Lecture Objectives:

1. Discuss nutritional disturbances during childhood.
2. Describe the various types of dehydration and nursing care indicated.
3. Discuss gastrointestinal dysfunctions during childhood and their treatment.
4. Formulate a plan of care for the child with a disorder of motility.
5. Describe the clinical manifestations and nursing management of children with intestinal parasitic diseases.

Lecture Objectives: (cont.)

6. Review the pathophysiology, therapeutic and nursing care management for children with inflammatory disorders.
7. Analyze the nursing process in the care of a child with hepatic disorders.
8. Describe the pathophysiology, clinical manifestations, therapeutic, and nursing care for children with structural and obstructive disorders.
9. Formulate a plan of care for the child with a malabsorption syndrome.
10. Describe the nursing management for the child who has ingested an injurious agent.
Reading Assignment:


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**Nutritional Disturbances**

- Vitamin Disturbances
- Mineral Disturbances
- Vegetarian Diets
- Protein and energy malnutrition
- Food sensitivity

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**Vitamin Disturbances**

- True deficiencies rare in US
- High fat diet with low vegetable/fruit intake responsible for most deficiencies
- Vitamin D
- Vitamin B6
- Vitamin A
- Folic Acid
Mineral Disturbances

- Macrominerals-daily requirements > 100mg
- Microminerals-daily requirements < 100 mg
- Mineral deficiencies
- Phytates/oxalates

Vegetarian Diets

- Lacto-ovo vegetarians - exclude meat, consume dairy and fish
- Lactovegetarians - exclude meat and eggs, but drink milk
- Pure vegetarians - exclude any food of animal origin
- Zen macrobiotics
- Semi-vegetarians

Vegetarian Diets and Nursing Care Management

- Identify nutritional deficits
- Dietary assessment
- Implement teaching based on food guide pyramid
- Educate family about vitamin toxicity and planning healthy vegetarian diet
Vegetarian Diet and Nursing Care Management (cont.)

- Lactoovovegetarian diet nutritionally adequate
- Vegan require supplementation with vit. D and B12 for child 2-12 years
- Breastfeeding infants
- Combining incomplete proteins

Protein and Energy Malnutrition (PEM)

- Kwashiorkor
- Marasmus

Kwashiorkor

- Deficiency of protein with adequate supply of calories
- Appearance- thin, wasted extremities, prominent abdomen, muscular atrophy, dry, scaly skin, alopecia
- Permanent blindness from Vit. A deficiency
- Diarrhea produces electrolyte imbalances
Marasmus

- Deficiency of both calories and protein
- Appearance - gradual wasting, severe atrophy, of body tissues, appears old with flabby, wrinkled skin
- Found in third world countries
- Usually syndrome of physical and emotional deprivation
- Child so lethargic that prostration occurs

Therapeutic Management

- High quality protein, increased carbohydrates, vitamins and minerals
- Control diarrhea
- Rehydration with appropriate route
- Protect from infection
- Tailoring activity to allow for adequate rest

Food Sensitivity

- Any type of adverse reaction to food or additives - common food sources
- Two types
  - Food intolerances
  - Food allergies
Food Intolerance

- Involves non-immunologic mechanisms

Food Allergy

- Caused by exposure to allergens—usually proteins—that are capable of inducing sensitization when ingested
- Occurs after food ingested one or more times
- More common in infancy because of the immature intestinal tract
- S/S can mimic acute asthma attack—CAN BE FATAL
- May outgrow
- Foods causing severe anaphylaxis avoided for life

Atopy

- Hereditary link
  - One parent with allergies—child has 50% chance of developing allergies
  - Two parents with allergies—child has 100% chance of developing allergies
- Education
  - Parents, teachers, all caregivers informed of allergy and tx.
  - Medical ID bracelet and epi-pen available
Preventing Atopy in Children

- Identify children at risk
- Prenatal precautions
- Postnatal precautions
- Environmental control

Cow’s Milk Allergy

- Adverse reaction to cow’s milk protein
- S/S- diarrhea, vomiting, abdominal pain, wheezing, coughing, asthma, nasal discharge, bronchitis, excessive crying, eczema
- Diagnosis- allergy testing and/or removal of cow’s milk from diet

Cow’s Milk Allergy (cont.)

