Lactose Intolerance

- The inability to tolerate lactose, the sugar found in dairy products.
- A inability to tolerate lactose develops as a result of an absence or deficiency of lactase.
- Lactase is an enzyme found in the secretions of the small intestine required for digestion of lactose.

Pathophysiology

- An absence or deficiency of lactase leads to an inability to digest lactose and the subsequent accumulation of lactose in the lumen of the small intestine.
- As a result water is drawn into the colon, resulting in watery osmotic diarrhea containing undigested lactose.

In addition, GI bacteria break down lactose and release hydrogen which causes excess gas production, bloating, and abdominal pain.

Clinical manifestation are diarrhea, frothy but not fatty, abdominal distension, crampy abdominal pain, and excessive flatus.

If the child has congenital lactose intolerance symptoms appear immediately and are more severe.

The treatment for lactose intolerance is removal of lactose from the diet. In most cases, total elimination is unnecessary. Additional dietary changes may be required to provide adequate sources of calcium and in the infant, protein and calories. Dietary changes can be supplemented with the use of commercial lactase preparations. Lactase can be take with lactose containing foods.

Teaching

- Provide information about high lactose containing food such as milk, milk products (ice cream)
- Assist parents with infants to find soy-based, lactose free formulas
- Provide information about alternative calcium sources (egg yolk, green leafy vegetable, dried beans)
- Gradually add yogurt, hard cheeses, and small amounts of milk to assess tolerance.

Cleft lip and palate

- Cleft lip and palate occur because maxillary and nasal tissue failed to fuse during embryonic development.
- They can result in an abnormal opening in the lip, palate, and/or nose.

Cleft Lip

- Management of cleft lip and cleft palate
- Management includes: Promoting family involvement in the infant’s care. This will foster acceptance and bonding.
Promoting adequate nutrition and preventing aspiration.
Providing correctional surgery as soon as possible.

Management cont...
- Preventing infection and trauma to the surgical site.
- Preventing complications such as aspiration, failure to thrive, speech difficulties, otitis media, and body image disturbance.

Cleft palate
- Cleft palate is more serious than cleft lip
- It can interfere with feeding
- It can interfere with breathing and is more difficult to repair

Cleft palate cont...
- Cleft palate may involve only the soft palate or extend into the nose and the hard plate
- The infant will not be able to suck and feeding will be expelled through the nose.
- Repair may not be attempted until 6 months to 2 years because the surgeon wants to take advantage of changes in the palate which occur with growth.
- Repair may require multiple surgeries at different stages in the child’s growth.

Cleft lip
- Cleft lip may be unilateral or bilateral.
- Cleft varies from a simple notching of the vermilion border of the lip to a deep cleft through the lip or into the nose.
- Early surgical repair prevents trauma to the area.
- It is psychologically more acceptable to parents and family members

Cleft lip cont...
- Prevents mouth breathing which can lead to cracking and infections at cleft site
- Early repair of a cleft facilitates parent-infant bonding and improves feeding.
- Cleft prevents normal development of the face because these structures grow fast.

Cleft lip and palate
- The therapeutic management is based on severity of the defect.
- Treatment involves a team approach and includes:
  - Surgeon, nurses, ENT specialist, Speech therapists, social worker and psychiatrist.

Preoperative care
- Preoperative care focuses on promoting parent-infant bonding, preventing pulmonary complication from aspiration while feeding
- Encourage parents to hold and touch infant to promote bonding.
- Offer information regarding support groups and other services available.

Preoperative care cont...
- Treatment includes:
  - Modified feeding techniques such as
  - Special nipples with larger holes,
  - Compressible bottles
  - Syringes with rubber tips.

Softer, Longer Nipples to help with Feeding

Preoperative care cont...
- Don’t touch the defect
- Assess for pain
- While feeding hold the child upright position. Burp frequently, and use special
devices if necessary.

- **Postoperative care**
  - Postoperative care focuses on promoting healing of the surgical site and preventing complication.
  - Avoid placing hard items in the mouth
  - No straws, pacifiers, or spoons
  - Keep the finger out of the mouth, use elbow restraints if necessary.

- **Postoperative care cont...**
  - No oral temperatures
  - No toys that can be put in the mouth
  - Keep the incision clean
  - Clean with sterile water or normal saline using a cotton swab.

