INTESTINAL OBSTRUCTIONS

DEFINITION

Intestinal obstruction refers to the partial or complete mechanical or non - mechanical blockage of the small or large intestine

TYPES

There are two types of intestinal obstructions, mechanical and non - mechanical.

Mechanical obstructions occur because the bowel is physically blocked and its contents cannot get past the obstruction. Mechanical obstructions can occur for several reasons. Sometimes the bowel twists on itself (volvulus) or telescopes into itself (intussusception). Mechanical obstruction can also result from hernias, impacted feces, abnormal tissue growth, the presence of foreign bodies in the intestines (including gallstones), or inflammatory bowel disease (Crohn's disease).

Non - mechanical obstruction, called ileus, occurs because the wavelike muscular contractions of the intestine (peristalsis) that ordinarily move food through the digestive tract stop.

Mechanical obstruction in infants

Infants under one year of age are most likely to have intestinal obstruction caused by meconium ileus, volvulus, and intussusception.

Meconium ileus, which is the inability to pass the first fecal excretion after birth (meconium), is a disorder of newborns. It is an early clue that the infant has cystic fibrosis, but may also occur in very low birth weight (VLBW) infants. In meconium ileus, the material that is blocking the intestine is thick and stringy, rather than the collection of mucus and bile that is passed by normal infants. The abnormal meconium must be removed with an enema or through surgery.

Volvulus is the medical term for twisting of either the small or large bowel. The twisting may cut off the blood supply to the bowel, leading to tissue death (gangrene). This development is called a strangulating obstruction.

In intussusception, the bowel telescopes into itself like a radio antenna folding up. Intussusception is most common in children between the ages of three and nine months, although it also occurs in older children. Almost twice as many boys suffer intussusception as girls. It is, however, difficult for doctors to predict which infants will suffer from intestinal obstruction.

CAUSES OF INTESTINAL OBSTRUCTION IN CHILDREN

Congenital

- Artesia
- Incarcerated hernia
- Imperforate anus
- Meckel diverticulum
- Hirschsprung disease
- Stricture
- Malrotation
- Volvulus
- Meconium plug
- Meconium ileus
- Annular pancreas

Acquired

- Pyloric stenosis
- Intussusceptions
- Post operative adhesions and strictures
- Tumors and
- Foreign bodies

SIGNS AND SYMPTOMS

Usually acute intestinal obstruction is characterize by **abdominal pain, nausea, vomiting, abdominal distention, and a change in spooling patterns**. Pain is caused by intermittent muscular contractions proximal to the obstruction as the bowel attempts to move luminal contents along the normal path it may also be due to severe abdominal distention, which results from accumulation of gas and fluid above the level of the obstruction. As abdominal distention progresses, the abdomen may become extremely tender, rigid and firm

When abdominal contents continue to accumulate, nausea and vomiting occur. Vomiting of gastric contents is often the first sign of high obstruction, such as obstruction of the pylorus and vomiting of the bile stained material is a sign of obstruction of the small intestine. Persistent vomiting can lead to dehydration and electrolyte disturbances. Constipation and obstipation prolonged absence of

defecation are early signs of low obstruction. In acute conditions such as intussusceptions, the clinical manifestation are apparent within a few hours of the onset of the disorders. In other conditions such as pyloric stenosis the signs and symptoms may initially be hyperactive, then diminish or cease. Respiratory distress may occur when the diaphragm is pushed up into the pleural cavity as a result of severe abdominal distention

DIAGNOSIS

suspects intestinal obstruction based on the **physical examination** and patient **history**, he or she will order **x rays,** a computed tomography scan (**CT scan**), or an **ultrasound** evaluation of the abdomen. In many cases the patient is given a **barium enema.** Barium sulfate, which is a white powder, is inserted through the rectum and the intestinal area is photographed. Barium acts as a contrast material and allows the location of the obstruction to be pinpointed on film.

Laboratory tests

The first blood test of a patient with an intestinal obstruction usually gives normal results, but later tests indicate **electrolyte imbalances**. There is no way to determine if an obstruction is simple or strangulated except surgery.

TREATMENT

Initial assessment

All patients with suspected intestinal obstruction are hospitalized. Treatment must be rapid, because strangulating obstructions can be fatal. The first step in treatment is inserting a nasogastric tube to suction out the contents of the stomach and intestines. The patient is then given intravenous fluids to prevent dehydration and correct electrolyte imbalances.

Nonsurgical approaches

Surgery can be avoided for some patients. In some cases of volvulus, guiding a rectal tube into the intestines will straighten the twisted bowels. In infants, a barium enema may reverse intussusception in 50-90%. An air enema is sometimes used instead of a barium enema. This treatment successfully relieves the obstruction in many infants. The children are usually hospitalized for observation for two to three days after these procedures. In patients with only partial obstruction, a barium enema may dissolve the blockage.

