevates the diaphragm. Place in **semi-Fowler's**. Auscultate lungs each shift. May need to drain early if dyspnea.

7

Monitor labs & glucose

BUN, creatinine, K⁺, Na⁺, Ca²⁺, phosphorus, albumin. **Blood glucose** (dextrose absorption — especially diabetics on 4.25%). Hgb/Hct for anemia.

8

Care for the exit site

Clean per protocol, inspect daily. Secure catheter to abdomen with tape to prevent traction. Report redness, warmth, drainage, tenderness.

5

Pharmacology

DIALYSATE, INTRAPERITONEAL ADDITIVES, AND CKD ADJUNCTS

Drug / Class	Mechanism	Key Side Effects	Nursing Considerations
Dianeal (Dextrose 1.5% / 2.5% / 4.25%)	Osmotic agent draws water from blood → dialysate	Hyperglycemia, hypernatremia, hypotension (4.25%)	Match concentration to fluid status. 4.25% only for overload. Monitor glucose & BP.
Heparin (IP, 500–1000 units/L)	Prevents fibrin obstruction of catheter	Local only; NOT systemically absorbed from peritoneum	Safe to add — does <i>not</i> cause systemic anticoagulation. Use sterile technique.
IP antibiotics (vancomycin, cefazolin, ceftazidime, gentamicin)	Treat peritonitis at the source	Vanco: red-man if rapid · Gent: oto/nephrotoxic	Per ISPD: empirical Gram ⁺ + Gram ⁻ coverage IP. Culture first. Monitor trough levels.
Regular insulin (IP for diabetics)	Counters dextrose load in dialysate	Hypoglycemia	Only regular insulin may be added. NPH/analogues adhere to bag. Monitor BG q6h.
Potassium chloride (IP when needed)	Replaces K ⁺ in dialysate (standard solutions are K-free)	Hyperkalemia if over-replaced	Add only with order & current K ⁺ level. Verify with second nurse.
Epoetin alfa / Darbepoetin (ESAs)	Stimulates RBC production (CKD anemia)	HTN, thrombosis, HA	Check Hgb (target 10–11 g/dL — do not over-correct). Iron supplementation needed.
Phosphate binders (sevelamer, calcium acetate)	Bind dietary phosphate in GI tract	Constipation, hypercalcemia (Ca-based)	Give WITH meals. Monitor Ca, phos, PTH. Constipation worsens PD outflow.
Calcitriol / Paricalcitol (Vit D analogs)	Promotes Ca ²⁺ absorption; suppresses PTH	Hypercalcemia, hyperphosphatemia	Monitor Ca, phos. Hold if Ca high.
Stool softeners (docusate)	Soften stool — constipation prevention	Minimal	Critical adjunct — constipation is the #1 cause of poor PD outflow.

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NCLEX Test Traps

WRONG-VS-RIGHT · THE ANSWERS STUDENTS MISS

✗ WRONG

Warm the dialysate in the microwave.

✓ RIGHT

Dry heat only (warming cabinet or pad). Microwaves heat unevenly and scald the peritoneum.

✗ WRONG

Cloudy effluent is normal in the first few exchanges.

✓ RIGHT

Cloudy = peritonitis until proven otherwise. Culture the effluent and notify HCP. (Brief blood-tinge can be expected early — not cloudiness.)

✗ WRONG

If outflow is sluggish, apply gentle suction with a syringe.

✓ RIGHT

Gravity drainage only. Check kinks → reposition (turn side to side) → ambulate → assess for constipation.

✗ WRONG

Hold heparin when added to dialysate because of bleeding risk.

✓ RIGHT

IP heparin is **not systemically absorbed**. Safe to add; it prevents fibrin clots in the catheter.

✗ WRONG

PD is too slow for hemodynamically unstable patients — use HD.

✓ RIGHT

PD is preferred in hemodynamic instability because fluid shifts are gentler. HD causes rapid shifts.

✗ WRONG

Restrict protein intake because dialysis takes care of it.

✓ RIGHT

HIGH-protein diet (1.2–1.5 g/kg/day). PD removes 5–15 g of protein daily in the effluent.

✗ WRONG

The masks-for-exchanges rule applies only to the patient.

✓ RIGHT

Both nurse and patient mask up during connect/disconnect — droplet contamination of the transfer set is the most common peritonitis route.

✗ WRONG

Use 4.25% dextrose for every exchange to remove maximum waste.

✓ RIGHT

Concentration is **matched to fluid status**. 4.25% is reserved for fluid overload — chronic use → hyperglycemia + peritoneal membrane damage.

✗ WRONG

Daily weight is optional if I&O is accurate.

✓ RIGHT

Daily weight is mandatory — same time, same scale, same clothes, empty cavity. It is the single best indicator of ultrafiltration.

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Patient & Family Education

HOME PD SUCCESS DEPENDS ON THE PATIENT MASTERING TECHNIQUE

1

Wash hands before every exchange.

Hand hygiene is the single most important infection-prevention step.

2

Wear a mask during exchanges.

Cover nose and mouth from connection to disconnection.

3

Inspect effluent every time.

Clear pale yellow = good. Cloudy, bloody, or fibrinous = call.

4

Weigh daily.

Same scale, same clothes, same time. Bring log to clinic visits.

5

Care for the exit site.

Clean per protocol; keep dry; secure catheter to prevent pulling. No tub baths or swimming until healed; showers OK.

6

Eat a HIGH-protein diet.

1.2–1.5 g/kg/day. Limit Na⁺, K⁺, phosphorus. Follow fluid restriction.

7

Monitor BP & blood glucose.

Especially diabetics — dextrose dialysate raises sugars.