- **Postoperative care cont...**
  - You don't want a scab to form. A scab will leave a scar
  - Clean using a rolling motion from the suture line out.

- **Postoperative care cont...**
  - Apply anti-infective ointment to keep the wound base moist.
  - Use elbow restraints. Remove every 2 hours for 15 minutes.
  - Observe drainage from incision
  - Note temperature and observe for redness, swelling, bleeding of incision area.
  - Wash mouth with water after feedings.

**Before and After**

**Trachea Esophageal Fistula and Esophageal Atresia**
- About 50% of patients with trachea esophageal fistula and trachea esophageal atresia have other anomalies, like cardiac, GI, etc.
- Many exhibits the 3 Cs with feeding
  - Coughing
  - Choking
  - Cyanosis.

**Esophageal Atresia and Tracheosaphageal Fistula**

**Trachea Esophageal Fistula and Esophageal Atresia cont...**
- Other signs are failure to be able to pass catheter to check for patency.
- Excessive oral secretion
- Infant returns fluid through nose and mouth/ risk for pneumonia
- Diagnosis can be confirmed with an x-ray.

**Trachea Esophageal Fistula and Esophageal Atresia cont...**
- The infant should be kept supine or prone with the head of the bed elevated.
- Needs immediate surgery
- Surgeon will perform an end to end anastomosis.

**A Gastrostomy tube in child**

**Pyloric Stenosis**
- Pyloric stenosis is caused by an increase in the size of the circular musculature of the pylorus (hypertrophy)
- A tumor-like mass constricts the lumen of the pyloric canal which impedes emptying of the stomach

**Pyloric Stenosis**
Symptoms of Pyloric Stenosis
- Symptoms of Pyloric Stenosis appear at about 2 to 4 weeks old
- The initial symptoms is vomiting after feedings
- At first it is mild vomiting then projectile, note no bile in the vomitus. WHY?
- The child will always be hungry. WHY?

Symptoms of Pyloric Stenosis cont...
- Little food will passes through the pylorus because of the obstruction.
- The infant will appear starved because?
- The infant will also be dehydrated, have poor skin turgor, and the epigastrum will be distended.

Symptoms of Pyloric Stenosis cont...
- There may peristaltic waves passing from left to right and a palpable olive-like mass in the right outer quadrant (ROQ)

Nursing Care of Pyloric Stenosis
- Assess bowel sounds and function
- Note characteristics of the stools and document.

Nursing Care of Pyloric Stenosis cont...
- Preoperative care includes
- Give normal saline enemas until clear or give polyethylene glycol electrolyte lavage (Golytely).
- Golytely give 25 to 60 ml/kg/hr
- This will cleanse the bowel in 6 hours or less, without absorption or fluid/electrolyte imbalances.

Nursing Care of Pyloric Stenosis cont...
- After bowel cleansing the infant will be NPO until surgery.
- Check length of time of NPO status relate to age and condition of infant.
- Administer neomycin (tabs/liquid) to sterilizes bowel. WHY?

Nursing Care of Pyloric Stenosis cont...
- Post-operative care includes:
- Same as other surgeries
- NPO until bowel sounds return
- Monitor N/G drainage. Noting color, amount, and compare with previous drainage and amount.

Nursing Care of Pyloric Stenosis cont...
- Check for abdominal distention.
- Keep accurate intake and output. How do you keep and accurate urine out record?
- Monitor for hydration be weighing the infant, checking skin turgor, urine specific gravity and lab values.

Celiac disease
- Celiac disease is a malabsorption syndrome characterized by marked atrophy and loss of function of the villi of the jejunum and occasional the cecum
- The condition is related to dietary gluten which is either a hypersensitive reaction to the protein in certain cereal grains, wheat, barley, oats.

Celiac disease cont...
- Celiac disease can also develop from a local toxic inflammatory reaction to gluten.
The gluten injury leads to a decreased surface area of absorption in the small intestine.

**Celiac Disease**
- Gluten is a protein found in rye, barley, and wheat.
- Gluten is broken down into gliadin in the small intestine.
- In Celiac disease there is an inability to digest gliadin.