- Management- substitute a formula which has predigested proteins, avoid soy based formulas and goat’s milk
- Nursing considerations- identifying potential milk allergies
Lactose Intolerance
- Deficiency of the enzyme lactase
- Three types
  - Congenital
  - Primary or late onset
  - Secondary
- S/S occur 30 minutes after consumption- abdominal pain, bloating, flatulence, diarrhea
- Diagnosis- history and/or breath hydrogen test

Controlling Symptoms of Lactose Intolerance
- Substitute soy based formula
- Hard cheese and yogurt allowed to get calcium requirement
- Limit consumption of milk to one glass daily-small amounts help colonic bacteria adapt to ingested lactose
- Pre-treated milk (microbial-derived lactase) and enzyme replacements

Gastrointestinal Dysfunction
- Clinical manifestations
- Dehydration- occurs whenever output exceeds intake. Can result from diseases that cause insensible losses through the skin and respiratory tract through increased renal excretion and through the GI tract
Water Balance In Infants

- Infants and young children have a greater need for water and are therefore more vulnerable to alterations in fluid and electrolyte balance
- Extracellular fluid
- Body surface Area (BSA)
- Basal Metabolic Rate (BMR)
- Kidney function
- Fluid requirements

Daily Maintenance Fluid Requirements

1. Calculate weight of child in kilograms
2. Allow 100 ml/kg for first 10 kg
3. Allow 50 ml/kg for second 10 kg
4. Allow 20 ml/kg for remainder of weight in kilograms
5. Divide total amount by 24 hours to obtain rate in milliliters per hour

Example #1: Daily Fluid Calculation

- Child weighs 32 kg
- 100 x 10 for 1st 10 kg of body weight = 1000
- 50 x 10 for 2nd 10 kg of body weight = 500
- 20 x 12 for remaining body weight = 240
- 1000 + 500 + 240 = 1740 ml/24 hr
Example 2: Daily Fluid Calculation
- Child weighs 8.5 kg
- 100 x 8.5 for 1st 10 kg of body weight = 850
- No further calculations
- 850 ml/24 hr

Example 3: Daily Fluid Calculation
- Child weighs 14 kg
- 100 x 10 for 1st 10 kg of body weight = 1000
- 50 x 4 for 2nd 10 kg of body weight = 200
- No further calculations
- 1000 + 200 = 1200 ml/24 hr

Types of Dehydration
- Isotonic
- Hypotonic
- Hypertonic
**Nursing Management - Dehydration**

- Assessment for signs and extent of dehydration (see table pg. 1495/1251)
- Conditions that may precipitate dehydration include diarrhea, sweating, fever, diabetes, renal disease, trauma (burns, etc.)
- Intake and Output
- Skin assessment
- Mucous membrane assessment
- Body weight
- Fontanel assessment
- Sensory alterations

**Disorders of Motility**

- Diarrhea
- Constipation
- Hirschsprung disease
- Vomiting
- Gastroesophageal reflux

**Diarrhea**

- Symptom that results from disorders involving digestive, absorptive, and secretory functions.
- Caused by abnormal intestinal water and electrolyte transport
Diarrheal Disturbances
- Gastroenteritis
- Enteritis
- Colitis
- Enterocolitis

Types of Diarrhea
- Acute
- Acute infectious/infectious gastroenteritis
- Chronic
- Intractable diarrhea of infancy
- Chronic nonspecific diarrhea (CNSD)

Etiology of Diarrhea
- Rotavirus
- Salmonella, Shigella, Campylobacter
- Giardia
- Cryptosporidium
- Clostridium difficile
- Antibiotic therapy
Diagnostic Evaluation - Diarrhea

- Complete history
- Laboratory test
- Stool samples

Therapeutic Management - Diarrhea

- Monitoring fluid and electrolyte imbalance
- Rehydration
- Maintenance fluid therapy
- Reintroduction of an adequate diet
- Oral rehydration therapy: pedialyte
- Preventing diaper dermatitis

Clinical Manifestations

- Decreased urine output
- Decreased weight
- Dry mucous membranes
- Poor skin turgor
- Sunken fontanels
- Pale, dry skin
- Tachycardia
- Hypotension
- Prolonged capillary refill > 2 seconds
Prevention of Diarrhea

- Most diarrhea is spread by the fecal-oral route
- Teach personal hygiene
- Clean water supply/protect from contamination
- Careful food preparation
- Handwashing!

Constipation

- An alteration in frequency, consistency, or ease of passage of stool
- May be secondary to other disorders
- Idiopathic (functional) constipation—no known cause
- Chronic constipation—may be due to environmental or psychosocial factors

Newborn Period

- First meconium should be passed within 24 to 36 hours of life; if not, assess for:
  - Hirschsprung disease, hypothyroidism
  - Meconium plug, meconium ileus (CF)
Infancy

- Often related to diet
- Constipation in exclusively breastfed infant almost unknown
  - Infrequent stool may occur because of minimal residue from digested breast milk
- Formula-fed infants may develop constipation
- Interventions

Constipation in Childhood

- Often due to environmental changes or control over body functions
- Encopresis: inappropriate passage of feces, often with soiling
  - May result from stress
  - Management

Nursing Considerations

- History of bowel patterns, medications, diet
- Educate parents and child
- Dietary modifications (age appropriate)
Hirschsprung Disease