8

Avoid heavy lifting (>10 lbs).

Increased intra-abdominal pressure → hernia & leak.

9

Prevent constipation aggressively.

Stool softeners, fluid as allowed, mobility. Constipation is the #1 cause of outflow failure.

10

Call immediately if:

Cloudy effluent, fever, abdominal pain, exit site redness, blood in effluent, inability to drain, or sudden weight gain >2 lbs/day.

8

Memory Boosters

MNEMONICS · PATTERN RECOGNITION · TEST-DAY RECALL

Cloudy = Call

THE SINGLE RULE THAT BUYS YOU A QUESTION

Effluent is the diagnostic specimen. **Cloudy effluent** = peritonitis until proven otherwise → culture & notify HCP.

WARM · ASEPTIC · GRAVITY

THE 3 PRINCIPLES OF EVERY PD EXCHANGE

- **W** Warm the dialysate (dry heat)
- **A** Aseptic technique (both masked)
- **G** Gravity for fill & drain (no suction)

PD-DANGER

COMPLICATIONS TO SCAN FOR

- **P** Peritonitis (cloudy effluent)
- **D** Drainage problem (constipation / kink)
- **D** Dyspnea (diaphragm pressure)
- **A** Abdominal pain
- **N** Nutrition — protein loss
- **G** Glucose elevated
- **E** Exit site infection
- **R** Respiratory compromise

3 P's of PD

THE HIGH-YIELD TRIAD

- **P** Protein loss → high-protein diet
- **P** Peritonitis → cloudy effluent
- **P** Position → turn side to side if outflow slow

CRAMPS Causes

WHY THE PATIENT HURTS DURING FILL

- **C** Cold dialysate
- **R** Rapid infusion
- **A** Air in tubing
- **M** More volume than usual
- **P** Position (catheter tip)
- **S** Solution acidity

"4-2-1" Rule (CAPD)

QUICK REFERENCE

- **4** exchanges per day (typical CAPD)
- **2** liters per exchange (adult)
- **1** cycler at night (APD alternative)

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NCJMM Clinical Judgment Scenario

NEXT GEN NCLEX · 6 STEPS OF CLINICAL JUDGMENT

SCENARIO

A 58-year-old man with ESRD on CAPD (8 months, 4 exchanges/day at home) presents to the clinic with worsening abdominal pain for 12 hours. He reports his effluent looks "milky" today. **Vital signs:** T 101.2 °F (38.4 °C) · HR 108 · BP 92/58 · RR 22 · SpO₂ 95%. Abdomen is diffusely tender with positive rebound and hypoactive bowel sounds. Exit site is clean, dry, and intact. **WBC 16,000.** When asked about technique, he mentions he ran out of masks last week "for a couple exchanges."

STEP 1

Recognize Cues

- › Cloudy / "milky" effluent
- › Fever 101.2 °F (38.4 °C)
- › Tachycardia (HR 108) + hypotension (BP 92/58)
- › Diffuse abdominal pain with rebound tenderness
- › Hypoactive bowel sounds
- › WBC 16,000 (leukocytosis)
- › Reported breach in aseptic technique (no mask)

STEP 2

Analyze Cues

- › The triad **cloudy effluent + abdominal pain + fever** is classic for PD-associated peritonitis
- › Rebound tenderness signals peritoneal inflammation
- › Tachycardia + hypotension + leukocytosis = developing **sepsis**
- › Missed masks during exchanges = likely portal of entry (skin flora — Staph spp.)
- › Exit site is clean — infection likely tracked via catheter lumen, not site

STEP 3

Prioritize Hypotheses

- 1 **PD-associated peritonitis with early sepsis** — highest priority (ABC threat, time-critical)
- 2 Catheter tunnel or exit-site infection — lower priority (site clean)
- 3 Bowel perforation — consider if not improving on antibiotics within 48–72 h
- 4 Volume depletion from excess ultrafiltration — less likely (cloudy effluent is the dominant cue)

STEP 4

Generate Solutions

- › Collect effluent specimen for **cell count, Gram stain, and culture BEFORE** any antibiotic
- › Obtain blood cultures × 2 from two separate sites
- › Notify nephrologist and HCP immediately
- › Anticipate **empirical IP antibiotics** per ISPD: vancomycin + ceftazidime (or aminoglycoside)
- › Establish IV access; prepare for fluid resuscitation per sepsis bundle
- › Continuous monitoring: VS q15min until stable; cardiac monitor
- › Pain assessment & management
- › Plan to continue PD with antibiotic-containing dialysate (not removal of catheter at this point)
- › Reinforce aseptic technique & arrange supply replacement after acute phase

STEP 5

Take Action

- › Collect effluent specimen **FIRST** — do not start antibiotics before culture

- › Establish IV access; draw blood cultures × 2
- › Notify HCP STAT — report cloudy effluent, fever, hypotension, tachycardia
- › Begin prescribed IP antibiotic exchange once cultures obtained
- › Administer prescribed IV fluids; titrate to MAP ≥ 65
- › Reassess VS, pain, and abdominal exam frequently
- › Document effluent characteristics, exchange volume, all interventions

STEP 6

Evaluate Outcomes

- › **Effective:** Effluent clears within 72–96 h · afebrile · VS stable · pain resolves · effluent WBC < 100 cells/mm³ · negative cultures by day 5
- › **Ineffective / Escalate:** Effluent remains cloudy > 5 days · persistent fever · worsening peritoneal signs · positive cultures despite therapy → consider **catheter removal**, resistant organism, or surgical complication
- › **Long-term:** Patient demonstrates correct masking, hand hygiene, and effluent inspection at discharge

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