**Maryland Next Gen NCLEX Test Bank Project**

**September 1, 2022**

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| **Case Study Topic**(& Standalone bowtie) | End stage renal disease and dialysis  | **Author** | Laura Sessions PhD, MScN, RN, CNETownson University  |

**Case Summary**

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| A 35-year-old female with end-stage renal disease (ESRD) secondary to chronic glomerulonephritis has been on peritoneal dialysis (PD) for approximately 6 months. Is admitted to the medical surgical unit with abdominal pain and fever. She is admitted to the unit with a diagnosis of R/O peritonitis. |

**Bow-tie Summary**

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| A 39-year-old male with end stage renal failure on hemodialysis is seen in the emergency department with signs and symptoms of septicemia.  |

**Objectives**

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| 1. Recognize signs and symptoms of peritonitis.
2. Differentiate diagnostic findings associated with ESRD versus peritonitis.
3. Plan care for a client with ESRD who develops peritonitis.
4. Determine appropriate delegation for interventions needed to provide care to the client.
5. Evaluate the effectiveness of the plan of care.
 |

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| --- | --- |
| **Case Study Link** | **Case Study QR Code** |
| <https://umaryland.az1.qualtrics.com/jfe/form/SV_d76sxmjHW6XOqTc> |  |
| **Bow-tie QR Code** | **Bow-tie Link** |
|  | <https://umaryland.az1.qualtrics.com/jfe/form/SV_8239FzxAw851hzw> |

**Case References**

|  |
| --- |
| Hinkle, J.L., Cheever, K.H., & Overbaugh, K. (2021). Brunner & Suddarth's Textbook of Medical-Surgical Nursing (15th ed.). Wolters Kluwer. |

**Case Study Question 1 of 6**

A 35-year-old female with end stage renal disease on peritoneal dialysis is admitted to the medical surgical unit unit with abdominal pain and fever.

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| **Admission Note** |
| 35-year-old female was diagnosed with chronic glomerulonephritis five years ago. Chronic kidney disease progressed to end stage renal disease (ESRD) over last year. Client was started on automated peritoneal dialysis six months ago. She developed fever, vomiting, and abdominal pain 1 day ago. Current assessment: T 39.1 °C, (102.40 F), HR 104, RR 16, B/P 145/ 87 mmHg. Weight: 66.8 Kg/147 lbs. NKDA. Periumbilical tenderness, defense and rebound. Erythema and creamy, yellow exudate around peritoneal dialysis catheter exit site. Dialysate effluent is cloudy yellow. Peritoneal effluent culture was obtained. Labs sent.  |
| **Laboratory Report** |
| Lab | Results | Reference range  |
| BUN | 46 mg/dL | 10-20 mg/dL |
| Creatinine (Serum) | 10.7 mg/dL | 0.9 to 1.4 mg/dL |
| C-reactive protein | 61.5 mg/L. | < 1.0 mg/dL |
| Albumin | 3.7 g/L | 3.4 to 5.4 g/dL |
| Potassium (serum) | 5.86 mEq/L | 3.5 to 5 mEq/L |
| Sodium (serum) | 144 mEq/L | 135 to 145 mEq/L |
| Calcium | 7.9 mg/dL | 8.6 to 10.3 mg/dL |
| Phosphorous | 5.8 mg/dL | 2.8 to 4.5 mg/dL |
| Hemoglobin | 10.6 g/dL | Females:12-16 g/dL |
| Hematocrit | 31% | Females: 35-47% |
| Serum WBC | 14.22 × 109 cells/L | 4.5 – 10.5 x 103 cells/mm3 |
| Serum Neutrophils | 89.8% | 55-70% |
| Dialysate WBC | 483 cells/μL  | Few |
| Dialysate polymorphonuclear cells | 63% | Few |

* Which 5 findings are the **most** concerning?

|  |
| --- |
| * Temperature\*
 |
| * Heart rate
 |
| * Respiratory rate
 |
| * Blood pressure
 |
| * Periumbilical tenderness\*
 |
| * Peritoneal dialysis catheter exit site\*
 |
| * BUN
 |
| * Creatinine
 |
| * Serum WBC\*
 |
| * Dialysate WBC\*
 |

**Scoring Rule: 0/1**

**Rationale**: Fever, abdominal pain, elevated WBC in the serum and dialysate effluent are indications of peritonitis, a potentially life-threatening complication of peritoneal dialysis. Although the BUN and creatinine are high for an individual without renal failure, these values are typical of a client with end stage renal disease on peritoneal dialysis. The blood pressure and heart rate are only slightly elevated, so are not a priority at this time. The respiratory rate is within normal range for an adult. Erythema and creamy, yellow exudate around the peritoneal dialysis catheter exit site indicate the possible presence of an exit site infection, which may be the source of the peritonitis.

**Case Study Question 2 of 6**

A 35-year-old female with end stage renal disease on peritoneal dialysis is admitted to the medical surgical unit unit with abdominal pain and fever.

