Preface

The fifth edition of the *Core Curriculum for Medical-Surgical Nursing* presents a comprehensive body of knowledge to support the mission of the Academy of Medical-Surgical Nurses (AMSN) to promote excellence in medical-surgical nursing practice. Designed for new and experienced nurses caring for patients with one or more disease processes in a broad spectrum of settings, this edition of the *Core Curriculum* has been expanded in response to feedback from readers.

New features in the fifth edition include:

- Increased emphasis on surgical procedures and the associated nursing care and/or nursing interventions for many of the pathologies described.
- Addition of case studies to most of the chapters to guide practical application of the content and stimulate critical thinking.
- Expansion of the reference section for most chapters to include Internet resources.
- Citation of text and each chapter in American Psychological Association style for nurses using this *Core* as a reference for scholarly papers and articles.

Contributors for each chapter were selected based on their expertise. Content was critically reviewed by practice experts to ensure it meets the needs of the clinical nurse. However, with the rapidity of change experienced within health care, no single reference can adequately address all topics. Readers are encouraged to review the references provided as additional readings, participate in continuing education activities, and review current literature to enhance their knowledge base.

The fifth edition of the *Core Curriculum for Medical-Surgical Nursing* maintains the long-standing tradition of providing the practitioner with:

- A foundation for practice in the area of medical-surgical nursing.
- A user-friendly reference for review of particular areas of practice within medical-surgical nursing.
- A guideline to prepare for medical-surgical certification examinations, particularly the exam offered by the Medical-Surgical Nursing Certification Board (MSNCB) leading to the Certified Medical-Surgical Registered Nurse (CMSRN®) credential.
- A template for organization of review courses that focus on medical-surgical nursing.

Without the efforts of the contributors, the dedication of the reviewers, and the AMSN member volunteers who participated in conference calls, the production of a publication that is comprehensive, organized, and reflects current nursing practice would not be possible. In addition, I would like to express my deep gratitude to the AMSN Board of Directors and to the staff of Anthony J. Jannetti, Inc., especially Ken Thomas and Linda Alexander, for their patient, supportive advice and assistance.

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Chapter 5

Care of the Bariatric Patient

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Kara Stevens, MS, RN, CMSRN

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Objectives

Study of the information presented in this chapter will enable the learner to:

- Describe the environmental considerations for the safety of the bariatric patient.
- Identify common laboratory abnormalities associated with the bariatric patient.
- Identify components of a functional assessment.
- Name typical physiological changes associated with the bariatric patient.
- Identify health problems that occur most commonly in the bariatric patient.
- Discuss appropriate nursing interventions for the bariatric patient.

Key Points

- Obesity is a growing epidemic that is showing increased trending in all populations.
- Bariatric patients are at increased risk for co-morbidities with increased morbidity and mortality rates.
- Understanding physiologic changes in the bariatric patient is necessary in providing appropriate, patient-centered care to the bariatric patient population.
- Nurses can improve patient outcomes by completing thorough assessments, understanding common co-morbidities and health care concerns, and implementing necessary safety measures with appropriate equipment.
- Consideration of specialized assessment, physiological changes, and pharmacological needs are essential in optimizing care delivery and patient outcomes.
- Preparation for the bariatric patient population requires specialty equipment for safe, quality care.

5 Care of the Bariatric Patient

Stacey Trotman, MSN, RN, CMSRN, RN-BC
Kara Stevens, MS, RN, CMSRN

I. Overview

A. Demographics.

1. Increasingly common prevalence of bariatric patients in medical-surgical nursing. Over one-third, 34.9%, of adults in the United States are obese. Impact of obesity has significant health and financial implications.
2. Trends in obesity rates.
   a. Ethnicity.
      (1) Obesity may be more prevalent among different ethnicities.
      (2) Non-Hispanic Black Americans have the highest age-adjusted rates of obesity at 47.8%.
      (3) Hispanic obesity rate of 42.5%.
      (4) Non-Hispanic White American obesity rate of 32.6%.
      (5) Non-Hispanic Asian obesity rate of 10.8%.
   b. Sex.
      (1) No statistical significance in obesity rates between males and females has been identified.
   c. Age.
      (1) 39.5% of middle-age adults (ages 40-59) are obese.
      (2) 35.4% of adults over age 60 are obese.
      (3) 30.3% of young adults ages 20-39 are obese.
   d. U.S. demographic regions:
      (1) Highest obesity rates in the Midwest at 29.5%.
      (2) South = 29.4%.
      (3) West = 25.1%.
      (4) Northeast = 25.3%.