Surgical treatment

If these efforts fail, surgery is necessary. Strangulated obstructions require emergency surgery. The obstructed area is removed and part of the bowel is cut

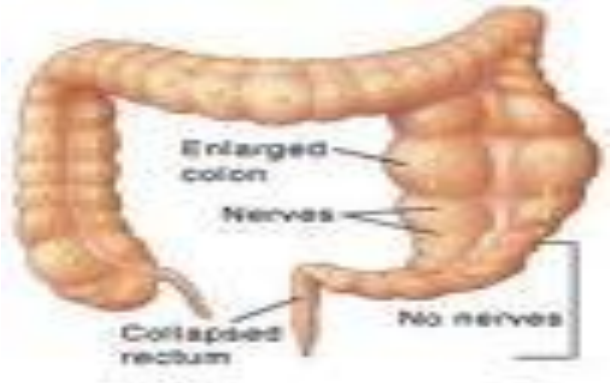
away. If the obstruction is caused by tumors, polyps, or scar tissue, they are removed. Hernias, if present, are repaired. Antibiotics are given to reduce the possibility of infection.

PROGNOSIS

Mortality

Untreated intestinal obstructions can be fatal. Delayed diagnosis of volvulus in infants has a mortality rate of 23-33% with prompt diagnosis and treatment the mortality rate is 3-9%. The bowel either strangulates or perforates, causing massive infection. With prompt treatment, however, most patients recover without complications.

HIRSCHSPRUNG'S DISEASE



DEFINITION

Hirschsprung's disease (congenital aganglionic megacolon) is a form of chronic intestinal obstruction affecting primarily full-term infants. It occurs due to the congenital absence of the parasympathetic ganglion nerve cells from within the muscle wall of the intestinal tract, usually at the distal end of the colon. Ganglion cells are located throughout the intestinal tract from the mouth down to the rectum.

INCIDENCE

Occurs in 1 in 5,000 (ranges 1:4,400 to 1:7,000) live births with no racial predilection. The male/female ratio is reported as 4:1, except in long segment disease, in which it is closer to 1:1, possibly favoring females. Strong evidence supports a genetic component with the male/female risk ratio of siblings being 7.5% and 2.5% to 6% incidence, respectively. Several associated congenital anomalies have been recognized with Hirschsprung's disease. Down syndrome has been reported in 4% to 16% of children with Hirschsprung's disease; also associated with Hirschsprung's are small/large intestinal atresias, trisomy 18, Ondine's curse, endocrine neoplasia 2A, congenital deafness, Waardenburg's syndrome, Recklinghausen's disease, and the Smith-Lemli-Opitz syndrome.

PATHOPHYSIOLOGY AND ETIOLOGY

- An arrest in embryologic development affecting the migration of parasympathetic nerve innervation of the intestine.
    - Normally, the nerve cells migrate to the upper end of the alimentary tract and then proceed in the caudal direction, with migration to the distal colon complete by 12 weeks.
    - Migration occurs first in the intermuscular layer, called Auerbach's plexus, and then moves into the submucosal plexus, moving along the GI tract in a descending manner.
- The process of aganglionosis is almost always continuous within the affected segment, ending in proximal segment with ganglion cells. Intermittent ganglion cells in the colon have been reported, but this is extremely unusual.
    - Most commonly affected site is the rectosigmoid colon (referred to as short-segment disease) (80%)
    - Long-segment disease extends to the upper descending colon and transverse colon (10% to 15%) and occasionally throughout the entire colon, involving the small bowel (5%).
    - Total angiogliosis of the bowel, involving the entire small and large bowel, is rare.
- No peristalsis occurs in the affected portion of intestine (ie, spastic and contracted). This section is usually narrow; therefore, no fecal material passes through it.
- Proximal to the narrow affected section, the colon is dilated.
    - Filled with fecal material and gas.
    - Hypertrophy of muscular coating.
    - Ulceration of mucosa may be seen in neonate.
- The internal rectal sphincter fails to relax, and evacuation of fecal material and gas is prevented. Abdominal distention and constipation result.

CLINICAL MANIFESTATIONS

Clinical Manifestations vary depending on degree of involved bowel.