**Celiac disease cont...**
- The symptoms of celiac disease are typical of all malabsorption syndromes which include:
  - Large, foul-smelling, bulky, frothy, and pale-colored stools.
  - The stool contain large quantity of fat.
  - There is recurrent diarrhea and abdominal distention.

**Celiac disease cont...**
- There is abdominal cramps, weakness, increased appetite with weight loss.
- Normochromic, hypochromic, or macrocytic anemia.
- Intestinal damage cause malabsorption of fats, sugars, vitamins, and proteins.

**Celiac disease cont...**
- Decreased fat absorption leads to large quantities of fatty, frothy, foul-smelling stools (streaterrhea)
- Decreased protein absorption leads to hypoproteinemia
- Decreased vitamin D leads to osteomalacia (bone softening) and osteoporosis (increased porosity of bones)

**Celiac disease cont...**
- Decreased vitamin K leads to bleeding from hypoprothrombinemia.
- Decreased folic acid leads to anemia.
- Iron, folate, vitamins A,D,E,K, and B12 become impaired.

**Celiac disease cont...**
- Early symptoms:
  - Foul-smelling stools from decrease fat absorption.
  - Weight loss
  - Abdominal distention
  - Diarrhea

**Celiac disease cont...**
- Symptoms progress to:
  - Colicky abdominal pain and protuberant abdomen
  - Vomiting
  - Subcutaneous fat loss and muscle wasting
  - Dependent edema

**Celiac Disease**

**Celiac disease cont...**
- Pale from anemia
- Bruising from decrease vitamin K
- Late symptoms:
- Growth retardation
Osteoporosis and a osteomalacia

Celiac disease cont...

Celiac crisis can result from mucosal cell destruction causing severe diarrhea and dehydration.

Hirschsprung’s disease – Aganglionic Megacolon

Ganglion provide parasympathetic innervation of the colon.

In Hirschsprung’s disease ganglions are absent from a variable length of the colon extending proximally from the anus.

Adequate peristalsis cannot occur in the affected colon. Leading to a tonic contraction of the lumen.

This produces a functional bowel obstruction.

Hirschsprung’s disease cont...

The functional bowel obstruction cause chronic constipation and passage of ribbon-like stools. It can lead to a complete bowel obstruction.

The obstruction of the lumen leads to a large amount of feces and gas to collect proximal to the aganglionic portion.

This leads to gross enlargement of this portion of the bowel segment.

The enlarged segment of colon is actually normal in function.

Hirschsprung’s disease cont...

Clinical manifestation

In the neonatal period a cardinal sign is delayed passage or absence of meconium.

The constriction of the lumen causes huge amounts of gas and feces to collect in the proximal aganglionic portion.

This results in the gross enlargement of this segment of the colon (pregnant-like abdomen).

Hirschsprung’s disease cont...

Child has pain from abdominal distention

Failure to thrive.

Hirschsprung’s disease cont...

Diagnosis

Rectal examine reveals absence of stool

A barium enema demonstrates an increase colon size and distented aganglionic proximal portion.

A definitive diagnosis is made by a rectal biopsy which demonstrates absence of ganglionic cells.

Hirschsprung’s disease cont...

Treatment includes:

Surgical removal of the aganglionic portion with an end to end anastomose

The child may get a colostomy if health status limits anastomose.

Later the child is in better health surgery is done and the colostomy is closed.

Intussusception

Intussusception is an invagination (telescoping) of a section of the intestine into the distal bowel.

Invagination results in bowel obstruction

The mesenteric vessels become trapped between the walls of the two layers and ischemia occurs.

It is the most common cause of bowel obstruction in children age 3 months to 6
years. 75% happen before the age of 2 years.

**Intussusception cont...**
- The pressure on the bowel leads to bleeding and “currant jelly” (bloody mucus) stools.
- Mesenteric ischemia causes edema and possible strangulation of the bowel.
- This can lead to rupture, peritonitis and sepsis. Resulting possible shock and death
- The cause is unknown

**Intussusception**

**Intussusception cont...**
- Clinical manifestation
  - A well-nourished child with no history of GI problems develops paroxysmal pain.
  - Pain subsides and recurs, progressing to constant, severe pain.
  - Child develops vomiting

**Intussusception cont...**
- The child passes bloody mucus stools (currant Jelly) and sausage-shaped abdominal mass.

**Intussusception cont...**
- Management
  - The goal is to restore bowel to normal position and function.
  - Diagnosis is made by barium enema
  - This may reduce the invagination by hydrostatic reduction

**Intussusception cont...**
- Barium or air enema are given until free flow of barium into the terminal ileum
- In 70% to 80% of case this works
- In hydrostatic reduction doesn’t work, surgery is necessary.