B. Obesity: Classifications and Predisposition.

1. Obesity classifications.
   a. Types of obesity
      (1) Simple obesity is the distribution of weight throughout the body.
      (2) Central or android obesity is the distribution of weight in the abdominal region.
   b. Categories of obesity
      (1) Obese: individuals who weigh more than 20% above expected weight for age and height.
      (2) Morbid or malignant obesity: individuals who weigh more than 100 pounds above expected weight for age and height.
   c. Obesity is defined by body mass index (BMI) (formula: weight (kg) / [height (m)]^2) and is classified by the Centers for Disease Control and Prevention as:
      (1) Class I obesity: BMI of 30-34.99 kg/m^2.
      (2) Class II obesity: BMI of 35-39.99 kg/m^2.
      (3) Class III obesity: BMI greater than 40 kg/m^2.
2. Obesity and genetic factors.
   a. Obesity and possible genetic correlation.
      (1) Variation in BMI among individuals in the same environment may indicate hereditary impact.
      (2) No definitive gene has been identified at this time.
      (3) Heredity may impact development of diseases that predispose patients to obesity (e.g., hypothyroidism, diabetes).
3. Obesity and lifestyle/environmental factors.
   a. Caloric intake exceeds caloric expenditure.
   b. Sedentary lifestyle.
   c. Co-morbidities.
      (1) Increased waist circumference correlated with increased cardiovascular risk. Increased abdominal fat may increase risk for coronary artery disease.
      (2) Other co-morbidities may include diabetes, arthritis, pulmonary dysfunction, hypercholesterolemia, and hypertension.
      (3) May contribute to worsening condition, decline in overall health, and functional capabilities.

II. Assessment of the Bariatric Patient

A. Typical physiologic changes with bariatric patients/physical assessment.

1. Vital signs.
   a. Temperature: should be taken orally as core temperature does not differ. Axillary temperatures may be lower in bariatric patients due to excess body fat.
   b. Respiratory rate.
      (1) Increased in bariatric patients due to adipose tissue that surrounds the chest wall and abdominal cavity.
      (2) Average rate between 15-21 breaths per minute as compared to the normal range of 10-12 breaths per minute.
      (3) Oxygen consumption may increase fourfold in bariatric patients.

6 Nutrition

Beth Quatrara, DNP, RN, ACNS-BC, CMSRN

NURSING ASSESSMENT

I. Overview

A. Malnutrition is a common problem in medical-surgical patients.

1. 15%-60% of hospitalized patients are malnourished.
2. Malnourished patients are not readily identifiable by visual cues.
3. Many patients enter the hospital malnourished. More patients become malnourished during the hospitalization.
4. Overweight and underweight patients can be malnourished.

B. Factors placing medical-surgical patients at risk for malnutrition.

1. One out of three patients enters the hospital malnourished due to age, chronic condition, socioeconomic status, or psychological issues.
2. Inflammatory processes such as infection and injury contribute to malnourishment.
3. Metabolic demands of illness and injury increase nutrient requirements: infection, cancer, surgery, trauma, burns, hyperthyroidism.
4. Illnesses and surgeries contribute to ineffective nutrient absorption issues: pancreatic insufficiency, gastric or intestinal resection, short bowel syndrome, diarrhea.
5. Patient conditions and iatrogenic issues lead to an inadequate intake of nutrients: poor dentition, anorexia, dysphagia, prolonged NPO (nothing by mouth) orders, extended use of dilute enteral formulas, hypocaloric dextrose intravenous solutions, and drug-nutrient interactions.
6. Illnesses and treatment plans can also be associated with increased nutrient losses: blood loss, draining wounds, and dialysis.