- Neonate symptoms appearing at birth or within first weeks of life.
    - No meconium passed in the first 48 hours of life.
    - Vomiting bile-stained or fecal

    - Abdominal distention
    - Constipation occurs in 100% of patients
    - Overflow-type diarrhea
    - Dehydration; failure to thrive
    - Temporary relief of symptoms with enema
- Older child symptoms not prominent at birth. Short-segment disease commonly presents later.
    - History of obstiration at birth
    - Progressive abdominal distention
    - Peristaltic activity observable over abdomen
    - Absence of retentive posturing (ability to contract the internal and external sphincter to purposefully avoid defecation)
    - Constipation unresponsive to conventional remedies
    - Absence of encopresis (common feature of functional constipation)
    - Ribbon like, fluid like, or pellet stools
    - Failure to grow ”loss of subcutaneous fat; appears malnourished, stunted growth
    - Presentation insidious or catastrophic as with enterocolitis
- Enterocolitis ” consists of severe toxemia and a proliferation of bacteria in the colonic lumen.
    - Abdominal distention
    - Explosive diarrhea
    - Vomiting
    - Fever
    - Lethargy
    - Rectal bleeding
    - Shock

DIAGNOSTIC EVALUATION

- Supportive findings on history and physical examination for Hirschsprung's disease.
- Digital rectal examination”reveals an anal canal and a rectum that are narrow and empty of stool (in long-segment disease). In short-segment disease, rectal impaction may be present; removal of finger may be associated with a rush of stool as the obstruction is relieved.

- Plain films" show severe gaseous distention of the bowel, with absence of air in the rectum.
- Radiopaque markers, ingested, measure intestinal transit time. Children with short-segment disease retain the markers in the rectum for long periods.
- Barium enema"used to demonstrate a transition zone between the proximal dilated, normal innervated colon, and the distal, narrow, aganglionic colon.
    - May be nondiagnostic in young infants who have not had sufficient time to develop a transition zone.
    - Delayed passage of barium is suggestive, but not definitive for Hirschsprung's disease.
- Anorectal manometry" demonstrates failure of the intestinal sphincter to relax in response to transient rectal distention. Requires cooperation of the child.
- Full thickness or suction rectal biopsy"absence or reduced number of ganglion nerve cells; definitive diagnosis.

MANAGEMENT

Definitive treatment is removal of the aganglionic, nonfunctioning, dilated segment of the bowel, followed by anastomosis, and improved functioning of internal rectal sphincter.

- Initially, a colostomy or ileostomy is performed to decompress intestine, divert fecal stream, and rest the normal bowel.
- Definitive surgery includes the following reconstructive procedures:
    - Swenson abdominoperineal pull-through leaving the smallest amount of aganglionic bowel remaining.
    - Duhamel" retrorectal transanal pull-through creating a neorectum with aganglionic anterior wall and ganglionic posterior wall.
    - Soave" endorectal pull-through in which the ganglionic segment is pulled through the aganglionic muscular cuff, preserving the internal sphincter; may be done laparoscopically. May be delayed until infant is age 9 to 12 months or until weight reaches 15 to 20 lb (6.5 to 9 kg).
- Many surgeons are now performing the endorectal pull-through without colostomy in neonates. This depends on the degree of defect, degree of dilatation of the colon, and the clinical status of the infant.

- In older child whose symptoms are chronic but not severe, treatment may consist of isotonic enemas, stool softeners, and low-residue diet.
- Treatment of enterocolitis.
    - I.V. or oral antibiotics based on severity of illness.
    - Colonic irrigation and decompression with saline solution is initial emergency treatment. Enemas alone are ineffective because they do not allow for adequate decompression of the colon and may be retained.
    - Surgical decompression colostomy.
    - At least 1 month after, abdominal perineal pull-through.

COMPLICATIONS

- Preoperative
    - Enterocolitis ”a major cause of death
    - Hydroureter or hydronephrosis
    - Water intoxication from tap water enemas
    - Cecal perforation
- Postoperative
    - Enterocolitis: remains the major cause of morbidity and mortality (mortality 6% to 30%).
    - Diarrhea (69%)
    - Vomiting (51%)
    - Fever (34%)
    - Lethargy (27%)
    - Leaking of anastomosis and pelvic abscess
    - Stenosis, sudden inability to evacuate colon
    - Long term: intestinal obstruction from adhesions, volvulus, intussusception

NURSING ASSESSMENT

- Observe neonate for constipation.
- Obtain parents' history, especially on infant's bowel and feeding habits.
    - Onset of constipation
    - Character of stools (ribbonlike or fluid-filled)
    - Frequency of bowel movements

    - Enemas needed
    - Suppositories or laxatives needed
- Observe for irritability, feeding difficulty, distended abdomen, and signs of malnutrition (pallor, muscle weakness, thin extremities, and fatigue).