**Omphalocele**

**Gastrochisis**

**Biliary Atresia**
- Normally the bile pass from the Liver to the Hepatic duct into the Cystic duct into the Gallbladder (concentrated 10X).
- Fatty foods entering the duodenum stimulates the release to Cholecystokinin
- Cholecystokinin is an hormone secreted by the small intestine which stimulates the Gallbladder to contract and release bile
- Bile enters the Cystic duct passing into the Common bile duct and into the duodenum.

**Biliary Atresia cont...**
- Bile emulsifies fats in the small intestine
- In Biliary Atresia theirs is faulty development of the bile ducts.
- Bile accumulates in the liver instead of the entering the intestinal tract.
- As a result bile plugs form and cause bile to back up in the liver.

**Biliary Atresia cont...**
- This back up leads to inflammation, edema and hepatic degeneration.
- Eventually the liver becomes fibrotic, and cirrhosis and portal hypertension develop,
leading to liver failure.
- The gradual degeneration of the liver causes jaundice, icterus and hepatomegaly.
- Biliary Atresia cont...
  - Because bile is not present in the intestine, fat and fat-soluble vitamins cannot be absorbed.
  - This leads to malnutrition, deficiencies of fat-soluble vitamins and growth failure.
- Biliary Atresia cont...
  - Clinical symptoms are:
    - Jaundice. Bile pigments enter the blood increased bilirubin causing jaundice.
    - Portal obstruction leads to ascites and hepatomegaly (enlarged liver)
    - Poor absorption of vitamins A,D,K, and E, all fat soluble vitamins.
- Biliary Atresia cont...
  - Lack of bile produces clay-colored stools
  - Urine is bile strain
  - Bleeding and clotting time prolonged due to loss of vitamin K and clotting factors
  - Prothrombin decreases leading to hemorrhage.
- Biliary Atresia cont...
  - Treatment
    - High protein diet
    - Low fat
    - Vitamin K to prevent hemorrhage. Give by injection.
- Biliary Atresia cont...
  - Give antibiotics to prevent infections.
  - Prognosis is poor unless a liver transplant is done.
- Hyperbilirubinemia
- Phenylketonuria - PKU
  - Phenylketonuria is a congenital disease due to a defect in metabolism of an amino acid phenylalanine.
  - Phenylalanine is an essential amino acid for body growth.
  - Symptoms result from lack of an enzyme phenylalanine hydroxylase which is necessary for the conversion of phenylalanine into tyrosine.
- PKU cont...
  - Unmetabolized phenylalanine leads to formation of increased accumulation of phenylpyruvic acid and phenylalanine.
  - This cause alterations in myelinization which leads to neurologic damage and severe mental retardation.
  - Phenylalanine collects in the blood and there is eventual excretion of phenylpyruvic acid in the urine.
  - PKU is an hereditary recessive trait.
- PKU cont...
  - Blocking the conversion of phenylalanine to tyrosine leads a decrease in tyrosine.
  - Decreased tyrosine cause a decrease in the production of melanin which causes blond hair, blue eyes, and light skin.
  - There is also a decreased epinephrine levels. Child experiences tremor, excessive perspiration and poor muscular coordination.
- PKU cont...
  - Screening of newborns for PKU entails a simple heel stick blood sampling test called
the Guthrie test.
☐ This test is routinely performed in the US.
☐ Infants with blood levels greater than 10mg/dl needs treatment.
☐ Treatment should start as soon as possible but no later than 7 to 10 days.
☐

**PKU cont...**
☐ Treatment includes:
☐ Restriction of the infant’s diet to control the effects of PKU is prescribed on the basis of his or her requirements for phenylalanine, protein, and calories.
☐ Effectiveness of the special diet must be evaluated by determinations of phenylalanine blood levels.
☐ A repeat blood test at home after 6 weeks after taking protein.

