

# Methodical recommendations for foreign students in

## Intussusception

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### Definition

Intussusception involves a telescoping of one portion of the intestine into another, which results in decreased blood supply of the involved segment.

Intussusception is the most common cause of intestinal blockage in children age 2 years and younger. It occurs mainly in young children; it is rare in adults.

Three types of intussusception can occur:

Ileocolic – the small intestine "telescopes" into the colon; this is the most common intussusception

Ileoileal – the small intestine "telescopes" into itself

Colocolic – the large intestine "telescopes" into itself

Ileoileal or colocolic intussusceptions occur less frequently than ileocolic intussusceptions.

### Causes, incidence, and risk factors

Intussusception is caused by part of the gut being pulled inward. This can obstruct the passage of digestive contents through the intestine. Strangulation, in which the blood supply is cut off, can occur in the segment of intestine that has been pulled inside. This can cause the tissue to die.

The pressure created by the two walls of the intestine pressing together causes irritation, swelling, and decreased blood flow. Tissue death can occur, with significant bleeding, perforation, and infection. Shock and dehydration can occur very rapidly.

The cause of intussusception is not known, although viral infections may be

responsible in some cases. Sometimes a mass like a lymph node, a polyp, or a tumor can serve as a lead point triggering the telescoping of the gut. The older the child, the more likely a lead point will be found. A definite lead point is identified in about 5% of patients. These include: Meckel's diverticulum, polyps, Henoch's Schönlein purpura, hematoma, lymphoma, foreign bodies, and duplications. Most children have no lead point and it is felt that enlarged mesenteric nodes or swollen Peyer's patches may be the cause.

Intussusception can affect both children and adults, although most cases occur in children between 6 months and 1 year of age. It affects males twice as often as females.

The first sign of intussusception is usually sudden, loud, and pained crying caused by abdominal pain. The pain is colicky and intermittent (not continuous), but recurs frequently, increasing in both intensity and duration.

As the condition progresses the infant may become weak and may go into shock. Vomiting and fever are common, and about half of the infants will pass bloody, mucuslike stool sometimes referred to as a "currant jelly" stool. Prompt diagnosis results in the most favorable prognosis.

### Symptoms

Abdominal pain alternating with some pain-free periods

Vomiting

Stool mixed with blood and mucus

Shock (pale color, lethargy, sweating)

Fever

An infant with severe abdominal pain may draw his or her knees to the chest while crying.

### Signs and tests

A physical examination may reveal a mass in the abdomen. Signs of dehydration or shock may be present.

Tests:

An abdominal X-ray may suggest obstruction.

A barium enema may show telescoping bowel.

## Treatment

Initial efforts will be directed at stabilizing the child. A tube will be passed into the stomach through the nose (nasogastric tube) to allow decompression of the bowels. An intravenous line will be placed, and fluids will be given.

In some cases, the bowel obstruction can be treated with a barium enema performed by a skilled radiologist. There is a risk of bowel perforation with this procedure, and it is not used if a bowel perforation is already present.

Hydrostatic reduction of the intussusception with the contrast material is successful in approximately 50% of cases. To be successful, the water soluble material must reflux into the terminal ileum. The surgeon should be notified before an attempt at hydrostatic reduction. Recently the use of gas enema reduction has been successful in patients with: (1) symptoms less than 12 hours, (2) no rectal bleeding, (3) absence of small bowel obstruction, and (4) normally hydrated. Ultrasonography can be used as a rapid sensitive screening procedure in the initial diagnosis of intussusception. Previous adverse clinical features that precluded barium reduction can be replaced during gas reduction. Predictors of failure of reduction are: (1) ileocolic intussusception, (2) long duration of symptoms, (3) rectal bleeding, and (4) failed reduction at another institution. Air reduction (pneumocolon) is a very effective alternative method since it brings less radiation (shorter fluoroscopy time), less costs and less morbidity in cases of perforations.

