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Medical Diagnosis/Disease: Urinary Tract Infection

NCLEX IV *(8)*: Physiological Integrity/Physiological Adaptation

Anatomy and Physiology

Normal Structures

Kidneys are the main organs of the urinary system. The main functions of the kidneys are regulating extracellular fluid and excreting waste products from the body. The kidneys also play a key role in BP regulation, erythropoietin production, activating vitamin D, and regulating acid-base balance. The kidneys are located on each side of the T12 vertebrae to the L3 vertebrae. The weight of each kidney is roughly 4-6 oz and are 5 inches in size. Each kidney has an adrenal gland located on top of them. Fat and connective tissue surround the kidneys to maintain the position. The capsule is the shock absorber that protects the kidneys from trauma. On the medial side of the kidneys, the hilus is the entry point for the renal artery and nerves; the renal vein and ureter also exit here. The tissue of the kidneys is called the parenchyma. The parenchyma also has layers: the cortex which is the outer layer and the medulla which is the inner layer. The medulla has pyramids in which urine passes through, into the calyces. The minor calyces widen and merge to the major calyces which form the renal pelvis. Urine is transported through the calyces to the renal pelvis, it then drains into the ureters to the bladder and is excreted through the urethra. The renal pelvis can hold up to 5 mL of urine as well. The functional unit of the kidney the facilitates diffusion and reabsorption of solutes is the nephron. The kidneys receive a large amount of blood in addition to urine. Roughly 1200 mL of blood flows to the kidneys per minute and accounts for 20-25% of CO. Urine is formed from filtration, reabsorption, secretion, and excretion of water, electrolytes, and metabolic waste products. The primary function

Pathophysiology of Disease

Escherichia Coli is the most common pathogen that causes UTIs. Fungal and parasitic infections may also cause UTIs- these pathogens are more common in immunosuppressed patients, patients with diabetes or kidney issues, and those who have been on long courses of Abx. UTIs are classified as upper and lower infections depending on the location in the urinary system. UTIs are also classified as complicated or un-complicated. Un-complicated UTIs occur in an otherwise normal urinary tract, and usually only involve the bladder. Complicated UTIs occur in individuals with underlying disease or structural problems within the urinary tract. Complicated infections can occur when the individual has developed antibiotic resistance, is immunocompromised, has pregnancy induced changes, or has recurrent infections. Complicated UTIs puts the individual at risk for pyelonephritis (inflammation of the renal parenchyma), urosepsis (a UTI that has spread systemically), and renal damage. The urinary tract of the urethra is sterile. Defense mechanisms that ensure sterility include normal voiding with complete bladder emptying, ureterovesical junction competence, and ureteral peristaltic activity that pro pels urine to the bladder. Antibacterial properties of urine are maintained by slightly acidic pH (6-7.5) and abundant antimicrobial proteins and peptides that interfere with bacterial growth. A change in these mechanism increases the risk for infection. The organisms that cause infection usually come from the perineum. The organisms enter the system via the ascending route from the urethra. Most infections are caused by gram-negative bacilli normally found in the GI tract. However, gram-positive organisms can also cause UTIs. A common factor contributing to

NCLEX IV *(7)*: Reduction of Risk

Anticipated Diagnostics

Labs

Dipstick UA, clean-catch urine sample, culture and sensitivity (to identify proper Abx required)

Additional Diagnostics

U/S, CT, cystoscopy

of the kidneys is to filter waste and maintain interstitial homeostasis. The urinary bladder is located behind the symphysis pubis and anterior to the vagina and rectum. It acts as a reservoir for urine and to eliminate waste products from the body. The trigone is the triangular area formed by the 2 ureteral openings and the bladder neck at the base of the bladder. The bladder muscle (detrusor) is made up of smooth muscle fibers. This muscle aids in contraction of bladder emptying during a void. The bladder is lined by transitional cell epithelium referred to as the urothelium. The urothelium is unique as it is resistant to absorption of urine. The bladder, urethra, and pelvic floor muscles form the ureterovesical unit. Voluntary control of this unit is referred to as continence. Stimulating and inhibiting impulses are sent from the brain through the thoracolumbar and sacral areas of the spinal cord to control voiding. Urine formation begins in the glomerulus where blood is also filtered. Hydrostatic pressure of blood in the capillaries of glomerulus causes blood to filter across the Bowman capsule's semipermeable membrane. The amount of blood filtered each minute by the glomeruli is the GFR. A normal GFR is 125 mL/minute however, only 1 mL/min is excreted as urine. Reabsorption of essential material occurs in the tubules and collecting ducts. 80% of electrolytes are reabsorbed in the proximal convoluted tubules. The kidneys also produce RBCs and regulate the BP. Erythropoietin made in the kidneys stimulate RBCs in the bone marrow. Renin also secreted by the kidneys regulates the BP by increasing it through the RAAS system if BP is low, and renal perfusion is decreased.	ascending infection is urologic instrumentation. This allows for bacteria that are normally present at the opening of the urethra to enter the urethra or bladder. Sexual intercourse promotes "milking" of bacteria from the vagina and perineum. UTIs can result from hematogenous transmission (blood-borne bacteria invade the kidneys, ureters, or bladder from somewhere else in the body).	

