Chapter 16 Nutrition, Fluids and Electrolytes, and Acid-Base Balance

Nutrition

Nutrients

° Water
  o Functions
    • Promotes metabolic processes
    • Transporter for nutrients and wastes
    • Lubricant
    • Insulator and shock absorber
    • Maintains body temperature
  o Factors that affect body water:
    • Age
    • Body fat
    • Gender

° Macronutrients
  o Carbohydrates
    • Simple carbohydrates
    • Complex carbohydrates
    • Glycogen
  o Proteins
    • Amino acids
      ↑ Essential
      ↑ Nonessential
    • Complete
    • Incomplete
    • Complementary
    • Protein metabolism
      ↑ Anabolism
      ↑ Catabolism
      ↑ Nitrogen balance
  o Lipids
    • Triglycerides
      ↑ Saturated fats
      ↑ Unsaturated fats
    • Cholesterol
    • Lipoproteins

° Micronutrients
  o Vitamins
    • Water soluble – C, B
    • Fat soluble – A, D, E, and K
  o Minerals
    • Macrominerals – body needs > 100 mg/day
    • Microminerals – body needs < 100 mg/day

° Standards for a healthy diet
  o Food Guide Pyramid [corresponds to Figure 16-1]
    • Bread, cereal, rice, pasta
• Vegetables
• Fruit
• Meat, poultry, fish, dry beans, eggs, and nuts
• Milk, yogurt, cheese
• Fats, oils, sweets
  o Alternate good guides [corresponds to Box 16-1]
    • Energy balance
      ↑ Caloric intake
      ↑ Energy output
    • Basal metabolic rate
      ↑ Metabolism
      ↑ Energy requirements
      ↑ Active vs. inactive person

Nursing Care
  ° Nutrition assessment
    o Height
    o Weight
      • Obtaining a weight [corresponds to Box 16-2]
    o Ideal Body Weight (IBW)
    o Body Mass Index (BMI)
      • Weight (in kg) divided by height in meters$^2$ = BMI formula
      • < 16 malnourished
      • 16-19 = underweight
      • 20-25 = normal
      • 26-30 = overweight
      • 31-40 = moderately to severely obese
      • > 40 = morbidly obese

  ° Nutritional concerns
    o Obesity
    o Undernutrition [corresponds to Box 16-3]
      • Protein-calorie malnutrition

  ° Nursing goals
    o Restore nutritional balance
    o Decrease risks
    o Promote healing
    o Prepare for procedures
    o Provide therapeutic diets
      • Intravenous fluids [corresponds to Table 16-1]
      • NPO or nothing by mouth
      • Clear liquid diet
      • Full liquid diet
      • Soft diet
      • Diet as tolerated
      • Modification for disease
    o Monitoring glucose
    o Stimulating the appetite
o Assisting clients with meals
o Providing enteral nutrition
  • Enteral and parenteral nutrition
  • Intermittent and continuous feedings
  ↑ Nasogastric tube [corresponds to Procedure 16-1]
  ↑ Nasoenteric tube
  ↑ Gastrostomy tube [corresponds to Procedure 16-2]
  ↑ Jejunostomy tube
o Feeding tube placement
o Verifying placement [corresponds to Box 16-4]
  • Discharge considerations
    o Client participation
    o Positive effects
    o Negative effects
    o Goals
  • Nursing Process Care Plan: Client with Altered Nutrition

**Fluids And Electrolytes, And Acid-Base Balance**

Factors Affecting Homeostasis
  • Temperature
  • Exercise
  • Water
  • Salt
  • Disease processes
  • Medical interventions

Body Fluid and Electrolyte Balance
  • Intracellular fluid
  • Extracellular fluid
  • Interstitial fluid – lymph and blood plasma
  • Composition of body fluids
    o Oxygen, nutrients, carbon dioxide
    o Electrolytes [corresponds to Table 16-2]
      • Cations
        ↑ Sodium
        ↑ Potassium
        ↑ Calcium
        ↑ Magnesium
      • Anions
        ↑ Chloride
        ↑ Bicarbonate
        ↑ Phosphate
        ↑ Sulfate
    • Regulating body fluids
      o Balance intake and output
    • Regulating electrolytes

Acid-Base Balance
  • Acid-base regulators
Buffer system
- Bicarbonate
- Carbonic acid

Respiratory system
- Short-term regulator
- Carbonic acid/CO2
- Acid environment
- Alkaline environment

Renal system
- Long-term regulator
- Bicarbonate/hydrogen ions
- Acidotic environment
- Alkalotic environment

Acid-Base Imbalances
° When systems cannot compensate – [corresponds to Table 16-3]
° Respiratory acidosis
  o $\text{PaCO}_2 > 45 \text{ mm Hg}$ and $\text{pH} < 7.35$
  o Shallow respiration, headache, nausea, vomiting, change in mental status
  o Prolonged: loss of potassium, arrhythmias, loss of consciousness, shock, cardiac arrest
  o Care: improve respiratory effort; administer oxygen

° Respiratory alkalosis
  o $\text{PaCO}_2 < 45 \text{ mm Hg}$ and $\text{pH} > 7.35$
  o Occurs with hyperventilation
  o Increased heart rate with no change in BP, ECG changes, restlessness, reduced blood to brain, dizziness, numbness in extremities
  o Prolonged: loss of bicarbonate, decreased respiratory rate, loss of consciousness, hyperreflexia, tetany, arrhythmias, seizures, coma
  o Care: early, breathe into paper bag to reduce $\text{CO}_2$ level

° Metabolic acidosis
  o Low $\text{PaCO}_2$, low bicarbonate, $\text{pH} < 7.35$
  o Hyperventilation
  o Prolonged: Kussmaul’s respirations, depressed CNS and heart, hypotension, weakness, headache, change in consciousness, diminished muscle tone and reflexes, nausea and vomiting, signs of hyperkalemia
  o Care: treat underlying cause; insulin for diabetic; patent IV; promote ventilation, record I&O; assess level of consciousness; promote safety; possible ventilator and dialysis

° Metabolic alkalosis
  o $\text{PaCO}_2 > 45 \text{ mm Hg}$, increased bicarbonate, and $\text{pH} < 7.35$
  o Decreased respiratory rate, polyuria followed by hypovolemia dn thirst, anorexia, weakness, diminished reflexes, tetany, irritability, disorientation, and seizures
  o Prolonged: possible arrhythmias and death
• Care: patent IV; supplemental oxygen; discontinue NG suctioning; antiemetics; seizure precautions
• Prevention: irrigate NG tubes with normal saline, not tap water

Nursing Care
• Monitor intake and output [corresponds to Figure 16-9]
  • Measure urine output [corresponds to Box 16-5]
  • Report I&O imbalance
• Monitor IV infusion
  • Points to monitor
    • Redness, swelling
    • Empty bag
    • Blood in tubing
    • Pump alarm
• Intravenous solutions
  • Isotonic, hypertonic, hypotonic
• Assist with tubings, drains
• Assist with dressing changes
• Discontinue an IV [corresponds to Procedure 16-3]
• Monitor for acid-base disorders [corresponds to Table 16-3]

Critical Thinking Care Map: Caring for a Client with Risk for Deficient Fluid Volume