C. Malnutrition results in poor clinical outcomes.

1. Delayed wound healing, including delayed bone fracture and pressure ulcer healing.
2. Decreased immunocompetence and increased infections, including surgical site infections, blood stream infections, and urinary tract infections.
3. Reduced muscle and fat mass, loss of respiratory muscle and cardiac function, and atrophy of visceral organs lead to organ failure.
4. Longer hospital stay, higher health care costs, and increased mortality.

D. Early and effective interventions by the interprofessional team and supported through the culture of the hospital environment can improve the care of malnourished patients (see Figure 6-1).

1. Prompt identification through screening.
2. Rapid intervention with a prescribed nutrition care plan.
3. Continuity of care with a nutrition care plan and patient/family education that extends across transitions of care through discharge.
4. Interprofessional teamwork focused on nutrition as a priority across the continuum.
5. Roles are clearly defined and maximized.
6. Nutritional status of patients is reviewed and communicated frequently.

II. Energy Requirements and Expenditure

A. Summary of 2015 U.S. Dietary Guidelines (see Figure 6-2).

1. Choose a variety of fruits and vegetables. Make selections from all vegetable subgroups especially dark green, orange, and red, and beans and peas.
2. In general, at least half the grains should be whole grains (pasta, breads, brown rice).
3. Limit alcohol. Up to one drink per day for women and up to two per day for men.
4. Limit solid fats. Keep total fat intake to 10% of calories, most from polyunsaturated or monounsaturated fats. Limit intake of saturated fat. Keep transfat acid consumption as low as possible. Trade solid fats for oils.
5. Consume less than 300 mg/day of cholesterol.
6. Choose meats or other sources of protein that are lean, low fat, or fat free (seafood, lean chicken, beans peas, soy products, and nuts).
7. Reduce sodium. Consume less than 2,300 mg (approximately 1 tsp of salt) of sodium per day (1,500 mg if over 51, African American, hypertensive, diabetic, or have chronic kidney disease).
8. Consume as little added sugar (or other caloric sweeteners) as possible.
9. Balance food consumption with energy expenditure. Improve nutrition and activity levels.
10. Enhance intake of potassium (bananas, oranges, spinach, potatoes, tomatoes), dietary fiber (whole grains), vitamin D and calcium (fat-free or low-fat milk or equivalent).

Table 6-2.
Clinical Signs of Malnutrition

Body Area/System	Clinical Findings	Nutrient Deficiency
Skin	Dryness, flakiness Petechiae	Vitamin A, zinc, essential fatty acid Vitamins C, K
Nails	Brittle or spoon-shaped	Iron
Eyes	Bitot's spots, xerosis, keratomalacia Pale conjunctivae	Vitamin A Iron, folate, B_{12}
Lips	Angular stomatitis, cracking, ulcerated lips (cheilosis)	Riboflavin, pyridoxine, niacin
Tongue	Magenta tongue Fissures	Riboflavin Niacin
Gums	Bleeding	Vitamin C
Musculoskeletal	Osteomalacia Joint pain	Vitamin D Vitamin C
Neurologic	Disorientation, irritability Peripheral neuropathy	Vitamin B_{12} Thiamin, vitamin B_6

