Gastro Intestinal System Examination

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Introduction

Welcome to the Learn Pediatrics examination of the gastrointestinal system. Here we will review a general approach to this examination. Note that if a specific pathology is suspected a more detailed exam may be indicated.

Clues about a child's gastrointestinal health should be sought not just from the abdomen, but also from his or her general well being and from a global overview of the other systems. As with all physical exams, be sure to plot the child's growth parameters on appropriate growth charts. Recording a series of measurements is particularly useful in order to establish a trend, or to establish whether a concerning measurement reflects an acute or chronic change.

General Appearance

Start with a general overview of the child's appearance. Identify the child that looks acutely unwell such that immediate action can be taken. Ensure vital signs are stable. Note the child's level of mental status.

Take note of the child's posture. The child that is writhing and unable to lie still is likely to suffer from colicky pain from acute cholangitis while the child that minimizes movement may have appendicitis or peritonitis.

Note any changes in colour – a patient with jaundice and scleral icterus is likely suffering from liver disease, while a pale patient may have anemia.

Furthermore take note of a patients' nutritional status. A cachectic appearance or signs of muscle wasting may be present in different chronic conditions including malabsorption or protein wasting. Peripheral edema may suggest hypoalbuminemia.

Then focus on the skin. There are some gastro-intestinal conditions that manifest skin lesions as part of the extra-intestinal symptoms of the disease such as dermatitis herpetiformis in Celiac Disease or erythema nodosum in Inflammatory Bowel Disease. If inflammatory bowel disease is suspected, evidence of other extra-intestinal manifestations should be sought, such as uveitis, aphtous ulcers, clubbing and arthritis.

Stigmata of liver disease are less common in the younger child but might be seen in the older child with chronic liver disease. These include muscle wasting, asterixis, palmar erythema, whitening of the nails, jaundice, spider angiomas, caput medusae and gynecomastia.

Abdominal Inspection

Proper positioning and lighting is important to properly visualize the child's abdomen for contour, peripheral vascular irregularities, and skin markings. The patient should be supine with his or her hips slightly flexed. This relaxes the abdominal muscles, giving better access to deeper structures. Always examine the patient from the right side.

Look for abdominal distention which may indicate abnormal gas-filled loops of bowel, fecal retention, a mass lesion, ascites or a ruptured viscus. On the other hand, a scaphoid abdomen can be seen in a patient with upper gastrointestinal obstruction or as a result of starvation. Peristaltic waves may be seen on occasion, but are especially prominent in pyloric stenosis. Pulsations of large vessels should generally not be visible.

Look for abdominal scars suggesting previous surgery which puts the patient at risk for obstruction secondary to adhesions or secondary to stenosis in the case of a previous bowel resection and anastomoses.

Look for vascular markings. In children hemangiomas are common and not a concern. Prominent veins such as caput medusae however can be seen in chronic liver or renal failure.

Look for abdominal wall protrusions. Umbilical hernias frequently are present in the infant, toddler, and younger child. Most umbilical hernias are uncomplicated, require no surgery, and resolve spontaneously. Diastasis recti and small epigastric hernias, if not readily visible, can be elicited by having the patient raise his or her head off the examining table while lying supine or by having the child tense the abdominal muscles; these hernias also do not require surgical correction.

Auscultation

Auscultate prior to palpation of the abdomen, so to avoid creating abnormal gas patterns or obliterating normal intestinal sounds. Abdominal sounds are most useful in the child with significant abdominal discomfort. Active bowel sounds, or borborygmi, may be heard in patients with gastroenteritis or at an area of bowel stenosis. Bowel sounds are decreased or absent in patients with appendicitis, ileus or intestinal obstruction.

Also listen for bruits, which may be present in stenosis of the aorta or other large vessels such as the iliac, femoral, or renal arteries.

Percussion

Percussion helps detect mass lesions and assess organ size. In the acutely ill child percussion is used to identify tenderness gently prior to palpation.

Percuss to determine if hepatomegaly is present, starting from the right lower quadrant, then ascending to the right upper quadrant. The transition between a tympanic and dull

percussion tone marks the lower border of the liver. Then start over the right lower lung field, percussing downwards to find the upper liver border. A normal liver span in the midclavicular line for a child depends on gender and on age. At one week of age the liver span should be less than 5 cm, while at 12 years of age up to 8 cm in boys and up to 7cm in girls.

Although percussion may be employed to determine if splenomegaly is present, this test is not very sensitive. Nonetheless this would be done by percussing within Traube's space. This is the triangular area between left 6^{th} rib, left midaxillary line and left costal margin. If percussion in this area reveals transition from a tympanic sound to dullness during inspiration Kastel's sign is said to be positive for splenomegaly.

Percussion can also be used to determine the presence of ascites, using two different methods. In the first, a test for "shifting dullness" is performed starting with the patient supine. Percuss from the flank towards the umbilicus in a plane perpendicular to the bed. At first dullness will be noted but as one approaches the umbilicus, the air-filled loops of intestine pushed centrally by peritoneal fluid will sound tympanic. Next ask the patient to role on their side. Repeat the maneuver. If ascites is present the fluid will redistribute into dependent areas and the line between tympany and dullness will be shifted accordingly.

The second test for ascities tests for the presence of a "fluid wave". Ask an assistant to place a hand vertically over the center of the abdomen with the patient supine. Then tap one flank with the tips of the fingers of one hand while feeling for a fluid wave over the contralateral flank.

