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Certified Nephrology Nurse - 202

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Question: 1532

A patient on APD reports fever and chills. The nurse observes redness at the catheter exit site and obtains an exit-site culture. Which finding confirms an exit-site infection?

- A. Culture positive for Escherichia coli
- B. Serum C-reactive protein 10 mg/L
- C. Effluent cell count 50/ μ L, 40% neutrophils
- D. Culture positive for *Staphylococcus aureus*

Answer: D

Explanation: *Staphylococcus aureus* is the most common cause of exit-site infections in PD patients, presenting with redness and fever. *Escherichia coli* is less likely, effluent cell count suggests peritonitis, and C-reactive protein is nonspecific.

Question: 1533

A Tenckhoff catheter exit site shows erythema and slight crusting. Which prophylactic measure is most effective in preventing progression to infection?

- A. Apply gentamicin cream daily
- B. Cleanse with alcohol swabs
- C. Use mupirocin cream daily
- D. Cover with occlusive dressing

Answer: C

Explanation: Daily mupirocin application at the Tenckhoff catheter exit site is effective in preventing infections, particularly by *Staphylococcus aureus*. Gentamicin is less effective against common organisms, alcohol swabs may irritate the site, and occlusive dressings increase infection risk.

Question: 1534

A patient with TMA on TPE has a pre-TPE LDH of 1200 U/L and haptoglobin <10 mg/dL. After 1.5 plasma volume exchanges with FFP, the LDH is 900 U/L. What is the most likely haptoglobin level post-TPE?

- A. <10 mg/dL
- B. 50–100 mg/dL
- C. 20–40 mg/dL
- D. >150 mg/dL

Answer: C

Explanation: TMA causes hemolysis, reducing haptoglobin (<10 mg/dL) and elevating LDH. TPE with FFP replaces haptoglobin and removes hemolysis mediators. A 1.5 plasma volume exchange removes ~78% of plasma constituents, replacing them with FFP (haptoglobin ~50–200 mg/dL). Post-TPE, haptoglobin rises modestly (20–40 mg/dL), reflecting partial restoration, while LDH decreases (1200 to 900 U/L), indicating reduced hemolysis.

Question: 1535

A 50-year-old female with AKI due to rhabdomyolysis has a serum creatine kinase of 25,000 U/L. Which electrolyte abnormality is most likely to occur acutely?

- A. Hyperkalemia
- B. Hypercalcemia
- C. Hypomagnesemia
- D. Hyponatremia

Answer: A

Explanation: Rhabdomyolysis causes muscle breakdown, releasing potassium into the bloodstream, leading to hyperkalemia, especially in AKI where renal potassium excretion is impaired. This can be life-threatening. Hypercalcemia is rare acutely but may occur in recovery. Hypomagnesemia is not typical, and hyponatremia is less likely unless significant fluid overload or dilution occurs.

Question: 1536

What is the primary advantage of CVVH over CVVHD in managing cytokine storm in sepsis?

- A. Higher convective clearance
- B. Better clearance of small solutes
- C. Lower anticoagulation needs
- D. Reduced filter clotting

Answer: A

Explanation: CVVH uses convection, which is more effective for clearing middle-molecular-weight molecules like cytokines in sepsis. CVVHD relies on diffusion, better for small solutes. Anticoagulation needs and filter clotting risks are similar between modalities.

Question: 1537

A 60-year-old patient with CKD-MBD has a serum phosphate of 6.5 mg/dL and calcium of 8.0 mg/dL. The nephrologist prescribes calcium acetate. When should the patient take this medication?

- A. At bedtime
- B. With meals
- C. Only when needed
- D. First thing in the morning

Answer: B

Explanation: Calcium acetate, a phosphate binder, should be taken with meals to bind dietary phosphate in the gut, reducing absorption. Timing at bedtime, morning, or as needed is less effective.

Question: 1538

A patient on APD with 5 cycles (2 L, 2.5% dextrose, 2-hour dwells) and a daytime icodextrin dwell has a PET indicating high transport status. Ultrafiltration is 500 mL/day, and the patient has edema and a 4 kg weight gain. What is the most appropriate intervention?

- A. Increase cycles to 6 with 1.5% dextrose
- B. Replace icodextrin with 2.5% dextrose
- C. Reduce cycle time to 1.5 hours
- D. Switch to 4.25% dextrose for all cycles

Answer: D

Explanation: High transporters lose the glucose gradient quickly, reducing ultrafiltration. Switching to 4.25% dextrose increases the osmotic gradient, improving fluid removal to address edema and weight gain. Increasing cycles with 1.5% dextrose is less effective, reducing cycle time may not sufficiently enhance ultrafiltration, and replacing icodextrin with 2.5% dextrose for the long dwell risks reabsorption.

Question: 1539

In CVVH, a patient's effluent rate is 28 mL/kg/h for a 60 kg patient. What is the total effluent volume over 24 hours?

- A. 1680 mL
- B. 6720 mL

- C. 5040 mL
- D. 40320 mL

Answer: D

Explanation: For a 60 kg patient, an effluent rate of 28 mL/kg/h equals $28 \times 60 = 1680$ mL/h. Over 24 hours, $1680 \times 24 = 40,320$ mL (40.32 L).