4. Laboratory studies: should be considered although do not provide direct insight into nutritional status
   a. Albumin: maintains oncotic pressure and is a carrier protein.
      (1) Values below 3.5 g/dL were traditionally referenced as indicators of poor nutritional status; affected by hydration status, changes in organ function, medications, and inflammatory processes. Not a reliable marker of nutritional status.
      (2) Normal values: 3.5-5.5 g/dL.
   b. C-reactive protein: elevated during metabolic stress (surgery, trauma, inflammation, and infection); otherwise nondetectable (<0.6 mg/dL).
   c. White blood cell count (WBC): reflection of inflammatory conditions and infectious processes.
      (1) Normal levels = 4,500-10,000 WBCs/mcL.
   d. Glucose: Elevated during metabolic stress.
      (1) Normal fasting = 70-100 mg/dL.
      (2) Normal random = below 125 mg/dL.
   e. Total lymphocyte count (TLC): reflects cellular immune function.
      (1) TLC = $\frac{\text{WBC x \% of lymphocytes}}{100 \text{ cells}}$
      (2) Normal values: 1,800-3,000 cells/mm^3.
   f. Skin testing: reflects cell-mediated immunity.
      (1) Antigens used: candida, mumps, purified protein derivative, streptokinase.
      (2) Anergy: no reaction observed; reactive: greater than 5-mm induration.
   g. Nitrogen balance: used to evaluate adequacy of protein intake.
      (1) Negative nitrogen balance occurs when nitrogen losses exceed nitrogen intake (catabolic states such as sepsis, surgery, trauma).
      (2) Positive nitrogen balance occurs when nitrogen intake exceeds nitrogen loss (anabolic states such as recovery from illness).
5. Monitoring profile.
   a. Body weight and fluid status.
   b. Percent and composition of meal intake.
   c. Mobility/Strength.
   d. Calorie counts.
   e. Severity of illness.

C. Characteristics of adult malnutrition (see Table 6-3).

PHYSIOLOGIC ALTERATIONS

I. Malnutrition Related to Starvation, Chronic Disease and Acute Disease or Injury

A. Starvation.

1. No inflammatory process present (inadequate intake of nutrients to meet energy needs, e.g., anorexia nervosa).
2. Fuel stores/reserves are used to supply energy.
   a. Hours: glucose stores (glycogen) are depleted.
   b. Days: skeletal muscle is catabolized to support gluconeogenesis.

IMPLICATIONS FOR SPECIFIC POPULATIONS

I. Special populations.

A. Older adults.
1. Nutritional status affected by:
   a. Physiologic changes (e.g., loss of lean body mass and reduced function of major organ systems, including the GI tract, dentition problems).
   b. Sensory changes (e.g., reduced vision, taste, smell, and sense of thirst).
   c. Psychosocial changes (e.g., impaired cognition, social isolation, decreased financial resources, depression).
   d. Other factors (e.g., chronic health problems, polypharmacy, drug-nutrient interactions).
2. Implement appropriate nutritional assessment tools.
3. Interventions for common eating problems.
   a. Dysphagia: evaluate whether swallowing studies are needed; have patient sit upright in chair or backrest elevated 90 degrees; determine food consistency best tolerated; remind to swallow if needed; consult speech pathologist as needed.
   b. Inability to feed self: avoid rushed or forced feeding; determine amount of food/size of bites best tolerated.
   c. Dementia: avoid distractions, demonstrate how to eat, chew, swallow as needed; use finger foods as appropriate.

B. Obesity: weight management program of exercise, diet, and behavior modification.
1. Establish realistic goal of 1-2 lbs per week for the first 6 months with an initial weight loss goal of up to 10% from baseline.
2. Regular exercise (most days of the week for 30 minutes) and eating on a regular schedule (4-5 meals/snacks per day, including breakfast).
3. Reduce dietary fat and carbohydrate intake to establish a caloric deficit of 500-1,000 kcals below estimated energy needs. Distribute calories equally throughout the day.
4. Daily monitoring of food intake (food diary, portion size) and weight.

C. Bariatric surgery: general nutrition recommendations.
1. Daily vitamin and mineral supplement.
2. Small, high-protein meals (60-70 g/day); fortified protein foods increase protein and not volume.
3. Avoid high-fat, high-calorie, simple carbohydrate meals to reduce dumping syndrome (stomach contents pass rapidly into small intestine, causing sweating, dizziness, weakness), weight gain.
4. 64-120 oz liquids/day to avoid dehydration; avoid liquids with meals and carbonated liquids to reduce nausea and slow dumping syndrome.
5. Small quantities of food that are chewed thoroughly; avoid chunks of food that could block pouch.
6. Dry, tough, sticky food may cause pain/indigestion.

