

PedsCases Podcast Scripts

This is a text version of a podcast from PedsCases.com on “[An Approach to Intussusception.](#)” These podcasts are designed to give medical students an overview of key topics in pediatrics. The audio versions are accessible on iTunes or at www.pedsCases.com/podcasts.

An Approach to a young child with intussusception

Developed by Kieran Purich and Dr. Ioana Bratu for PedsCases.com.

November 12, 2016

Hi, my name is Kieran Purich, medical student at the University of Alberta. This podcast was developed with the help of Dr. Ioana Bratu, a pediatric surgeon and Associate Professor at the University of Alberta. Today's podcast will discuss an approach for a child in whom you suspect idiopathic intussusception.

Objectives

- 1) Recognize the presenting signs and symptoms of idiopathic intussusception
- 2) Develop an organized approach to a child with suspected intussusception including differential diagnosis, physical exam and investigations
- 3) Review the treatment and prognosis of intussusception

Case presentation

You are a fourth year student on a rural emergency medicine elective. A mother arrives in the Emergency Department with her 9-month-old baby boy who has been lethargic for the past couple hours. On history you find that the child has had intermittent, progressive episodes of crying over the past 5 hours, accompanied by vomiting and abdominal distention. The child has no notable comorbidities, yet he was diagnosed with a viral infection four days ago and the mother is worried that the previous physician may have overlooked a more serious infection. What would you consider on your differential diagnoses?

As with many conditions in newborns and toddlers, the differential diagnosis is very broad as the presentation has few distinguishing features. Some diagnoses, which should be considered in this patient, are: gastroenteritis, intussusception, appendicitis, intestinal malrotation, volvulus, testicular or ovarian torsion, congenital peritoneal bands, Meckel's diverticulum, or an incarcerated inguinal hernia.

Luckily, intussusception, the focus of our podcast, can be distinguished through imaging with high accuracy. Yet it is important to remember to rule out these other diseases in children with similar presentations. For a more detailed review of the differential diagnosis, you can listen to our PedsCases podcast on acute abdominal pain.

What is intussusception?

Intussusception is the invagination of a proximal segment of intestine (the intussusceptum) into a distal segment (the intussusciens). This can cause obstruction as well as venous and lymphatic congestion in the bowel. If left unresolved it can also lead to intestinal edema, ischemia and potential perforation. Most commonly this invagination occurs at the ileocolic junction with the ileum telescoping into the colon, and in the antegrade direction, paralleling the direction of peristalsis. This ileocolonic intussusception is typical for idiopathic intussusception. It is important to stress that idiopathic intussusceptions only occur as an ileo-colonic intussusception where the ileum invaginates into the colon and can travel down from the right colon to the transverse colon, and even further down to the left colon and sometimes out per rectum!

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Intussusception can also occur in other areas of the bowel, such as small bowel to small bowel invagination, or large bowel to large bowel invagination, although this is less common, and would indicate that it is not idiopathic but that it has a pathological lead point.

Idiopathic intussusception is one of the most common acute abdominal emergencies in young children, occurring in approximately 56 children in 100 000 in the USA (Applegate, 2009). Idiopathic intussusception occurs primarily in infants from 3 months to 3 years old, peaking between 5-9 months. Risk factors for intussusception include: male sex and co-existing/recent viral illnesses (adenovirus, rotavirus and HHV 6). Older rotavirus vaccines have also been correlated with an increased risk and as a result have subsequently been removed from the market. Intussusceptions that are not idiopathic have a pathological lead point such as: a Meckel's diverticulum, duplication cyst, polyps, previous abdominal trauma with hematoma of bowel wall, gastrojejunal tube, lymphoma, metastatic disease, or other less common lead points.

This being said, over 90% of cases of intussusception in young children are from an idiopathic cause, usually associated with lymphoid hyperplasia in Peyer's patches within the ileum wall as a normal immune response to a viral illness. Within the older age groups intussusception is rare, and once the patient is older than five years a pathological lead point is much more common and needs to be further worked up.