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* For each client finding, click to specify if the finding supports the diagnosis of peritonitis or end stage renal disease (ESRD). Each finding may support more than one condition. Each column must have at least 1 option selected.

|  |  |  |
| --- | --- | --- |
| Findings | Peritonitis | End Stage Renal Disease (ESRD) |
| BUN 46 mg/dL |  | * \*
 |
| Creatinine 11.7 mg/dL |  | * \*
 |
| C-reactive protein 61.5 mg/L. | * \*
 |  |
| Potassium (serum) 5.86 mEq/L |  | * \*
 |
| Phosphorous 5.4 mg/dL |  | * \*
 |
| Hemoglobin 10.6 g/dL |  | * \*
 |
| WBC 14.22 × 109 cells/L | * \*
 |  |
| Neutrophils 89% | * \*
 |  |

**Scoring Rule: +/-**

**Rationale:** C-reactive protein is an inflammatory marker and is elevated in the presence of infection and inflammation. BUN, creatinine, and potassium imbalances are common in clients with ESRD associated with the inability of the client’s kidneys to excrete waste products. Anemia is indicated by the low hemoglobin and hematocrit. This is a result of the kidney’s inability to produce erythropoietin in client’s with ESRD. Elevated WBC and neutrophil levels are diagnostic of infection.

**Case Study Question 3 of 6**

A 35-year-old female with end stage renal disease on peritoneal dialysis is admitted to the medical surgical unit unit with abdominal pain and fever.

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| **Admission Note** |
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The client is diagnosed with peritonitis.

* Drag the most appropriate word from the choices to fill in the blank of the following sentence.

The client is at highest risk for developing

|  |
| --- |
| Word Choices |
| Abdominal abscess |
| Cellulitis |
| Pyelonephritis |
| Sepsis\* |

**Scoring Rule: 0/1**

**Rationale:** Approximately 11% of ESRD patients with peritonitis develop sepsis. Sepsis is a general term used to characterize an immune system response to an infection. In sepsis the chemicals from the body's own defenses trigger inflammatory responses, which can impair blood flow to organs, like the brain or heart. This in turn can lead to organ failure and tissue damage. At its most severe, the body's response to infection can cause dangerously low blood pressure, a sign of septic shock. The mortality from septic shock is about 33%.

**Case Study Question 4 of 6**

A 35-year-old female with end stage renal disease on peritoneal dialysis is admitted to the medical surgical unit unit with abdominal pain and fever.

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| **Laboratory Report** |
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| **Microbiology** |  |
| Type of sample: Dialysate effluentPreliminary visual report: Gram-negative rods |

The nurse reviews new lab information

* Based on the new lab data, for each potential order, click to specify whether the order is appropriate or not appropriate to include in the plan of care.

|  |  |  |
| --- | --- | --- |
| Potential order | Appropriate | Not Appropriate |
| Daily weights | * \*
 |  |
| Blood cultures STAT | * \*
 |  |
| Peritoneal dialysis catheter care Q shift | * \*
 |  |
| IVF D5 ½ NS with 20mEq/l KCl at 120 ml/hr |  | * \*
 |
| Calcium carbonate with meals  | * \*
 |  |
| Vancomycin IV |  | * \*
 |
| Gentamicin intraperitoneally daily  | * \*
 |  |
| Enoxaparin subcutaneous daily |  | * \*
 |
| Epoetin alfa injections | * \*
 |  |

**Scoring Rule: 0/1**

**Rationale for “Not Appropriate”:** IVF: D5 ½ NS with 20mEq/l KCl at 120 ml/hr is not appropriate as client’s with ESRD are oliguric or anuric and this would place the client at risk for developing hypervolemia and hyperkalemia. Vancomycin is not effective against gram-negative pathogens. Unless the patient is septic, antibiotics should be infused intraperitoneally for peritonitis in clients with ESRD on peritoneal dialysis. Enoxaparin is not appropriate in clients with ESRD. This medication is excreted renally, so clients with ESRD cannot clear the medication, leading to a high risk of bleeding.

**Rationale for “Appropriate”**: A daily weight is needed to assess for hypervolemia associated with ESRD. Inflammation of the peritoneum associated with peritonitis may interfere with the efficacy of peritoneal dialysis. Blood cultures are needed to assess for potential bacteremia. Clients with bacteremia may need IV antibiotics in addition to intra-peritoneal antibiotics. PD catheter care is needed to treat the infection. The catheter may need to be removed and reinserted if the infection does not clear. Gentamicin is a good broad-spectrum antibiotic that treats gram-negative bacteria. Once culture results are received, the antibiotic should be adjusted based on sensitivity results. Intra-peritoneal delivery is more effective than IV for peritonitis. Epoetin alfa is used to treat anemia associated with ESRD. In clients with ESRD, the kidneys do not produce enough erythropoietin to stimulate red blood cell production. Calcium carbonate, a phosphate binders must be taken with each meal to prevent the absorption of phosphorus from the gut. Keeping serum phosphate levels within the normal range will prevent serum phosphorus from binding with serum calcium, which lowers the calcium level.

**Case Study Question 5 of 6**

A 35-year-old female with end stage renal disease on peritoneal dialysis is admitted to the medical surgical unit unit with abdominal pain and fever.