D. Colostomy or ileostomy: no specific diets, based on individual response to foods.
1. Recommend trying new foods slowly, one at a time, and for more than one trial.
2. Advise on foods that may cause gas (alcohol, carbonated beverages, broccoli, onions) and stomal blockage (celery, corn, cabbage, nuts, popcorn, seeds).
3. Advise to chew food thoroughly to prevent stomal blockage.
4. Counsel on foods that may help to control diarrhea (applesauce, bananas), foods that produce odor (onions, garlic, asparagus), and foods that are natural deodorizers (yogurt, parsley, buttermilk).
5. If significant ileal resection, supplemental vitamin B_{12} may be needed.
6. Depression and anxiety related to altered body image are common concerns and may affect appetite/eating.

II. Nutritional Support Techniques and Considerations

A. Oral feedings.
1. When patients are unable to meet 2/3 to 3/4 of their daily caloric needs, strategies to increase oral intake should be attempted. Collaboration with interprofessional team members is essential; input from dietitians, pharmacists, physicians, and speech therapists (swallowing evaluation) all may be required to optimize care.
   a. Collaborate with dietitian and calculate a 3-day calorie count.
   b. Offer foods high in protein and calories, taking into consideration patient's favorite foods. Offer small amounts frequently.
   c. Offer oral supplements (canned or powdered formulas), soups, bars, shakes.
   d. Increase compliance by allowing patient to choose favorite flavors, offering variety of products to prevent taste fatigue, and chilling before serving. Can also blend with ice (to make milkshake consistency) or blend with fruit.

20 The Renal and Urologic Systems

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NURSING ASSESSMENT OF THE RENAL AND UROLOGIC SYSTEMS

I. Overview of System

A. Components.

1. Renal system is a filtering system; also referred to as the renal/urinary system.
2. Includes two kidneys, two ureters, one bladder, and one urethra.
3. Microstructure of kidneys includes cortex, medulla, pelvis, glomerulus, and nephron. The nephron consists of Bowman's capsule and loop of Henle.

II. Anatomy and Physiology

A. Kidneys (two).

1. Retroperitoneal placement on both sides of vertebral column, right lower than left.
2. 5-7 cm wide; 11-13 cm long; 2.5 cm thick.
3. From 12th thoracic to third lumbar vertebrae.
4. Tightly adhering capsule surrounds each kidney; kidney embedded in mass of fat for protection.
5. In severe fasting, kidney synthesizes glucose from amino acids (gluconeogenesis).

B. Cortex of kidney.

1. Outermost layer, just under fibrous capsule.
2. Contains all the glomeruli and portions of tubules.
3. Metabolically active, aerobic metabolism occurs.
   a. Ammonia formed.
   b. Glucose formed.

C. Medulla of kidney.

1. Middle layer formed by straight segments of proximal and distal tubules and collecting ducts.
2. Glycolytic metabolism; supplies energy for active transport.
3. Composed of 6-10 renal pyramids.

D. Renal pelvis.

1. Cortico-medullary junction: point of division between cortex and medulla.
2. Renal pyramid: cone-shaped mass of collecting ducts, plus surrounding cortical tissue.