Failure of hydrostatic reduction requires urgent operation through a right lower quadrant horizontal incision. The intussusception is reduced by pushing on the distal bowel like a tube of toothpaste rather than pulling the proximal bowel and appendectomy is added as cecopexy and avoidance of future diagnostic problems of a RLQ incision. Most cases are ileo-colic intussusception, and a few are jejuno-jejunal or ileo-ileal intussusception.

If the bowel is severely damaged as a result of the intussusception, additional procedures may be required.

Usually the bowel tissue can be saved, but if not, any dead tissue will be removed. Intravenous feeding and fluid will be continued until a normal bowel movement has passed.

### Expectations (prognosis)

The probable outcome is good with early treatment. In older children, intussusception may develop because of the presence of polyps or tumor.

Intussusception recurs in 5% to 11% of children, and some children may have multiple recurrences. Surgery, even with resection, has a 1% to 4% incidence of recurrence.

### Complications

Perforation with infection is a complication.

### Postoperative obstruction

Mechanical small bowel obstruction can complicate the postoperative course after any operative entry into the peritoneal cavity. The diagnosis is obscured by ileus and the symptoms and signs that are a usual accompaniments of a laparotomy incision.

Normally, paralysis of peristaltic function resolves within 72 h after a laparotomy involving handling of the intestine. There is then an absence of distension, and the patient reports a return of appetite along with expulsion of flatus and faeces. In cases of obstruction, normal peristaltic function may never return, or may do so only to be interrupted by an episode of obstruction. The superimposition of the signs and symptoms of obstruction on those of convalescence after laparotomy makes the diagnosis elusive.

Most cases are the result of adhesions and involve the ileum. Although the extent of adherence of peritoneal surfaces to each other is variable, the time course usually is not. By 72 h after laparotomy, extensive soft adhesions will have formed. These seem most extensive at about 10 days to 2 weeks, by which time they become dense and vascular. A

gradual process of resolution then occurs; this may go on for many years, accounting for appearance of obstruction at remote times. This process of adhesion formation in some cases is abnormally vigorous and may then reflect peritoneal reaction to foreign material introduced during the operation. Sterile peritonitis can be an important contributor to a course of delayed resumption of intestinal function without actual mechanical obstruction. Obstruction by adhesions in the early period is usually the result of kinking and tensions on adherent loops of intestine rather than of obturation. The presence of a stoma or intestinal tube may contribute to these mechanical problems by offering a fixed cicatricial point. Other causes of obstruction include internal hernias and peritoneal defects after partial dehiscence of the deep layer of a wound or the peritoneal floor. An abscess involving adjacent segments of intestine can cause obstruction or can lead to localized ileus.

The clinical problem is to distinguish between cases of mechanical obstruction and those that reflect ileus prolonged by a sterile peritonitis or other factors, such as chronic narcotic use. Fortunately, except when there is a peritoneal defect, strangulation of an obstruction is rare in a postoperative patient. Careful repeated observation of the patient is paramount. Radiography offers the next best help: plain films show gas throughout the small and large bowel in most cases of ileus. In difficult cases, the use of barium will sometimes provide important information.

Careful replacement of fluid and electrolytes is needed, and nutritional support may facilitate overall recovery. It is generally believed that nasogastric decompression is essential and that decompression through a long tube may be helpful; passage of such tubes is most likely to succeed in those patients with mechanical obstruction. The usefulness of long tubes in the overall management of patients is estimated to be high by some surgeons, but many do not find them useful.

The timing of surgical intervention is difficult. Although it is important to relieve mechanical obstruction promptly, operations on patients with profound ileus and in those with extensive nonobstructing adhesions are fruitless and delay recovery. No simple rule can be offered. Generally, complete obstruction, evidence of sepsis, and an unacceptably prolonged course dictate an exploratory operation. An unacceptably long course is the least useful indication.