Palpation

Palpation is used to detect masses, organomegaly and abdominal tenderness. The often-ticklish younger child may require a calm, reassuring touch, and no initial hand movement by the examiner. Palpation can be aided by asking the child to take a deep breath and then exhale slowly while the examiner applies firm steady pressure to the abdomen. The softer and less tense the abdominal musculature, the more easily organs and masses can be felt. For the obese child, a two-hand technique with the fingers of one hand applying pressure on top of the fingers of the other hand may be required.

Start with superficial palpation, progressing to deeper palpation.

When peritonitis is suspected, rebound tenderness may be elicited by pressing firmly and slowly on the abdomen and then quickly releasing pressure. Subsequent wincing, apprehension or other signs of pain upon withdrawal of pressure suggests peritoneal irritation.

Next palpate for organomegaly. To feel the liver, place the fingers of the right hand over the lower quadrant in a somewhat oblique position. Palpation should progress in a superior direction until the lower edge of the liver is detected. It is important to start low enough as an enlarged liver may be missed if initial placement was above the liver

edge. In the newborn, the liver edge may be felt about 2 cm below the costal margin, while in older children the normal location of the liver edge is flush with or behind the inferior costal margin. Also try to assess whether the liver edge is soft or hard, smooth or boggy. An inflamed liver edge may not only be enlarged but also feel boggy and irregular while a fibrotic liver may feel hard.

A similar maneuver is used to determine the size of the spleen. In children it is important to start palpation for splenomegaly in the right lower quadrant as the spleen enlarges across the midline.

Some clinicians use the "scratch test" to determine the inferior margin(s) of the liver and/or spleen by listening with a stethoscope while gently scratching the skin surface with a finger nail or blunt instrument. Placing the stethoscope over the right lower chest at about the level of the 7^{th} rib, listen for a change in sound quality as your finger ascends over the liver border. The same can be done over the left for the spleen.

The kidneys are palpated in a two handed technique. Palpate deep anteriorly with your one hand, and in the costophrenic angle with your other hand. An enlarged kidney will be palpable by the anterior hand.

Renal tenderness is determined easily in a cooperative child with pyelonephritis through percussion over the costovertebral angles. With the child sitting up, firmly strike over the back with the ulnar surface of a closed fist. This will elicit marked discomfort in the patient with pyelonephtritis.

Several positive physical findings may help make the diagnosis if appendicitis is suspected. On history the point of maximal pain and ternderness often progressed from peri-umbilical to a point 1/3 the distance between the iliac crease and the umbilicus in the right lower quadrant. Light palpation over this location or McBurney's point may elicit tenderness and guarding. Deeper palpation and quick release of pressure may create rebound tenderness. Tenderness over the right lower quadrant while palpating the contralateral side is often found (Rovsing's sign). In advanced cases of appendicitis, significant abdominal muscular rigidity can develop, making palpation difficult. Depending on the position of the inflamed appendix, some special tests can be elicited to further support the diagnosis of appendicitis. The obturator sign involves pain on internal rotation at the hip, a maneuver which stretches the obturator muscle which may be irritated when the appendix is located inferiorly. The psoas sign elicits pain on right hip flexion tested against resistance, present when the inflamed appendix is located in the retroperitoneum and is irritating the psoas muscle.

Also part of the exam of the GI system is a good assessment of the groin for lymphadenopathy, inguinal hernias or femoral hernias. In boys with abdominal pain the scrotum should also be examined for possible testicular torsion or incarcerated inguinal hernia. Both these diagnoses are medical emergencies and should not be missed, though scrotal involvement may not be evident from history. For girls, possible ovarian torsion must be considered. In sexually active girls presenting with abdominal pain a gynaecologic exam may also be indicated.

Inspection of the anus and rectum is relatively standard for all age groups. In the newborn infant look for an imperforate or anteriorly placed anus. This anatomical abnormality is relatively rare but should not be missed.

In the older child, infantile perianal pyramidal protrusions (IPPP), also known as perianal skin tags or skin folds may be seen, more commonly in girls, and associates with constipation or lichen planus. The lesion is typically located in the midline, just anterior to the anus. It is a pedunculated pyramidal protrusion with a tongue-like lip that is covered with smooth mucosa. Perianal fissures, also associated with passage of hard stools, are seen in all age groups. In the older child with suspected inflammatory bowel disease the presence of perianal abscesses or fistulas should be sought.

Hemorrhoids are found primarily in older patients.

In patients suspected of having been sexually abused, careful examination of the peri-anal area for bruises, tears, and lacerations is important.

Digital rectal examinations are not performed routinely as part of the regular physical examination of children. This may however be indicated for the child with a lower abdominal mass and/or history of infrequent passage of stools or constipation. When digital examination becomes necessary, the examiner should remain sensitive to the potential embarrassment and discomfort for the patient. The patient and/or guardian should be given an easily understandable explanation of why the examination is being done and warned that discomfort might be experienced. The examination is performed best with the patient lying on his or her left side and legs flexed at the hips and knees. Gloves and an appropriate lubricant should be used. A smooth-walled rectal vault with soft stool in the rectal ampulla is the normal finding. A palpable abnormal mass or blood-tinged stool on a gloved finger requires more extensive investigation.

Assessment of anal tone is important where Hirsprung’s disease is suspected, also in trauma victims with possible spinal cord injury.

Conclusion

This concludes the gastro-enterology examination in the pediatric patient. Remember that like with all physical exams, becoming competent at performing a complete yet time efficient GI exam takes time. Depending on the age of the child, different approaches to the exam might be required, and different physical findings may be expected. Proficiency at changing your approach to the exam to better suit the clinical situation at hand is a skill that will develop over time.