Nursing Diagnoses

Preoperative

- Ineffective Breathing Pattern related to abdominal distention
- Acute Pain related to intestinal obstruction
- Imbalanced Nutrition: Less Than Body Requirements related to poor intake
- Constipation due to pathophysiologic process

Postoperative

- Risk for Injury related to postoperative course
- Risk for Infection of Surgical Incision
- Risk for Injury related to decreased peristalsis postoperatively
- Ineffective Family Coping related to care of child with colostomy

Nursing Interventions

Preoperative

Improving Breathing Pattern

- Monitor for respiratory embarrassment that may result from abdominal distention; watch for rapid, shallow respirations; cyanosis; sternal retractions.
- Elevate infant's head and chest by tilting the mattress.
- Administer oxygen, as ordered, to support respiratory status.

Relieving Pain

- Note degree of abdominal tenderness.
    - Infant's legs drawn up
    - Chest breathing

- Note color of abdomen and presence of gastric waves; take sequential measurements of abdominal girth for evidence of changes.
- Assist in emptying the bowel by giving repeated colonic irrigations.
    - Procedure for irrigation in an infant is similar to that in an older child, except that less fluid and pressure are used.
    - Physiologic saline solution (warmed) should be used for irrigations. Tap water may result in large quantities of water being absorbed and in water intoxication.
- Administer medications (antibiotics) to reduce the bacterial flora of the bowel.
- Note any change in degree of distention before and after irrigation. Record if location of distention changes (i.e., upper or lower abdomen).
- Record all intake and output of irrigant and drainage. Report marked discrepancies in retention or loss of fluid.
- Insert rectal tube for escape of accumulated fluid and gas as ordered.
- If abdominal distention is not relieved by irrigation and decompression and discomfort is significant, insert an NG tube as ordered.
    - Note drainage from NG tube, and chart characteristics.
    - Check for patency; saline irrigations may be requested. Carefully record intake and output.
    - Perform frequent mouth care.
    - Alternate nares when changing NG tube every 24 hours, and use minimal amount of tape to prevent skin irritation.
- Offer pacifier for nonnutritive sucking if on parenteral fluids.
- Encourage parents to hold and rock infant.
- Maintain position of comfort with head elevated. Offer soothing stimulation (e.g., music, touch, play therapy).

Providing adequate nutrition

- Obtain a dietary history regarding food and eating habits.
    - This will contribute to planning dietary alterations.
    - Explain to parents that eating problems are common with Hirschsprung's disease.
- Monitor I.V. fluids appropriately. Measure all output.
- Offer small, frequent feedings. (Low-residue diet will aid in keeping stools soft.)

    - Feed child slowly.
    - Provide as comfortable a position as possible for child during feedings.
- Inform parents that defect can be corrected, but it may take some time for the child's physical status and feeding habits to improve.
    - Feeding may cause additional discomfort because of distention and nausea.
    - Parenteral nutrition may be necessary.

Controlling constipation in the older child

- Be aware that older children who present with milder forms of the disorder may be treated medically (rare).
- Note and record frequency and characteristics of stools (constipation is likely to occur).
- Provide demonstration and written and verbal instructions to family for saline enema administration and use of stool softeners.
- Obtain dietary consultation for teaching of low-residue diet.

Postoperative

Preventing Complications

- Monitor vital signs and respiratory status closely.
- Monitor for proper functioning of colostomy, if present.
    - Note drainage from colostomy: characteristics, frequency, fecal material, or liquid drainage.
    - Record stoma color, size, and return of function.
    - Note abdominal distention.
    - Measure fluid loss from colostomy because the amount will affect fluid replacement.
- Report signs of obstruction from peritonitis, paralytic ileus, handling bowel, or swelling.
    - No output from colostomy
    - Increased tenderness
    - Irritability
    - Vomiting
    - Increased temperature

- Place child in a lateral position on a flat or only slightly elevated bed. When head of bed is elevated, the residual carbon dioxide in the child's abdominal cavity causes referred pain in neck and shoulder.
- Differentiate type and cause of pain to determine appropriate pain management interventions. Proper positioning, patent catheters and tubes, and timely administration of analgesics are key to ensuring patient comfort.
- Nothing per rectum • sign should be placed at head of bed so no rectal temperatures, rectal medications, or digital rectal examinations are done.

Preventing Wound Infection

- Change wound dressing using sterile technique. If done laparoscopically, wound is minimal.
- Prevent contamination from diaper.
    - Apply diaper below dressing.
    - Change diaper frequently.
- Be aware 7 to 10 stools per day can be passed postoperatively. When cleared by surgery, prevent perianal and anal excoriation by thorough cleansing sitz baths and application of zinc oxide paste and karaya after soiling.
- If skin is denuded and moist, apply a skin barrier and provide specific instruction to the family to prevent further damage to skin with aggressive removal.
- Use careful hand-washing technique.
- Report wound redness, swelling or drainage, evisceration, or dehiscence immediately.
- Suction secretions frequently to prevent infection of the tracheobronchial tree and lungs.
- Encourage frequent coughing and deep breathing to maintain respiratory status.
- Allow the infant to cry for short periods to prevent atelectasis.
- Change the infant's position frequently to increase circulation and allow for aeration of all lung areas.