Question: 1540

A 50-year-old female, 5 years post-deceased donor renal transplant, has a serum creatinine of 1.8 mg/dL (baseline 1.3 mg/dL). Biopsy shows chronic allograft nephropathy (Banff grade II). Her immunosuppression includes tacrolimus, MMF, and prednisone. Which factor is most strongly associated with reduced graft survival in this scenario?

- A. Chronic calcineurin inhibitor toxicity
- B. History of acute rejection
- C. Donor age >60 years
- D. Recipient BMI >35 kg/m²

Answer: B

Explanation: A history of acute rejection is a strong predictor of reduced graft survival, as it contributes to cumulative immune-mediated damage, accelerating chronic allograft nephropathy. While calcineurin inhibitor toxicity, older donor age, and high BMI are risk factors, prior acute rejection has a more significant impact due to its direct effect on long-term graft function.

Question: 1541

A dialysis facility's RO system operates at 150 psi with a permeate flow of 60 L/min and a concentrate flow of 20 L/min. What is the recovery rate?

- A. 75%
- B. 60%
- C. 80%
- D. 85%

Answer: A

Explanation: Recovery rate = [Permeate flow / (Permeate flow + Concentrate flow)] × 100 = [60 / (60 + 20)] × 100 = 75%, indicating efficient water use per AAMI RD62:2014 guidelines.

Question: 1542

A 47-year-old patient on CAPD reports a bulge near the PD catheter site, exacerbated by coughing. The bulge is tender and irreducible. What is the most likely complication, and what is the immediate management?

- A. Encapsulating peritoneal sclerosis; start corticosteroids
- B. Peritoneal leak; reduce dwell volume
- C. Incisional hernia; urgent surgical consultation
- D. Tunnel infection; initiate antibiotics

Answer: C

Explanation: A tender, irreducible bulge near the PD catheter site, worsened by coughing, suggests an incarcerated incisional hernia, a serious complication requiring urgent surgical consultation to prevent strangulation. EPS involves systemic symptoms and fibrosis, not a localized bulge. Peritoneal leaks cause diffuse or scrotal edema, and tunnel infections present with erythema or discharge, not an irreducible mass.

Question: 1543

Which component of the RAAS is most directly responsible for increasing sodium reabsorption in the distal nephron, contributing to blood pressure regulation?

- A. Angiotensin II
- B. Aldosterone
- C. Renin
- D. Vasopressin

Answer: B

Explanation: Aldosterone, a RAAS hormone, acts on the distal tubule and collecting duct to increase sodium reabsorption via epithelial sodium channels (ENaC), promoting water retention and elevating blood pressure. Angiotensin II stimulates aldosterone release, renin initiates the cascade, and vasopressin regulates water reabsorption.

Question: 1544

A 55-year-old patient with thrombotic microangiopathy is undergoing daily TPE. The nurse calculates the patient's plasma volume using the formula: $\text{Plasma Volume (L)} = [0.065 \times \text{weight (kg)}] \times (1 -$

hematocrit). If the patient weighs 80 kg and has a hematocrit of 40%, what is the plasma volume?

- A. 2.88 L
- B. 3.84 L
- C. 3.36 L
- D. 3.12 L

Answer: D

Explanation: Plasma volume = $[0.065 \times 80] \times (1 - 0.4) = 5.2 \times 0.6 = 3.12$ L. This calculation accounts for the patient's weight and hematocrit to determine the plasma volume for TPE planning.

Question: 1545

A patient with CKD has a hemoglobin of 9 g/dL. What is the primary renal mechanism contributing to this anemia?

- A. Increased hemolysis in glomeruli
- B. Reduced erythropoietin production
- C. Decreased iron reabsorption
- D. Enhanced cytokine production

Answer: B

Explanation: CKD reduces erythropoietin production by peritubular interstitial fibroblasts, impairing red blood cell production and causing anemia. Hemolysis, iron reabsorption, and cytokines are secondary or unrelated.

Question: 1546

A 39-year-old female kidney transplant recipient is on cyclosporine with a trough level of 200 ng/mL. She develops gingival hyperplasia and hirsutism. Which modification to her calcineurin inhibitor regimen is most appropriate?

- A. Continue cyclosporine and treat symptoms
- B. Switch to tacrolimus
- C. Reduce cyclosporine dose to target 100–150 ng/mL
- D. Increase cyclosporine to target 250 ng/mL

Answer: B

Explanation: Gingival hyperplasia and hirsutism are common side effects of cyclosporine. Switching to

tacrolimus, which has a lower incidence of these side effects, is appropriate while maintaining effective immunosuppression. Reducing the dose may compromise efficacy, and continuing cyclosporine does not address the adverse effects.

Question: 1547

A home HD patient's caregiver reports a temperature of 38.5°C and chills during a session. The patient's WBC count is 14,000/ μ L. What should the caregiver do first?