Lets move on to objective 2 – and discuss an organized approach to a child with intussusception.

Clinical Presentation

Clinical findings seen with intussusception are variable, and often are mistaken for a viral gastroenteritis in early stages. This issue is compounded as many children have a preceding viral illness causing upper respiratory tract or flu like symptoms before onset. The classic clinical triad of intussusception is acute crampy, colicky & progressive abdominal pain, currant jelly (dark red mucous filled) stools and a palpable abdominal mass that may be sausage shaped. However, less than one quarter of children have this triad but it is still essential to inquire about these three features on history and physical. Up to 20% of children have no notable pain or rectal bleeding at initial presentation, making it common to initially miss the diagnoses. Other common findings are vomiting, intermittent crying & discomfort, lethargy, diarrhea, abdominal distention and tenderness. If left unresolved for extended periods of time patients can also present with shock, sepsis, bowel obstruction or perforation.

Physical exam

Following vital signs to ensure the patient is stable; a thorough abdominal exam should be completed. The most consistent sign in intussusception is an ill-defined palpable mass, which may be sausage shaped and is often in the RUQ. The RUQ mass may be accompanied by the absence of bowel in the RLQ, known as Dance's sign. However, palpation may be difficult in a crying infant. If there are bloody stools, be sure to check the rectum to look for alternative explanations such as an anal fissure. In boys, palpate both testes to rule out a testicular torsion.

Imaging

Imaging is key for the diagnosis of intussusception. Ultrasound is the preferred modality due to its superior safety profile and higher sensitivity and specificity for the diagnoses of intussusception. In the emergency setting, supine, frontal and left lateral decubitus abdominal radiographs are often used to rule out other potential conditions such as the presence of free peritoneal air. These radiographs can occasionally detect intussusception but cannot rule it out.

On radiographs there will be a picture of a small bowel obstruction with dilated loops of small bowel and air-fluid levels, along with a paucity of gas in the cecum and ascending colon, and little or no stool in the rectum. The radiologist may also occasionally discern a "target sign" – in which distinct borders of each segment of bowel are clearly visible making a donut like appearance. The target sign confirms the diagnosis of intussusception.

Ultrasound is not only used to diagnose intussusception but can also assess the reducibility of the lesion, rule out ischemia of the involved bowel by Doppler scan, look for free fluid, and discern whether or not a pathological lead point is present. Similar to what is seen on radiograph, the target sign is a common finding on ultrasonography.

Sonography is operator dependent; therefore the efficacy for diagnosis depends largely on the examiner. If sonography is not available, air enema can be used for both diagnosis and therapy. Please note that air enema is only indicated in ileocolonic idiopathic intussusception. In older patients where you suspect a pathological lead point, other investigations may be needed. To work up a potential pathological lead point for non-idiopathic intussusception, one may need a contrast enema (barium is not preferred in case a perforation occurs), colonoscopy, or CT scan of the abdomen/pelvis. .

Following a strong suspicion of idiopathic intussusception and support from the ultrasound or radiograph, intussusception is confirmed by air enema. Guided pneumatic reduction is also the mainstay of treatment for the majority of these patients.

Investigations

All patients should have blood drawn for a CBC differential and electrolytes. Hemocult testing and cultures of the stool may be indicated depending on the presenting symptoms.

Treatment

When a physician suspects intussusception they should arrange for an urgent surgical consult. All patients may have significant dehydration reduced oral intake and vomiting, and may need fluid resuscitation. The patient should be kept NPO and given IV fluids for rehydration. If the patient is obstructed a nasogastric or NG tube can be placed.