Preventing Abdominal Distention

- Maintain patency of NG tube immediately postoperatively.
    - NG suction for 24 to 48 hours or until adequate bowels sounds, gas from rectum or gas from ostomy.
    - Watch for increasing abdominal distention; measure abdominal girth.
    - Measure fluid loss because amount will affect fluid replacement.
- Maintain NPO status until bowel sounds return and the bowel is ready for feedings as determined by provider.
- Administer fluids to maintain hydration and replace lost electrolytes.
- Maintain Foley catheter for 24 to 48 hours.
- Provide frequent oral hygiene while NPO.
- Begin oral feedings as ordered.
    - Avoid overfeeding.
    - Bubble frequently during feeding.
    - Turn head to side or elevate after feeding to prevent aspiration.

Supporting the Parents

- Acknowledge that even a temporary colostomy can be a difficult procedure to accept and learn to manage.
    - Initiate ostomy referral.
    - Support the parents when teaching them to care for the colostomy.
    - Include the parents soon after surgery in dressing changes and any other appropriate activities.
    - Assist and encourage the parents to treat the infant or child as normally as possible.
    - Reassure parents that colostomy will not cause delay in the child's normal development.
- Encourage the parents to talk about their fears and anxieties. Anticipating future surgery for resection may be confusing and frightening.
- Initiate community-nurse referral to help the parents care for the child at home away from the comforting situation of the hospital, and obtain necessary equipment.
- Initiate a genetic counseling referral, especially if the parents plan to have more children.

Ostomy care in children

Care of the colostomy and ileostomy in the infant and young child is based on the same principles and is essentially the same as that for an adult (see chapter 18), with the following exceptions:

- Colostomy irrigation is not part of management in small children. Irrigation is primarily for the purpose of regulating the colostomy to empty at regular intervals. Because children have bowel movements at more frequent intervals, this type of control is not feasible. Irrigation should be done only in preparation for tests or surgery and occasionally for the treatment of constipation.
- Dehydration occurs quickly in the infant or small child; therefore, it is particularly important to observe drainage for amount and characteristics. Drainage should be measured to provide an accurate basis for computation of fluid replacement.
- Prevention and treatment of skin excoriation around the stoma are of primary concern. With the advent of better skin shields and equipment designed especially for the pediatric patient, keeping an ostomy appliance in place is now less difficult. Through careful application and trying different types of pouches until a proper fit is obtained, most children can be kept clean and dry for at least 24 hours between changes. This is a significant factor in preventing skin breakdown and subsequent infections in the peristomal area. Remember, however, that infant dressings must be checked frequently.
    - Check ostomy bag for leakage every 2 hours, and change bag as soon as leakage is suspected.
    - Teach the parents the importance of emptying the bag when it is one-quarter to one-third full.
    - Skin breakdown is more frequent. Reinforce to parents to treat breakdown with method and products recommended by ostomy nurse.
    - Be aware that infant elimination is more frequent than in the older child.

- For older children with ostomies:
    - Potty training can be achieved for ostomy pouch emptying.
    - Pouching optimizes socialization and developmental activities.
    - Encourage a matter-of-fact and accepting attitude to help build child's self-confidence.

- Encourage the child to participate in ostomy care.
- Encourage child to join age-appropriate ostomy support group.

Community and Home Care Considerations

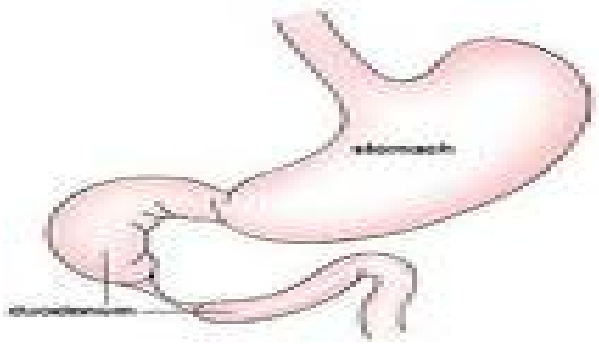
- Begin early teaching about the colostomy (preoperatively, before discharge, and at home), including how it works, and how to care for it and the child. Explanations should be thorough and in accordance with family readiness. Encourage care of the ostomy as part of normal activities of daily living.
- Arrange frequent home visits to carry out comprehensive teaching plan. Consult with ostomy nurse as needed for any skin breakdown or other ostomy problems.
- Involve the entire family in teaching colostomy care to enhance acceptance of body change of the child. An older child should become totally responsible for own colostomy care.
- Assess family's self-care of the ostomy, including such procedures as preparation of skin, application of collecting appliance, care of appliance, and control of odor.
- Observe for and teach family about signs of stomal complications, including ribbonlike stool, diarrhea, failure of evacuation of stool or flatus, and bleeding.
- If ordered, practice and teach dilatation of stoma with finger or soft rubber rectal tube.
- Assess hydration status, and teach increased fluid intake because colon absorption is decreased.
- Review GT feeding techniques if ordered.
- Assist family to discuss the child's needs with day-care workers, teachers, and school nurse as applicable. Review care of ostomy with child's care providers.
- Assist with preoperative preparation for colostomy closure when the time comes.