NCLEX II *(3)*: **Health Promotion and Maintenance**

NCLEX IV *(7)*: **Reduction of Risk**

Contributing Risk Factors	Signs and Symptoms	Possible Therapeutic Procedures	Prevention of Complications
Foley catheter insertion/urological procedures, sexual intercourse, improper hygiene	Painful urination, dysuria, frequency, urgency, suprapubic discomfort/pressure, Urine: hematuria, sediment, cloudy appearance **Upper UTI**: fever, chills, flank pain	Non-surgical N/A Surgical N/A	(What are some potential complications associated with this disease process) Pyelonephritis, urosepsis, kidney damage, urethritis, cystitis

NCLEX IV *(6)*: **Pharmacological and Parenteral Therapies**

Anticipated Medication Management
Abx-amoxicillin, ampicillin, fluroquinolones, cephalosporins (empiric or matched to C/S results)

NCLEX IV *(5)*: **Basic Care and Comfort**

Non-Pharmacologic Care Measures
Education on prevention, promoting adequate hydration

NCLEX III *(4)*: **Care Needs**

What stressors might a patient with this diagnosis be experiencing?
Patients may have a fear of recurrent infections; lack of knowledge may also be an issue in preventing recurrent UTIs

Client/Family Education

List 3 potential teaching topics/areas
•Teach importance of taking full course of Abx •Educated on importance of adequate daily hydration •Educate on voiding regularly (Q3-4hr), and before sexual intercourse

NCLEX I *(1)*: **Safe and Effective Care Environment**

Multidisciplinary Team Involvement
(Which other disciplines do you expect to share in the care of this patient) Urologist, radiologist, microbiologist, nurse, pharmacist

Potential Patient Problems (Nursing Diagnoses)

To Be Completed Before the Simulation

Anticipated Patient Problem: Impaired urinary elimination

Clinical Reasoning: UTI, dysuria, distended bladder, bladder scan showing >300mL of urine post void

Goal 1: Pt will have little to no bladder distention by the end of my care

Goal 2: Pt will have UO >30mL/hr during my time of care

Relevant Assessments (Prework) What assessments pertain to your patient's problem? Include timeframes.	**Multidisciplinary Team Intervention** (Prework) What will you do if your assessment is abnormal?
Assess UO, characteristics, color, odor with each void	Increase PO or IV fluids, administered ordered Abx
Assess PVR via bladder scan after voiding	Notify provider of retention amount; straight cath pt if instructed by physician
Assess I&O Q8hr	Encourage intake of fluids, notify provider of UO <30mL/hr
Assess for bladder distention Q4hr	Perform bladder scan
Assess UA, WBC when resulted	Administer ordered Abx
If pt has foley assess patency and level of collecting bag w/ each encounter	Maintain collecting bag below the level of the waist

To Be Completed Before the Simulation

Anticipated Patient Problem: Deficient Knowledge

Clinical Reasoning: Has recurrent UTIs, questions, “what causes UTIs,” states, “I only have to take my Abx until I feel better”

Goal 1: Pt will verbalize ways to prevent UTIs by the end of my care

Relevant Assessments (Prework) What assessments pertain to your patient’s problem? Include timeframes.	**Multidisciplinary Team Intervention** (Prework) What will you do if your assessment is abnormal?
Assess voiding habits with first encounter	Schedule voiding times for q2-3 hrs
Assess hygiene practices; especially r/t pericare during bath times and when using the bathroom	Educated on proper peri care (wipe front to back)
Assess knowledge on causes of UTIs at first encounter	Educate on causes such as sexual intercourse, infrequent voiding
Ask pt what their daily fluid intake looks like at the first encounter	Encourage adequate hydration and PO fluid intake daily
Assess type of fluids pt drinks at each meal	Encourage water, educate that cranberry juice may be beneficial as well
Assess knowledge on Abx regimen at each dose and before D/C	Educate on importance of continuing full course even if Sx diminish

Goal 2: Pt will verbalize the length of Abx treatment by the end of my care

To Be Completed During the Simulation:

Actual Patient Problem: Risk for shock r/t infection (1)

Clinical Reasoning: Presented to ED w/ urosepsis, new onset of confusion and restlessness, decreased CO, metabolic acidosis, BP: 130/94, T: 101 degrees Fahrenheit, crackles in lungs all lobes bilaterally, Spo2: 85% 4L NC

Goal: Pt will maintain a temperature <100.4 during my time of care Met: ☐ Unmet:☐

Goal: Pt will have an UO of >30 mL during my time of care Met: ☐ Unmet:☐

Actual Patient Problem: Impaired gas exchange (2)

Clinical Reasoning: Spo2: 85% 4L NC→ titrated O2 to 6L NC, labored breathing, RR: 32- shallow breaths, altered mental status

Goal: Pt will remain >90% on 4L NC during my time of care Met: ☐ Unmet:☐

Goal: Pt will maintain at RR <20 during my time of care Met: ☐ Unmet:☐

Additional Patient Problems: Anxiety (3), Acute pain (4), Impaired skin integrity (5)

Below will be your notes, add more lines as needed. **Relevant Assessments:** Indicate pertinent assessment findings. **Multidisciplinary Team Intervention:** What interventions were done in response to your abnormal assessments? **Reassessment/Evaluation:** What was your patient's response to the intervention?