- Also called congenital aganglionic megacolon
- Mechanical obstruction from inadequate motility of intestine
- Incidence: 1 in 5000 live births; more common in males and in Down syndrome
- Absence of ganglion cells in colon

Clinical Manifestations of Hirschsprung

- Aganglionic segment usually includes the rectum and proximal colon
- Accumulation of stool with distention
- Failure of internal anal sphincter to relax
- Enterocolitis may occur

Diagnostic Evaluation

- X-ray, barium enema
- Anorectal manometric exam
- Confirm diagnosis with rectal biopsy
Therapeutic Management

- Surgery
- Two stages
  - Temporary ostomy
  - Second stage—“pull-through” procedure

Nursing Considerations

- Preoperative care
- Postoperative care
- Discharge care

Vomiting

- Forceful ejection of gastric contents through the mouth
Causes of Vomiting

- Infectious diseases
- Food intolerances
- Allergies
- Mechanical obstruction
- Metabolic disorders
- Psychogenic problems

Management of Vomiting

- Antiemetic medications
- Assessment of type of vomiting
- Administer glucose-electrolyte solutions
- Include carbohydrates in diet to spare body protein
- Position child on abdomen to prevent aspiration
- Promote oral hygiene

Gastroesophageal Reflux (GER)

- Defined as transfer of gastric contents into the esophagus
- Occurs in everyone
- Frequency and persistency may make it abnormal
- May occur without GERD
- GERD may occur without regurgitation
**Gastroesophageal Reflux (GER)**
- Diagnostics
- Therapeutic management
- Nursing considerations

**Intestinal Parasitic Diseases**
- Giardiasis
- Enterobiasis (pinworms)

**Giardiasis**
- Etiology- protozoan Giardia lambilia
- Transmission- person to person, bodies of water, food, and pets
- Manifestations
  - Infants- diarrhea, vomiting, anorexia, failure to thrive
  - Children over 5 years of age- abdominal cramps, loose stools, constipation, watery/pale/greasy stools
**Giardiasis (cont)**

- **Diagnosis**: stool specimen, string test, EIA
- **Management**
  - Medications: Flagyl, Atabrine, Quinacrine, Furoxone
  - Prevention: education

**Enterobiasis (Pinworms)**

- **Etiology**: nematode enterobius vermicularis
- **Transmission**: crowded conditions, eggs are ingested or inhaled, eggs hatch in intestine. With scratching, eggs are transferred to hands and fingernails
- **Clinical manifestations**: intense perinanal itching

**Enterobiasis (cont.)**

- **Diagnosis**: tape test
- **Management**
  - Medications: Vermox, Pripsen, Povan (stains bright red). ALL family members are treated
  - Education: prevent reinfection
### Inflammatory Disorders

- Acute Appendicitis
- Meckel Diverticulum
- Inflammatory Bowel Disease
- Peptic Ulcer Disease

### Acute Appendicitis

- Inflammation of the vermiform appendix and is the most common condition requiring abdominal surgery during childhood
- Etiology
- Pathophysiology

### Acute Appendicitis (cont.)

- Clinical manifestations
- Diagnostic evaluation
- Therapeutic management
  - Ruptured appendix
  - Prognosis
- Nursing considerations
Meckel Diverticulum
- It is the most common congenital malformation of the GI tract
- Occurs in 1% to 3% of the population
- Pathophysiology

Meckel Diverticulum (cont.)
- Clinical manifestations
- Diagnostic evaluation
- Therapeutic management
- Nursing considerations

Inflammatory Bowel Disease (IBD)
- Includes ulcerative colitis (UC) and Crohn disease (CD)
- Etiology and pathophysiology
- Diagnostic evaluation
- Therapeutic management
- Medical treatment
- Nursing considerations
Peptic Ulcer Disease (PUD)

- Etiology and pathophysiology
- Clinical manifestations
- Diagnostic evaluation
- Therapeutic management
  - Medical
  - Surgical
  - Nursing considerations

Hepatic Disorders

- Acute hepatitis
- Cirrhosis
- Biliary atresia

Acute Hepatitis

- Causes
  - Virus
  - Chemical reaction
  - Drug reaction
  - Other disease processes
Types of Hepatitis

- Hepatitis A
- Hepatitis B
- Hepatitis C
- Hepatitis D
- Hepatitis E
- Hepatitis G

Hepatitis

- Diagnostic evaluation
- Therapeutic management
- Prognosis
- Nursing considerations
- Infection control

Cirrhosis

- Occurs at the end stage of many chronic liver diseases including biliary atresia and chronic hepatitis
- Clinical manifestations
- Therapeutic management
- Nursing considerations
**Biliary Atresia**

- Also called extrahepatic biliary atresia
- Etiology and pathophysiology
- Diagnostic evaluation
- Therapeutic management
- Prognosis
- Nursing considerations