Family Education and Health Maintenance

- Instruct the parents to serve small, frequent meals to the child and be alert for and eliminate foods that cause gas and diarrhea, such as cabbage, spicy foods, beans, Brussels sprouts, fruits, and fruit juices.

- Advice parents that colds or viruses may cause loose stools, which increases risk of dehydration, especially in long-segment disease, so to increase fluids.
- Alert parents of common postoperative problems, including bacterial overgrowth, colitis or enterocolitis, and lactose intolerance. Advice parents to contact their health care provider if persistent diarrhea, abdominal distention, abdominal pain, fever, vomiting or constipation occur.
- Encourage parents to practice all procedures long before the infant is to be discharged.
- Emphasize the importance of treating the child as normally as possible to prevent behavior problems later.
- Teach the basics of good nutrition and diet. Involve the dietitian as necessary.
- Encourage close medical follow-up and general good health and hygiene.
    - Safety
    - General growth and development
    - Immunizations
- Advise older children without colostomies that fecal staining may occur, but this will improve with time.

DUODENAL ATRESIA



DEFINITION

Duodenal atresia is a condition in which the duodenum (the first part of the small bowel) has not developed properly. It is not open and cannot allow the passage of stomach contents.

CAUSES

The cause of duodenal atresia is unknown, but it is thought to result from problems during an embryo's development in which the duodenum does not normally change from a solid to a tube-like structure.

INCIDENCE

Duodenal atresia is seen in more than 1 in 10,000 live births. Approximately 20-30% of infants with duodenal atresia have Down syndrome. Duodenal atresia is often associated with other birth defects.

SYMPTOMS

- Upper abdominal swelling may or may not be present
- Early vomiting of large amounts, which may be greenish (containing bile)
- Continued vomiting even when infant has not been fed for several hours
- Absent urination after first few voidings
- Absent bowel movements after first few meconium stools

DIAGNOSIS

A fetal ultrasound may show polyhydramnios (excessive amounts of amniotic fluid in the uterus) or swelling of the stomach and part of the duodenum.

An abdominal x-ray may show air in the stomach and first part of duodenum, with no air beyond that

TREATMENT

A tube is placed to decompress the stomach. Dehydration and electrolyte abnormalities are corrected by providing fluids through an intravenous tube. An evaluation for other congenital anomalies should be performed.

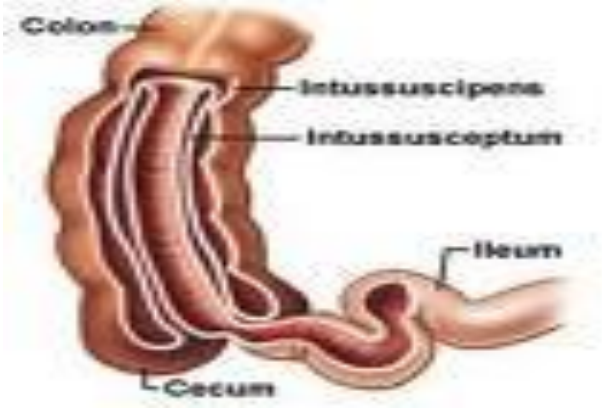
Surgery to correct the duodenal blockage is necessary (pyloromyotomy), but is not an emergency. The surgical approach will depend on the nature of the abnormality. Associated problems (such as those related to Down syndrome) must be treated as appropriate.

POSSIBLE COMPLICATIONS

- Other birth defects
- Dehydration

After surgery, there may be late complications such as duodenal swelling (megaduodenum), intestinal motility problems, or gastroesophageal reflux

INTUSSUSCEPTION



DEFINITION

Intussusception is the invagination or telescoping of a portion of the intestine into an adjacent, more distal section of the intestine, which creates a mechanical obstruction.

INCIDENCE

It can occur at any time in life but most commonly occurs in children younger than age 3, with the greatest incidence between ages 5 and 10 months. It is twice as common in male infants as in female infants. Incidence in the United States is 1.5 to 4 cases per 1,000 births with males more frequently affected. Intussusception should be high on the differential list when a child younger than age 1 presents with sudden onset of abdominal pain.