## Recurrent obstruction

The risk of strangulation and the likelihood of early recurrence usually dictate prompt operation at the first episode of obstruction. An operation for obstruction due to adhesions carries a higher likelihood of recurrence than a laparotomy for other indications. This is of the order of 20 per cent. When obstruction recurs, the possibility of a cause other than adhesions is lower, and there is perhaps more justification for a non-operative management, in the form of decompression with a nasogastric tube and careful parenteral replacement of lost fluids and electrolytes.

During any period of observation, there will be continued concern about the possibility of bowel compromise. The nature of pain is the best indicator of this complication. Plain and contrast studies are helpful in ruling out complete obstruction, which also serves as an indication for surgical relief. If the obstruction resolves, there is generally no reason for a laparotomy in the patient with recurrent obstruction due to adhesions.

There is no good way to prevent the recurrence of adhesions. Some authorities have suggested that plication of the wall or mesentery of the small bowel to form a ladderlike configuration may be helpful: there is no good evidence for the efficacy of these measures, and few surgeons use them. An in-lying long enteric tube may also produce a configuration of loops less prone to obstruction from adhesions. Such tubes should be left in place for at least 2 weeks, but their efficacy has not been clearly established.

Laboratory tests are of little value beyond helping to rule out other causes of abdominal pain. The exception to this rule is the plain radiograph of the abdomen, which is especially helpful in confirming the clinical impression of obstruction, and can also, when interpreted by an experienced clinician, add additional useful information as to completeness, site, and aetiology of obstruction. Upright films may show air in the biliary or portal system and beneath the diaphragm; these are important observations with respect to timing of surgery.

## Non-operative measures

As a rule, mechanical small bowel obstruction is an urgent indication for surgical intervention. This practice reflects the risks of strangulation and perforation, the fact that

persistence of obstruction will eventually require an operation in many cases, and the likelihood of recurrence even with spontaneous resolution.

Preoperative assessment of fluid status with rapid replacement of deficits is important. A patient whose obstruction has been identified many hours from its onset, when there has been vomiting or sequestration of large amounts of fluid in the lumen, intestinal wall and peritoneal cavity, may require administration of several litres of fluid. In these cases, restoration of an adequate urine output serves as a useful general index of adequate replacement. In older patients, especially those with a history of cardiac disease, central venous or pulmonary artery pressure monitoring may be needed. Concurrent, sometimes exacerbated, medical problems such as diabetes mellitus and cardiac impairment must be considered and managed separately.

Nasogastric suction relieves distension from air swallowing and reduces fluid passage into the small bowel; it should be instituted early in management. The use of long intestinal tubes has less justification. They do not pass readily, do not empty the stomach, and delay more definitive management. Generally, they have no useful role in the management of acute obstruction. Although exceptions may be cited, an efficiently functioning nasogastric tube is clearly preferable in most cases.

### Surgical intervention

Though sometimes easy, operative intervention may be complex. The procedure requires the management of the segment of intestine at the site of obstruction, the distended proximal bowel and the underlying cause of obstruction.

If the patient has had a previous surgical incision which, with enlargement, will afford a portal for complete abdominal exploration, it should be used. This approach allows repair of all associated hernias and easy access to the most frequent site of obstruction by adhesions, which is the incision itself. It is usually wise to enter the abdomen through an extension into normal tissues to avoid injury to adherent loops.

When obstruction is due to adhesions the question of whether all or only the offending adhesions should be released is unresolved. Generally, adhesions can be expected to recur when there has been any trauma to serosal surfaces. Thus, as a rule it is probably wise to

divide only those adhesions involving the bowel at the site of obstruction and those that prevent restoration of the proximal and distal segments to their normal place of residence in the abdominal cavity.

### Prevention

Any laparotomy should be performed with operative measures that minimize adhesion formation, decreasing the incidence of small bowel obstruction. All reasonable steps to minimize serosal trauma should be utilized, including gentle handling and packing of intestine and avoiding the unnecessary introduction of foreign material into the peritoneal cavity. Sutures and ties involving the serosa cause small areas of tissue ischaemia and necrosis which can cause adhesions. Serosal defects should not be repaired if the underlying muscularis and submucosa are intact.