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| Type of sample: Dialysate effluentPreliminary visual report: Gram-negative rods |

The nurse leads a team that includes an LPN and an unlicensed assistive personnel (UAP) and plans the client’s care based on the most effective use of the team’s skill mix.

* For each task click to specify if the task should be performed by the RN, the LPN, or the UAP.

|  |  |  |  |
| --- | --- | --- | --- |
| Tasks | RN | LPN | UAP |
| Vital signs |  |  | * \*
 |
| Dialysate exchange | * \*
 |  |  |
| Daily weights |  |  | * \*
 |
| Peritoneal dialysis catheter care Q shift |  | * \*
 |  |
| Intraperitoneally gentamicin  | * \*
 |  |  |
| Peritoneal dialysis catheter care teaching | * \*
 |  |  |

**Scoring Rule: 0/1**

**Rationale:** The UAP provides basic care skills such as hygiene, and collects limited assessment data, such as vital signs and weights. The LPN can perform nursing care in “routine” nursing situations. They can provide non-complicated wound care. They cannot implement “non-routine” care such as administering antibiotics intraperitoneally, providing catheter care teaching or performing a dialysate exchange for a client on peritoneal dialysis. Those tasks must be done by the RN.

**Case Study Question 6 of 6**

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| **Microbiology** |  |
| Type of sample: Dialysate effluentPreliminary visual report: Gram-negative rods |

The nurse teaches the client about peritoneal dialysis catheter care to help prevent future infections.

* Click to specify whether each statement indicates the client understands or does not understand the teaching provided concerning self-care of the peritoneal dialysis catheter.

|  |  |  |
| --- | --- | --- |
| Statement | Understands | Does Not Understand |
| “Before cleaning the area, I will wash my hands with soap and water and put on clean gloves.” | * X
 |  |
| “I should remove crusts or scabs at the exit site before washing the site.” |  | * X
 |
| “I should hold the catheter in place during cleaning to prevent injury to the skin.” | * X
 |  |
| “I should scrub the exit site vigorously with an antiseptic solution like iodine or chlorhexidine.” |  | * X
 |
| “I will put antibiotic cream on the skin around the catheter with a cotton-tip swab every time I change the dressing.” | * X
 |  |
| “I will not use any creams with petroleum because they can damage the catheter.” | * X
 |  |
| “I will leave the exit site open to air or covered by loose clothing.” |  | * X
 |

**Scoring Rule: 0/1**

**Rationale**: Clients should not pick or remove crusts or scabs at the exit site before washing the site. This could tear the skin and increase the risk for site infection. Clients should clean the catheter exit site with a liquid antibacterial soap and a clean cloth. Antiseptics can dry and crack the skin, increasing the risk of infection. The exit site should not be left open to air. It should be covered with sterile gauze, which should be changed every time the site is cleaned.

**Bowtie**

A 39-year-old male with end stage renal failure on hemodialysis dialysis is seen in the emergency department with fever.

|  |
| --- |
| **Emergency Department Nurse’s Admission Note** |
| A 39-year-old male came to the emergency department with shaking chills, and Tmax reported as 101.2F (38.4C). Weight: 109.1 Kg/240 lbs. NKDA. Client has history of end stage renal failure secondary to heroin nephrotoxicity and has been on hemodialysis for approximately 7 months. Current assessment: Client has a left upper arm arterio-venous (AV) fistula with a positive thrill and bruit. The AV fistula is red and inflamed. Labs sent.  |
| **Vital Signs**  |
| Time | 1500 | 1600 |
| Temp | 39.2 °C, (102.60 F | 40.2 °C, (104.40 F) |
| HR | 104 | 121 |
| RR | 18 | 26 |
| B/P | 150/92 | 100/64 |
| Pulse oximeter | 95% room air | 90% room air |
| Pain (AV site) | 6 | 8 |

* Based on the client information, complete the diagram by dragging a response from the choices below to specify what condition the client is most likely experiencing, **2** actions the nurse should take to address that condition, and **2** parameters the nurse should monitor to assess the client’s progress.

|  |  |  |
| --- | --- | --- |
| Action to take |  | Parameter to monitor |
|  | Condition most likely experiencing |  |
| Action to take |  | Parameter to monitor |
| **Actions to take** | **Potential conditions** | **Parameters to monitor** |
| Administer oxygen\* | Cardiogenic shock | Pain |
| Raise head of bed | Adult respiratory distress syndrome | Urinary output |
| Administer broad-spectrum antibiotics IV\* | Multisystem organ failure | Pulse oximeter\* |
| Prepare for intubation | Septicemia\* | Blood pressure\* |
| Begin epinephrine drip |  | Liver enzymes |

**Scoring Rule: 0/1**

**Rationale:** The client has evidence of a skin infection at the AV site. The drop in blood pressure and pulse oximeter readings suggest the client has septicemia and is developing septic shock. Antibiotics and oxygen are most needed. The nurse should monitor the client’s perfusion by watching for changes in the pulse oximeter and blood pressure. Urine output is not a good measure of perfusion in a client on dialysis.