PATHOPHYSIOLOGY AND ETIOLOGY

- The cause can fall into one of three categories: idiopathic, lead point, or postoperative.
    - Idiopathic: this is the most common type, with no identifiable cause. It is not unusual, however, to obtain a history of a recent upper respiratory or GI virus. It is hypothesized that hypertrophy of the Peyer's patches create a thickened segment. Most common in infants.
    - Lead point: an identifiable change in the intestinal mucosa can be discovered, usually during surgical treatment. Most common in children ages 2 to 3. Malformations include polyps, cysts, tumors, Meckel's diverticulum, and hematomas (seen in Henoch-SchÃ¶nlein

purpura). Children with cystic fibrosis are at risk for lead point intussusception.
    - Postoperative: uncommon but can occur after surgery of the abdomen, and even the chest. May be due to interrupted motility from anesthesia or direct handling of the intestine. It can also occur from placing long tubes into the bowel.
- Invagination results in complete intestinal obstruction
    - Mesentery/lymphatics/blood vessels pulled into intestine when invagination occurs
    - Intestine becomes curved, sausagelike; blood supply is cut off.
    - Bowel begins to swell; hemorrhage may occur.
    - Necrosis of involved segment occurs.
    - If not recognized and treated, bowel death occurs, possibly resulting in significant loss of intestine, shock, and death.
- Classification of location:
    - Ileocecal (most common): when ileum and the attached mesentery, lymphatic tissue, and blood vessels invaginate into the cecum
    - Ileocolic: ileum invaginates into colon.
    - Colocolic: colon invaginates into colon.
    - Ileo-ileo (enteroenteric): small bowel invaginates into small bowel

CLINICAL MANIFESTATIONS

- Paroxysmal abdominal pain:
    - Attacks of pain • that awaken child from sleep; inconsolable, drawing up legs, colicky.
    - Cyclic repetition of symptoms at approximately 5- to 30-minute intervals.
    - Between episodes, child may act normal.
- Currant jelly-like stools:
    - Sloughed mucosa of dark red color, with a mucoid consistency.
- Vomiting"may begin with decreased appetite and progress to bilious vomiting.
- Bowel sounds:
    - During a crisis of pain bowel sounds may be hyperperistaltic rushes (borborygmi).
    - Ileus/peritonitis: bowel sounds are diminished or absent

- Increasing absence of stool.
- Increasing abdominal distention and tenderness.
- Sausagelike mass palpable in abdomen. This is pathognomonic and is known as Dance's sign" elongated mass in the right upper quadrant of the abdomen with absence of bowel sounds in the right lower quadrant.
- Unusual-looking anus; may look like rectal prolapse.
- Dehydration, fever, lethargy; shocklike state with rapid pulse, pallor, marked sweating.
- Hematochezia (maroon-colored stools)" not always present.
    - Rectal examination is significant if bloody mucus on examiner's finger.
    - Occult or gross blood on rectal exam in 60% to 90% of patients.
- The groin should be inspected for incarcerated hernia or torsion of testicle or ovary as differential diagnosis.

DIAGNOSTIC EVALUATION

- X-ray examination.
    - Supine and upright abdomen film. Early course may be normal, but as it progresses absence of gas in the colon is found. Can also have finding of right upper quadrant mass
    - If no intraperitoneal air found on abdominal film, an air or barium enema is attempted.
    - Commonly, a concave filling defect is seen in the transverse colon that can be reduced to the cecum.
- Ultrasonogram to locate area of telescoped bowel.
- Color Doppler sonography used more recently to determine whether reducible or not. Absence of blood flow (color) indicates ischemia, and, therefore, enema reduction should BE AVOIDED.

MANAGEMENT

- Air or barium enema" both for diagnosis and treatment (hydrostatic reduction) in reducing intussusception.
    - A surgeon should be present during the barium enema due to risk of perforation

    - A no inflatable tube is passed into rectum; contrast enters by gravity under fluoroscopic guidance. If air is used, it is delivered under constant pressure.
    - As the intussusception is reduced, the contrast or air should reflux freely into the small intestine; this radiographic is needed to confirm a successful reduction.
    - Success ranges from 70% to 90%. Recurrence is the most common complication, but perforation can also occur.
- Surgical reduction of intussusception may be necessary when radiologic reduction is unsuccessful, a pathologic lead point or peritonitis is suspected, or with multiple recurrence.
- Surgery involves a laparotomy ”manual milking out of the intussuscepted segment from the distal to proximal end, followed by resection of the nonviable bowel and, commonly, an incidental appendectomy.
- Recurrence is 5% to 7% regardless of the type of treatment undertaken.