Patient Problem	Time	Relevant Assessments	Time	Multidisciplinary Team Intervention	Time	Reassessment/ Evaluation
1	0700	Audible expiratory wheezes, labored breathing, difficulty stating pt identifiers	0705	Elevated HOB	0705	States, "That's better."
2	0730	Spo2: 88% RA	0730	Applied 2L NC, encouraged deep breathing	0740	Leaning forward in bed, labored breathing
1,2	0745	VS: T- 100.6, Spo2: 98% 2L NC, HR- 90, BP- 130/94; crackles in all lobes of lungs bilaterally; states, "I don't feel good."	0800	Titrated O2 to 4L NC, administered Tylenol 325 mg PO	0830	T: 99.8, Spo2: 90% 4L NC
1	0900	Labored breathing, Spo2: 90% 4L NC	0900	Encouraged cough and deep breathing	0900	Productive cough; Corse crackles in all lobes bilaterally
1	1000	Neighbor of pt brings in home meds; duplicate med w/	1015	Consulted pharmacy for med reconciliation	1100	Not taking cardiac meds at home as prescribed;

		different doses				contributing to fluid overload Sx
1	1300	2550 mL IVFs administered and 100 mL PO fluid intake	1330	Physician contacted; ordered 0.25 mg digoxin to be given now, as well as 20 mg IVP lasix	1900	UO of 100mL over several hours despite meds given
3,4	1700	Pt found on floor calling for help; diagnostics show hip Fx d/t fall; pt visibly upset (crying, stating, “I don’t know how this is happening to me”)	1800	Pt placed in Bucks traction; encourage verbalization of fears and feelings	1705	States, “I’m frightened and don’t understand what this means” “I don’t know what that traction is going to do”
4	1900	Pain 4/10; verbalizes, “This traction is helping to relieve my pain”	1930	Provided the pt with a bed bath; maintained bucks traction as ordered	1935	RN discovered a PI and redness of coccyx
5	1940	Stage 2 PI on coccyx	1950	Applied barrier cream; physician contacted for Tx orders	1955	States, “My bottom sure has been getting sore”
1	2100	Stating, “Where am I?”; restless and confused, UO cloudy, VS: T- 101, Spo2: 85% 4L NC, RR- 32	2105	Titrated O2 to 6 L NC; notified Dr. Baxter on change of condition; ABG draw ordered	2200	pH: 7.28, PaCo2: 35, HCo3: 20

ATI Virtual Clinical Questions and Reflection

1) Identify two members of the healthcare team collaborating in the care of this patient:
    a. **Primary day shift RN**
    b. **Marta from pharmacy**
2) What were some steps the nursing team demonstrated that promoted patient safety?
    a. **Ensure an open line of communication between all care team members r/t status and changes in condition**
    b. **Requested med reconciliation to ensure pt has correct meds at home to prevent further episodes r/t her cardiac issues**
    c. **Performed frequent assessments/re-assessments and VS checks**
3) Do you feel the nurse and medical team utilized therapeutic communication techniques when interacting with individuals, families, and health team members of all cultural backgrounds?
    a. If **yes**, describe: Yes, the primary day shift RN acknowledged the pt's fears regarding her fall and the use of Buck's traction. He listened and offered reassuring words of therapeutic communication.
    b. If **no**, describe:

Reflection

1) Go back to your Preconference Template:
    a. Indicate (circle, star, highlight, etc.) the components of your preconference template that you saw applied to the care of this patient.
2) Review your Nursing Process Form: Did you select a correct priority nursing problem?
    a. If **yes,** write it here: _____
    b. If **no,** write what you now understand the priority nursing problem to be: **Although at first I thought impaired urinary elimination would be the priority given a UTI pt, it was an issue, but not the priority. I now understand that the priority problem is risk for shock**
3) Review your Patient Problem Form: Did you see many of your anticipated nursing assessments and interventions used?
    a. Were there interventions you included that *were not* used in the scenario that could help this patient?
        i. If **yes**, describe:
        _____
        _____
        ii. If **no**, describe: **No, because the main issue at hand r/t Sx regarding shock and not as much impaired urinary elimination.**
4) After completing the scenario, what is your patient at risk for developing?
    a. My pt is at risk for developing shock

b. Why? She had a systemic infection, fluid overloaded, impaired gas exchange→metabolic acidosis

5) What was your biggest “take-away” from participating in the care of this patient? How did this impact your nursing practice?

My biggest takeaway is that just because you pt are diagnosed with something, that does not mean your course of care will follow to exact path that you plan. I planned to fully take care of my pt and address her urinary problem however that was not the case with this scenario. This impacted my nursing practice by reminding me to be flexible with my plan of care- a pt’s status can change rapidly as seen in the scenario.