E. Nephron.

1. Structural and functional unit of kidney.
2. Approximately 1.2 million in each kidney.
3. Compensation for significant loss of nephrons.
   a. Filter greater amount of solutes.
   b. Hypertrophy of those remaining.
4. Two types.
   a. Cortical: located in outer region of cortex, short loops of Henle; low capacity of sodium reabsorption.
   b. Juxtamedullary: located in inner cortex, long loops of Henle; greater capacity for concentration of urine because they are sodium-retaining.
5. Each nephron contains the following functional segments:
   a. Renal corpuscle: contains Bowman's capsule and glomerulus.
   b. Bowman's capsule: supports glomerulus.
   c. Glomerulus: capillary bed serves as filtration membrane.
      (1) Blood in glomerulus is separated from fluid in Bowman's capsule by capillary membranes, encouraging fluid to flow from glomerular capillaries to Bowman's capsule.
      (2) Semipermeable membrane, normally permeable to water, electrolytes, nutrients, and wastes; relatively impermeable to large molecules.
      (3) Electrical potential of membrane has a negative charge, favoring passage of positively charged molecules and slowing passage of negatively charged molecules.
      (4) Filters electrolytes, urea, creatinine.
   d. Renal tubules.
      (1) Proximal convoluted tubules.
         (a) 65% water passively reabsorbed along with solute.
         (b) 65% sodium reabsorbed.
         (c) 100% potassium reabsorbed.
         (d) 65% calcium actively reabsorbed.
         (e) Phosphate actively reabsorbed in presence of sodium.
         (f) Magnesium actively reabsorbed in presence of sodium.
         (g) Participate in regulation of acid-base balance by secretion of buffers, or buffer systems, and by regulating hydrogen ion and bicarbonate release into filtrate.
      (2) Descending loop of Henle.
         (a) Permeable to water and urea, water moves out into medulla, urea secreted into tubule.
         (b) 25% sodium reabsorbed.
         (c) 20% to 25% calcium reabsorbed.
      (3) Ascending loop of Henle: impermeable to urea, sodium and chloride actively reabsorbed from tubule.

Table 20-1.
Diagnostic Studies of the Renal System

Test	Description	Nursing Responsibility
Urinalysis • Normal • Color: yellow • Clarity: clear • Odor: slightly aromatic	A screening tool not useful in diagnosis of disease process but very useful in providing clues to hemostasis and fluid volume.	Teach patient how to obtain a clean catch mid-stream sample. (Wash external genitalia, start urine stream, then catch sample.) Since urine starts to degrade in 1 hour, get sample to lab as quickly as possible.
Specific gravity: 1.010-1.025 • pH: 4.5-8 • Glucose: none • Ketones: none • Protein: none		
Leukocyte esterase: negative		
Sediment • Cells: - Epithelial cells: 0-10/HPF - RBC: 1-3/HPF - WBC: 0-4/HPF • Casts: - RBC casts: none - WBC casts: none - Hyaline casts: few		
Serum creatinine • Normal: - men: 0.6-1.3 mg/dl SI units: 53-115 micromole/L - women: 0.5-1.0 mg/dl SI units: 44-48 micromole/L	End product of protein breakdown in muscle cells. Slightly higher in men than women and children because of higher muscle mass. Level remains constant unless disease process occurs.	An excellent indicator of renal failure if no muscle breakdown present.
Blood urea nitrogen (BUN) • Normal: 10-20 mg/dl	End product of protein metabolism, influenced by fluid volume, dietary protein intake, and catabolism.	Alone, is not a good indicator of renal disease as will also increase in GI bleeds, fluid volume depletion. Changes in BUN must be correlated with creatinine to determine renal failure.
Estimated glomerular filtration rate (eGFR) • Normal greater than 60 ml/min/1.73^2 • May be less accurate indicator of renal function in older adults	Much more sensitive indicator of the impact of damage to the kidneys than other measure. The amount of fluid filtered from the blood into renal capsule per minute. The blood pressure and volume are the primary facors controlling GFR. Takes into account age, gender, and race.	Assure blood is drawn as ordered.
Urine creatinine clearance • 110-120 ml/min • Formula: volume - urine (ml/min) x urinary concentration	Determines glomerular filtration rate as creatinine normally filters out in glomerulus and is passed out of system unchanged. If renal function decreases, clearance of creatinine decreases.	24-hour urine specimen necessary, should be kept cool or in ice chest during collection. Is an excellent indicator of renal function.
Uric acid • 250-800 mg/24 hours • SI units: 1.5-4.8 micromole/L	Formed from breakdown of proteins, excreted as a waste product. Elevated levels occur in patients with gout because of increased production and in renal failure because of decreased secretion.	Observe for symptoms of gout in patients with elevated uric acid levels.

continued on next page

Case Study 1

Scenarios

A nurse from the float pool is working today on the renal inpatient unit. Each of the following situations refers to patients she is caring for.