COMPLICATIONS

- Perforation
- Peritonitis
- Shock
- Loss of bowel resulting in SBS

NURSING MANAGEMENT

Nursing Assessment

- Obtain careful history of infant's or child's physical and behavioral symptoms, including any recent or chronic illness.
- Perform physical examination, which may reveal a well-developed, well-nourished, afebrile infant with abdominal tenderness and distention.
- Observe for dehydration, may be mild or severe. Poor capillary refill, decreased mental status, and decreased urine output are reliable indicators of shock in children.

Nursing Diagnoses

Preoperative

- Acute Pain related to paroxysmal abdominal pain, fever, and treatments
- Risk for Decreased Fluid Volume related to vomiting
- Ineffective Breathing Pattern related to abdominal distention
- Anxiety related to hospitalization, knowledge deficit of illness, surgery, and treatments

Postoperative

- Risk for Injury related to postoperative course

Nursing Interventions

Preoperative

Minimizing Pain

- Observe behavior as indicator of pain; the infant may be irritable and very sensitive to handling or lethargic or unresponsive. Handle very gently.
- Encourage family to participate in comfort measures. Explain cause of pain, and reassure parents as to purpose of diagnostic tests and treatments.
- Administer medications as prescribed.

Maintaining Fluid and Electrolyte Balance

- Monitor fluids, and maintain NPO status.
- Restrain infant as necessary for I.V. therapy.
- Monitor intake and output.

Promoting Effective Breathing

- Be alert for respiratory distress because of abdominal distention. Watch for grunting or shallow and rapid respirations if in shocklike state.
- Insert NG tube if ordered to decompress stomach.
    - Irrigate at frequent intervals.
    - Note drainage and return from irrigation.
- Maintain NPO status as ordered.

    - Wet lips, and perform mouth care.
    - Give infant pacifier to suck.
- Continually reassess condition because increased pain and bloody stools may indicate perforation.

Preparing for Surgery

- Offer support to the parents during time of crisis and fear.
- Offer specific teaching to parents
    - Compare intussusception to a collapsible telescope or antenna or by drawing a picture.
    - Visual aids, such as a rubber glove with one finger into itself, may be helpful. Reduction can be demonstrated by filling glove with water until inverted finger resumes its normal position.
- Children need brief, simple explanations in age-appropriate language.

Postoperative

Preventing Postoperative Complications

- Monitor vital signs and general condition, notify health care provider of any change or unexpected trend.
- Assess temperature and administer antipyretics and other cooling measures. Fever is usually present from absorption of bacteria through the damaged intestinal wall.
- Assess for abdominal tenderness, bowel sounds, and distention of abdomen. Maintain NG suction as ordered.
- Assess pain and level of consciousness.
- When able to take fluids, assess tolerance carefully and advance intake slowly.

Family Education and Health Maintenance

- Explain that recurrences are rare and usually occur within 36 hours after reduction. Review signs and symptoms with parents.
- Review activity restrictions with parents (e.g., positioning on back or side, quiet play, and avoidance of water sports until wound heals).
- Encourage follow-up care.
- Provide anticipatory guidance for developmental age of child.

- Encourage awareness of symptoms that require prompt medical attention among day-care centers and other child-care providers (eg, paroxysmal abdominal pain, blood or mucus in stool).

JOURNAL

Topic: Fetal Intestinal Obstruction Induces Alteration of Enteric Nervous System Development in Human Intestinal Atresia

Abstract

Intestinal motility disorders are a major cause of morbidity after surgical repair of intestinal atresia of unknown mechanism. We hypothesized that interruption of antenatal peristalsis may disturb the normal development of the enteric nervous system. Using a series of neuronal (synaptophysin, neuronal nitric oxide synthase, neurofilaments) and nonneuronal markers (glial acidic fibrillary protein and c-Kit) and immunohistochemistry, we have defined developmental steps of the enteric nervous system in normal intestine (12 fetuses, 15 children, and 4 adults) and their alterations above and below the obstacle in 22 human intestinal atresia compared with age-matched controls. Antisynaptophysin antibody revealed the progressive conversion of the myenteric plexus from a continuous belt into regularly spaced ganglions during normal fetal gut development and, by contrast, the significantly delayed appearance of individual neuronal ganglions in the distal segments of atresia ($p < 0.05$). Staging using three other markers for neuronal (neurofilaments and neuronal nitric oxide synthase) and nonneuronal cells (glial acidic fibrillary protein) confirmed that maturation of the myenteric plexus was significantly delayed below atresia ($p < 0.01$). These results indicate that intestinal atresia impairs the development of the enteric nervous system and provide an anatomical substrate for the motility disorders observed after surgical repair. They point to the role of peristalsis in normal gut development and suggest that stimulation of peristalsis might be used to accelerate recovery.

http://journals.lww.com/pedresearch/Abstract/2004/12000/Fetal_Intestinal_Obstruction_Induces_Alteration_of.21.aspx