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**Structural Defects**

- Cleft lip and/or cleft palate
- Esophageal atresia with tracheoesophageal fistula (TEF)
- Hernias

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**Cleft Lip and/or Cleft Palate**

- Facial malformations that occur during embryonic development
- May appear separately or together
- Etiology and pathophysiology
- Diagnostic evaluation
Surgical Correction of Cleft Lip

- Closure of lip defect precedes correction of the palate
- Z-plasty to minimize retraction of scar
- Protect suture line with Logan bow or other methods

Surgical Correction of Cleft Palate

- Typically 12 to 18 months of age
- Effect on speech development
- Prognosis
- Nursing considerations

Cleft Lip and Palate Feeding

- Issues
- Techniques and interventions
- Special feeding equipment
- Breastfeeding issues
Esophageal Atresia and Tracheoesophageal Fistula (TEF)

- Failure of esophagus to develop as a continuous passage
- May occur separately or in combination
- Etiology and pathophysiology
- Diagnostic evaluation
- Clinical manifestations

Management of TEF

- Surgical interventions
- Prognosis
- Associated tracheomalacia
- Nursing considerations

Hernias

- Definition: a protrusion of portion of an organ through an abnormal opening
- Danger of incarceration/strangulation
Pediatric Hernias

- Diaphragmatic
- Hiatal
- Umbilical/abdominal wall defects
  - Omphalocele
- Gastrochisis

Obstructive Disorders

- Hypertrophic pyloric stenosis (HPS)
- Intussusception
- Malrotation and Volvulus
- Anorectal malformations

Pyloric Stenosis

- Constriction of pyloric sphincter with obstruction of gastric outlet
- Pathophysiology
- Diagnostic evaluation
- Therapeutic management
- Prognosis
- Nursing considerations
Intussusception

- Telescoping or invagination of one portion of intestine into another
- Occasionally due to intestinal lesions
- Often cause is unknown

Intussusception (cont'd)

- Diagnostic evaluation
- Therapeutic management
- Prognosis
- Nursing consideration

Malrotation and Volvulus

- Malrotation is due to abnormal rotation around the superior mesenteric artery during embryonic development
- Volvulus occurs when intestine is twisted around itself and compromises blood supply to intestines
- May cause intestinal perforation, peritonitis, necrosis, and death
**Anorectal Malformations**

- Imperforate anus
- Persistent cloaca
- Cloacal extrophy
- Genitalia may be indefinite
- Diagnostic evaluation
- Management

**Malabsorption Syndromes**

- Celiac disease
- Short bowel syndrome
- Characterized by chronic diarrhea and malabsorption of nutrients
- May result in failure to thrive

**Celiac Disease**

- Also called gluten-induced enteropathy and celiac sprue
- Four characteristics
  - Steatorrhea
  - General malnutrition
  - Abdominal distention
  - Secondary vitamin deficiencies
Celiac Disease

- Pathophysiology
- Diagnostic evaluation
- Therapeutic management
- Nursing considerations

Short Bowel Syndrome (SBS)

- A malabsorptive disorder
- Results from decreased mucosal surface area, usually as result of small bowel resection
- Etiology and pathophysiology
- Therapeutic management
- Nursing considerations

Ingestion of Injurious Agents

- Principles of emergency treatment
  - Medical evaluation is necessary with all episodes of poisoning
  - Telephone the Poison Control Center before initiating any intervention
  - Assessment: treat the child first not the poison.
    - Vital signs, signs of shock, respiratory and/or circulatory compromise
Principles of Emergency Treatment (cont.)

- Gastric decontamination
- Administration of antidotes
- Prevention of poisonings

Heavy Metal Poisonings

- Mercury toxicity
- Clinical manifestations
- Treatment: chelation therapy

Lead Poisoning

- Causes: non-intact lead based paint in older homes and contaminated soil. Water and food can be contaminated with lead
- Pathophysiology
- Clinical manifestations
- Diagnostic evaluation
### Lead Poisoning Screening

- Universal screening at ages 1 and 2
- Any child not previously tested, should be tested between 3-6 years
- Targeted screening is acceptable when an area has been determined by existing data to have less risk

### Lead Poisoning-Therapeutic Management

- Education
- Treatment depends on lead blood levels
  - Chelation therapy
    - When a child has a blood level of 45 ug/L calcium disodium edetate (EDTA) and succimer are given
    - Level > 70 ug/L BAL is administered
    - Rebound effect

### Lead Poisoning-Nursing Considerations

- Prevent the child’s initial or further exposure to lead
- Identify sources of lead in the environment
- Accurate I & O because EDTA and lead are toxic to kidneys
- Seizure precautions are instituted at the bedside of children with high blood lead levels
- Psychological support