The nurse receives report that she is to admit a patient from the emergency department with "severe renal colic." How would the patient describe this pain and what medical and nursing interventions are necessary?

The patient would report severe spasmodic pain as his body attempts to pass a kidney stone. Medical and nursing interventions would include:

- Strain urine to capture stone for analysis.
- Pain management using opioids and comfort measures.
- Increase fluid intake and monitor urine output.
- Stone removal if it is not passed spontaneously.
- Dietary changes and medications to reduce the risk of future stone formation.

The patient admitted with a diagnosis of a renal stone has been identified as having a calcium oxalate stone. The patient asks what foods cause these stones to occur and the nurse states they are associated with intake of which foods?

Dark green leafy vegetables and caffeine

The nurse is assessing the patency of a Mr. Stein's left arteriovenous fistula after he returns from his dialysis treatment. Which finding indicates the fistula is patent and able to be used?

Auscultation (bruit) and/or palpation (thrill) of blood rushing through the fistula.

Mr. Stein, has chronic renal failure and needs protein. Which type of protein would be the least harmful to the kidneys?

High-quality protein that is low in phosphorous, such as lean meats (turkey, chicken), cottage cheese, egg whites, fish, and protein supplements like Ensure®

Mr. Stein has had a GI x-ray ordered. What drug would be likely to increase his risk for acute respiratory failure if given as a GI prep and why?

Sodium phosphate laxatives (e.g., Fleets®). Phosphate is normally absorbed by the GI tract and excreted by the kidneys. In chronic renal failure, the ingestion of excessive phosphates leads to hyperphosphatemia. As a result, calcium is deposited in tissues, causing hypocalcemia and tetany, and leading to acute respiratory failure.

Case Study 2

Scenario: Diuretic

Mrs. Dewey, 76 years old, has a history of cardiovascular disease including hypertension and heart failure. She had been receiving furosemide and developed mild hypokalemia for which a potassium supplement was prescribed. How does furosemide work?

Furosemide is a loop diuretic that acts in the ascending loop of Henle to inhibit sodium and chloride reabsorption. This leads to decreased interstitial hypertonicity, reduced water reabsorption, and increased urine output.

What mechanisms of action of furosemide would cause Mrs. Dewey to become hypokalemic?

Furosemide also increases urinary potassium excretion by enhancing distal tubular potassium secretion and reducing potassium reabsorption in the loop of Henle.

What assessments, then, would the nurse find necessary to make?

Muscle strength, bowel sounds, respirations, EKG (flat, ST segment, Q waves)

Mrs. Dewey was also instructed to increase her dietary intake of potassium. What foods would the nurse suggest she eat?

Dried fruit, bananas, orange juice

The hypokalemia continued and Mrs. Dewey was switched to spironolactone. How is this drug different from furosemide?

Spironolactone is a potassium-sparing diuretic that promotes the excretion of sodium, chloride, and carbonate but blocks potassium excretion by inhibiting aldosterone.

Mrs. Dewey arrives at the health provider's office. During the assessment, she reveals she has been experiencing nausea, abdominal cramping, and diarrhea along with some muscle cramps, weakness, and a feeling that "her heart was going to jump out of her chest." What might be occurring now?

The patient is displaying signs of hyperkalemia.

What might have caused the hyperkalemia?

Potential causes of the hyperkalemia include:

- Renal insufficiency reducing the excretion of potassium.
- Increased dietary intake of potassium.
- Too high dosage of spironolactone for elderly patient.

What would need to be included in the teaching plan for Mrs. Dewey?

Avoid potassium-rich foods; signs and symptoms of hyperkalemia to report to physician.