- A. Administer oral acetaminophen 500 mg
- B. Collect blood cultures
- C. Stop dialysis and notify the center
- D. Switch to a low-flux dialyzer

Answer: C

Explanation: Fever (38.5°C), chills, and leukocytosis (14,000/ μ L) during HD suggest a possible infection (e.g., access-related). Stopping dialysis and notifying the center is critical for evaluation and treatment. Acetaminophen treats symptoms, blood cultures require medical supervision, and changing dialyzers is irrelevant.

Question: 1548

A patient on APD with a 2.5% dextrose dialysate achieves a weekly Kt/V of 1.6, below the target of 1.7. The PET shows a D/P creatinine ratio of 0.55, indicating a low-average transporter. What modification to the prescription is most likely to improve Kt/V?

- A. Increase cycle volume to 2.5L
- B. Increase dwell time to 90 minutes per cycle
- C. Reduce dextrose to 1.5%
- D. Switch to CAPD with four exchanges

Answer: B

Explanation: A D/P creatinine ratio of 0.55 indicates a low-average transporter, with slower solute clearance. Increasing dwell time to 90 minutes per cycle in APD enhances solute diffusion, improving Kt/V. Increasing volume or switching to CAPD may not be as effective, and reducing dextrose could compromise ultrafiltration.

Question: 1549

A 67-year-old patient with CKD undergoes a kidney biopsy showing lupus nephritis. Which laboratory finding is most specific for this diagnosis?

- A. Normal urine albumin-to-creatinine ratio
- B. Normal serum complement levels
- C. Negative ANA test
- D. Elevated anti-dsDNA antibodies

Answer: D

Explanation: Elevated anti-dsDNA antibodies are highly specific for lupus nephritis, reflecting autoimmune glomerular damage. Low complement levels, not normal, are typical. A negative ANA test and normal uACR are inconsistent with active lupus nephritis.

Question: 1550

A patient on CVVH with a polysulfone filter experiences a sudden increase in venous return pressure from 80 mmHg to 200 mmHg over 30 minutes. The ultrafiltration rate is 1.5 L/h, and heparin anticoagulation is used (aPTT 60 seconds). What is the most appropriate next step?

- A. Administer a 1000-unit heparin bolus
- B. Increase ultrafiltration rate to 2 L/h
- C. Switch to citrate anticoagulation
- D. Rinse back the circuit and replace the filter

Answer: D

Explanation: A rapid increase in venous return pressure suggests filter clotting, as clots increase resistance in the circuit. The aPTT (60 seconds) indicates therapeutic anticoagulation, making additional heparin unnecessary. Increasing ultrafiltration worsens clotting by concentrating blood in the filter. Switching to citrate may prevent future clotting but doesn't address the current clot. Rinsing back the blood (if not fully clotted) and replacing the filter is the standard response to circuit clotting.

Question: 1551

Which renal mechanism compensates for respiratory alkalosis?

- A. Increased potassium reabsorption
- B. Increased hydrogen ion secretion
- C. Decreased bicarbonate reabsorption
- D. Reduced ammonium excretion

Answer: C

Explanation: In respiratory alkalosis, the kidneys compensate by decreasing bicarbonate reabsorption, primarily in the proximal tubule, to reduce plasma pH. Hydrogen ion secretion decreases, potassium reabsorption is unrelated, and ammonium excretion is not the primary response.

Question: 1552

A 70-kg patient on SLED for AKI has a prescribed urea clearance (Kt/V) goal of 0.8 per session. The dialysis parameters are Qb 180 mL/min, Qd 300 mL/min, and session duration of 10 hours. The dialyzer has a urea clearance rate of 160 mL/min at these settings. Calculate the delivered Kt/V and determine if the prescription meets the goal.

- A. 0.85, meets goal
- B. 0.72, does not meet goal
- C. 0.90, meets goal
- D. 0.76, does not meet goal

Answer: B

Explanation: Kt/V is calculated as (dialyzer clearance \times time) / volume of distribution (V). Here, clearance (K) is 160 mL/min, time (t) is 10 hours (600 min), and V is estimated as $0.6 \times$ body weight = $0.6 \times 70 \text{ kg} = 42 \text{ L}$ (42,000 mL). $Kt = 160 \text{ mL/min} \times 600 \text{ min} = 96,000 \text{ mL}$. $Kt/V = 96,000 / 42,000 = 2.29$ for the session, but since SLED targets a per-session Kt/V, we adjust for daily equivalence. For 10 hours, $Kt/V \approx 0.72$ ($96,000 / (42,000 \times 1.33)$, as 24/10 adjustment)). This is below the goal of 0.8, so it does not meet the target.

Question: 1553

In a patient with AKI, which intervention is most critical to prevent progression to intrinsic renal damage in the prerenal stage?

- A. Correction of hypovolemia
- B. Administration of loop diuretics
- C. Initiation of dialysis
- D. Use of nephrotoxic contrast agents

Answer: A

Explanation: Correcting hypovolemia in prerenal AKI restores renal perfusion, preventing ischemia and progression to intrinsic damage (e.g., acute tubular necrosis). Diuretics may worsen dehydration, dialysis is premature, and contrast agents are nephrotoxic.

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