**Appendicitis**
☐ Appendicitis is a common childhood condition.
☐ It occurs when vermiform appendix becomes inflamed.
☐ Inflammation is caused by a physical obstruction of the lumen by a fecalith (hard feces) or an anatomic defect within cecum.

**Appendicitis cont...**
☐ Symptoms are diverse
☐ The individual might complain of generalized periumbilical pain.
☐ Later the pain may localize in the right lower quadrant (RLQ)
☐ May demonstrate rebound tenderness
☐

**Appendicitis**

**Appendicitis cont...**
☐ May have a fever and vomiting
☐ Diarrhea or constipation
☐ Bowel sounds decreased or absent

**Appendicitis cont...**
☐ Diagnosis is based on:
☐ Rectal examination
☐ Elevated WBCs, elevated band cells, and elevated temperature
☐ Ua to R/O cystitis
☐ Chest x-ray to R/O pneumonia
☐

**Appendicitis cont...**
☐ Decrease in pain but abdominal rigid and guarding of abdomen could indicate rupture leading to peritonitis.

**Enterobliasis (Pinworms)**
☐ Transmission of Pinworms is favored in crowded conditions
☐ Infection begins when eggs are infested or inhaled
☐ Eggs hatch in the upper intestines
☐ Mature in 2 to 8 weeks and migrate to cecal area

**Enterobliasis (Pinworms) cont...**
☐ Females mate, then migrate on to the anus to lay their eggs
☐ Lay up to 17,000 eggs
☐ The movement of worms on the skin and mucous membrane causes intense itching.
☐ The eggs are very adhesive to any surface.
Enterobliasis (Pinworms) cont...
- The child scratches the anus (eggs)
- Eggs deposited on hands and fingernails.
- Hand to mouth activity transfers the eggs
- Pinworms can persist for 2 to 3 weeks in the environment (toilet seats, doorknobs, bed linen, toys, food, and underwear)

Enterobliasis (Pinworms) cont...
- Diagnosis
  - Tape test. A tongue blade with tape, sticky side out is pressed against the perianal area.
  - Flashlight inspection of anus 2 to 3 hours after the child falls to sleep.
- Presents of Pinworms can be upsetting to parents

Enterobliasis (Pinworms) cont...
- Treatment
  - Drug of choice is mabendazole (Vermox)
  - Vermox is safe and effective with few side effects.
  - One dose treatment, followed by second dose in 2 weeks.

Enterobliasis (Pinworms) cont...
- Prevent re-infection by:
  - Vacuum house
  - Wash linen
  - Hand washing
  - Keep child's finger nails short.

Shigella
- Characteristics
  - Incubation period 1 to 7 days
  - Most common in summer
  - Remains communicable for 1 to 3 weeks

Shigella cont...
- Clinical manifestations
  - Symptoms last 5 to 10 days
  - Diarrhea begins as watery, progresses to small bloody, mucus
  - There is severe abdominal pain
  - High fever
  - Neurological symptoms of headache, nuchal rigidity and convulsion

Shigella cont...
- Diagnostic findings
  - Blood mucus and WBCs in stool
  - Positive culture

Shigella cont...
- Treatment
  - Bactrim 8 to 10 mg/kg/day times 5 days
  - Ampicillin 50 to 100 mg/kg/day times 5 days
  - Enteric precautions
  - Identify source if possible

Salmonella
- Characteristics
  - Incubation period 6 hours to 3 days
Most common in summer and fall
Usually food-borne
Infectious for duration of illness and variable period afterward

Salmonella cont...
- Clinical manifestations
- Symptoms last 2 to 5 days
- Rapid onset
- Secretory diarrhea
- Abdominal pain, nausea, vomiting is common

Salmonella cont...
- Diagnostic findings
- Stool positive for blood,
- PMNs in stool

Salmonella cont...
- Treatment
- Same as Shigella
- Enteric precautions
- Identify source if possible

Giardia Lamblia
- Characteristics
- Caused by protozoan
- Most common cause of parasitic diarrhea diarrhea in U.S.
- Spread in water
- High risk factor for children attending daycare.