As mentioned previously, pneumatic air enema is the primary treatment for patients with idiopathic intussusception, often completed under fluoroscopy or ultrasound. Air enema is more effective and avoids the risks associated with liquid or barium enemas. Enema reduction is relatively safe, with under a less than 1% (0.8%) perforation rate and a 10% recurrence rate – which usually occurs within 48 hours of treatment. The success rate for reduction of intussusception for air enemas is reported to be 84%, yet success rates depend on various factors. Predictors of successful reduction by enema are: intervention within under 24-48 hrs of symptoms, adequate hydration, age of child > 3 months, if the intussusception is in a location other than the rectum, absence of small bowel obstruction, absence of trapped intraperitoneal fluid and the absence of enlarged lymph nodes in the intussusceptum. In the case of recurrence enemas are safe to be repeated.

Post successful air enema reduction, patients should be followed closely, as recurrence may occur. Hospitalization should be considered in patients who have limited access to care. Our hospital guidelines recommend that after successful air enema reduction, the child be observed in the emergency department for 8 hours and if well, the child can be discharged home with parental instructions to look out for recurrence of symptoms.

Surgical reduction or resection is indicated if air enema reduction is contraindicated, particularly if there is a bowel perforation. If the child is critically ill, in shock, has peritonitis or there are signs of sepsis or free air in the peritoneal cavity they should be resuscitated and then managed surgically. In addition, children who cannot be reduced by air enema will usually need to go to the OR for surgical reduction or resection. Generally the operation is done through an open laparotomy incision, but can also be attempted by laparoscopy in certain cases. In the rare cases of a suspected intussusception due to a pathological lead point, the treatment is surgical with resection of the lead point if possible, otherwise an ostomy may be needed.

Prognosis

The overall mortality for children with idiopathic intussusception is less than 1%. Most infants do well if intervention occurs within 24hrs.

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As mentioned previously idiopathic intussusception recurrence occurs within hours to a few days is approximately 10% of non-operative patients. If someone presents with chronic, repeat intussusception, they likely have a pathological lead point, and further investigation is warranted to rule out polyps, tumors and Meckel's diverticulum.

Case Summary

Let's get back to our clinical case. You are concerned that the patient may have viral gastroenteritis. You move onto physical exam and note a mass in the child's right upper quadrant. Initial 3 view x-rays of the abdomen show no free air, but there is a pattern of small bowel obstruction with paucity of air in the right lower quadrant. You decide to order an ultrasound, which shows a target sign, and the radiologist report suggests ileocolonic intussusception. No lead points are visible on imaging. Shortly after the ultrasound the baby passes dark red mucous filled stool – completing the presence of the triad of intussusception. You urgently consult pediatric surgery, and luckily reduction is achieved through the use of a pneumatic air enema. You observe the child carefully for the next eight hours to ensure the intussusception does not recur, and you send now a healthy baby home with tired parents the following morning.

Conclusion

Let's finish with a few key take-away points on intussusception.

- Idiopathic intussusception has a varied presentation, the classic triad consisting of episodic pain, currant-jelly red stools and a palpable mass in the RUQ.
- Ultrasound is very sensitive, specific and safe and is the favored imaging modality for diagnosis, although radiographs also play a role.
- In young children intussusception is usually idiopathic from lymphoid hyperplasia due to viral illness.
- In the majority of cases, treatment is through the use of reduction by air pneumatic enema.
- Intussusception is an emergency, which must be identified and treated as quickly as possible.

Thank you for listening to this PedsCases podcast on intussusception. Stay tuned for more podcasts!

Resources

Applegate, K. Intussusception in children: Evidence-based diagnosis and treatment. *Pediatric Radiology*. 2009; 39 (suppl 2): S140-S143.

Applegate, K.. Clinically Suspected Intussusception in Children: Evidence-Based Review and Self-Assessment Module. *American Journal of Roentgenology*. 2005; 185 (3).

D'Agostino, J.. Common Abdominal Emergencies in Children. *Pediatric Emergency Medicine: Current Concepts and controversies*. 2002; 20 (1): 139-153.

Dynamed summary Intussusception.

Waseem, M., Rosenberg, H.K. Intussusception. *Pediatric Emergency Care*. 2008. 24 (11): 793-800.