Giardia Lamblia cont...
- Infection begins with ingestion of the cyst
- Activated by stomach acid
- Activated cyst (active feeding stage) emerges and colonized in the duodenum and proximal jejunum.
- The cyst is passed in the feces and cycle continues.
- Cyst can survive in the environment for months.
- Mode of transmission is fecal-oral route.

Giardia Lamblia cont...
- Clinical manifestation
- Afebrile, diarrhea, vomiting, anorexia and failure to thrive.
- Abdominal pain, cramps, intermittent diarrhea and constipation, distention and flatulence
- Variable diarrhea

Giardia Lamblia cont...
- Stools malodorous, watery, pale, greasy, and may float.
- Not easily diagnosed from the stool
- Need 2 or more stools over several weeks to identify cyst

Giardia Lamblia cont...
- Management
- Drug of choice is metronidazole (Flagyl)
Meticulous sanitary practices
Family education is important.

Giardia Lamblia cont...
- Stools positive for blood, PMNs, ova, and parasites
- Parasite on duodenal biopsy

Giardia Lamblia cont...
- Treatment
- Flagyl times 7 days
- Enteric precautions
- Treat all unknown water sources with chorine/iodine before drinking

Rotavirus
- Characteristics
- Incubation 1 to 3 days
- Common in winter months
- Accounts for 50% of cases of acute diarrhea in children

Rotavirus cont...
- Clinical manifestations
- Symptoms usually last 2 to 6 days
- History of preceding or concurrent respiratory illness
- Fever for 1 to 2 days

Rotavirus cont...
- Diagnostic findings
- No blood in stool
- No Ova and parasites
- No pharmacologic treatment
- Use enteric precautions

Clostridium Difficile
- Characteristics – like Parvovirus in dogs
- Antibiotic associated
- Most common nosocomial diarrhea
- Diarrhea develops after antibiotic treatment.
- Stool positive for blood

Clostridium Difficile cont...
- Treatment
- Cholestyramine used to enhance mucosal recovery and decrease length of diarrhea
- Possibly treated with Vancomycin or Flagyl times 10 days

Quiz
- Family members should be encouraged to participate in care as soon as possible (T/F)
- True. Parents should be encouraged to hold, feed, and provide care for the infant.
- The infant should be kept flat in the prone position to prevent aspiration (T/F)
- False. Best position is upright and side-lying

Quiz
- When feeding an infant with cleft lip you should hold the infant parallel to arm and
direct the nipple towards the gums (T/F).
☐ False. Infant should be held up right to feed and direct feeding to back of mouth.
☐ After surgery the infant will have a smooth, straight incision to prevent lip from notching (T/F)
☐ False. The Z plasty method creating a staggered suture line is used to prevent scar tissue contraction and lip elevation.

125 Quiz
☐ The child will need to wear elbow restraints after surgery to prevent injury to the surgical site (T/F)
☐ True. Elbow restraints prevent the child from being able to touch the incisional area.
☐ The child will be encouraged to sip water slowly through a straw (T/F)
☐ False. Sucking and placing devices in the mouth is discouraged. Sipping from a cup is preferred method of fluid administration.

126 Quiz
☐ An absence or deficiency of lactase leads to an inability to digest ___
☐ Lactose
☐ GI bacteria break down lactose producing bloating and abdominal pain (T/F)
☐ True. Bacteria break down lactose and release hydrogen

127 Quiz
☐ The three Cs of trachea esophageal fistula and esophageal atresia are __
☐ Coughing, choking, and cyanosis
☐ Pyloric stenosis impedes emptying of the small intestine into the colon (T/F)
☐ False. It impedes emptying of the stomach

128 Quiz
☐ Initial symptoms of pyloric stenosis is vomiting after feedings (T/F)
☐ True. Mild then projectile. No bile in vomitus.
☐ The child is always hungry because __
☐ Little food passes into the small intestine

129 Quiz
☐ Celiac disease is a malabsorption syndrome characterized by a permanent intolerance to ___
☐ Gluten
☐ Gluten is a protein found in ___
☐ Wheat, rye, barley, and oats

130 Quiz
☐ Gluten cause a change in the absorptive surfaces of the intestine (T/F)
☐ True. This causes decrease fat absorption leading to large quantities of fatty frothy, foul-smelling stools