Appendicitis, intussusception, and hypertrophic pyloric stenosis (HPS) are three of the most common reasons for emergent abdominal imaging in pediatric patients. Although the use of computed tomography has risen dramatically over the past 2 decades, children are particularly at risk for the adverse effects of ionizing radiation, and even low-dose radiation is associated with a small but significant increase in lifetime risk of fatal cancer. In most emergency departments, the use of magnetic resonance (MR) imaging as a primary modality for the evaluation of a child with abdominal pain remains impractical due to its high cost, its limited availability, and the frequent need for sedation. Ultrasonography (US) does not involve ionizing radiation and, unlike MR imaging, is relatively inexpensive, is widely available, and does not require sedation. Another major advantage of US in abdominal imaging is that it allows dynamic assessment of bowel peristalsis and compressibility. Delayed diagnosis of any of the aforementioned disease processes can lead to serious morbidity and, in some cases, death. The ability to diagnose or exclude disease with US should be part of a core radiology skill set for any practice that includes a pediatric population.
Introduction

The use of computed tomography (CT) has risen dramatically over the past 2 decades, with more than 7 million pediatric CT studies now being performed annually in the United States (1). This trend has significant implications for the pediatric population. Children are particularly at risk for the adverse effects of ionizing radiation, and even low-dose radiation is associated with a small but significant increase in lifetime risk of fatal cancer (1). Magnetic resonance (MR) imaging can be used to evaluate for abdominal disease without the use of ionizing radiation. In most emergency departments, however, the use of MR imaging as a primary modality for the evaluation of a child with abdominal pain is still impractical due to its high cost, its limited availability, and the frequent need for sedation to obtain diagnostic-quality images in young children. Ultrasonography (US) does not involve ionizing radiation and, unlike MR imaging, is relatively inexpensive, is widely available, and can be performed without the need for sedation (2–4). Another major advantage of US in abdominal imaging is that it allows dynamic assessment of bowel peristalsis and compressibility (4).

Three of the most common reasons for emergent US evaluation in the pediatric patient are appendicitis, intussusception, and hypertrophic pyloric stenosis (HPS). In this article, we discuss proper US technique, characteristic imaging findings, and diagnostic criteria for these three disease processes. In addition, we describe potential pitfalls in diagnosis and common mimics of disease.

Appendicitis

Appendicitis is the most common condition requiring emergent surgery in childhood. Approximately 60,000–80,000 children undergo treatment for appendicitis in the United States each year (5,6). Appendicitis occurs in all age groups but has a higher incidence in children between 5 and 15 years of age (7). It is generally agreed that this condition is the result of obstruction of the appendiceal lumen. The obstructed lumen becomes distended, pressure across its wall increases, and there is a subsequent decrease in mural perfusion (7,8). Unless appendectomy is performed, gangrene and perforation can occur.

The classic presentation is onset of periumbilical pain that migrates to the right lower quadrant (RLQ) at McBurney’s point over a period of 12–24 hours, with associated anorexia, leukocytosis, and, oftentimes, low-grade fever (3,7,9). Younger children cannot describe their symptoms, and up to one-third have atypical clinical findings for appendicitis (6). This may help explain why there is a higher prevalence of ruptured appendicitis in children (30%–74% of cases, depending on the study population) (10). If diagnosis is delayed, serious complications can arise, including bowel obstruction, peritonitis, sepsis, or even death.

Historically, an acceptable negative appendectomy rate (NAR) (ie, when a normal appendix is removed at surgery for clinically suspected appendicitis) has ranged from 15% to 25% (11). Today, increased use of imaging has contributed to a much lower NAR. Krishnamoorthi et al (5) reported an NAR of 8.1% (19 of 235 patients) in their retrospective study on the utility of a staged protocol for the evaluation of appendicitis (US performed in children with clinically suspected appendicitis, with follow-up CT performed only when US findings were equivocal). Studies show that an even lower NAR can be achieved with the routine use of CT (11), although the risk of increased radiation exposure should be taken into consideration.

Operator dependency is widely cited as a major disadvantage of US in evaluating for appendicitis. Strouse (12) contends that “every US technologist and every radiology resident should be taught how to perform appendiceal US and should achieve and maintain competence.” High sensitivity and specificity for appendicitis can be achieved by an experienced technologist or radiologist. In a meta-analysis by Doria et al (4), the pooled sensitivity and specificity for US alone in the diagnosis of appendicitis in children were 88% and 94%, respectively. Focused reimaging by the radiologist following the US technologist’s examination is ideal because appendicitis may be overlooked initially or an alternative diagnosis may be encountered, but this may not always be
feasible. Technical failures can occasionally result from patient obesity or severe tenderness limiting adequate compression (6).

Appendiceal US is performed using a high-resolution linear-array transducer (5–12 MHz). In choosing a starting point for imaging, it is a good idea to ask the child, “Where does it hurt?” and to pay close attention to how he or she responds. If a child points to a specific area, it often indicates the site of an inflamed appendix (12). Gradual pressure is applied with the probe to displace bowel loops. This graded compression can help differentiate normally collapsible intestine from an inflamed, noncompressible appendix. Key anatomic landmarks that must be visualized include the cecum, iliac vessels, and psoas muscle. The cecum is recognized as an aperistaltic large-caliber viscus that contains gas and fluid and is contiguous with the ascending colon (6). The terminal ileum empties into the cecum at the ileocecal valve and is a readily compressible structure that demonstrates active peristalsis. The appendix arises from the posteromedial aspect of the cecal base a few centimeters inferior to the ileocecal valve, although its distal tip may have a variable location (3,6).

Some authors report high success rates in identifying a normal appendix at US (Fig 1), although doing so may often be time consuming or difficult. Successful identification of a normal appendix provides the best argument against a diagnosis of appendicitis. A normal appendix should have an outer wall diameter of 6 mm or less, and its lumen should at least partially collapse under compression. A concerted effort should be made to visualize the blind-ending bulbous tip of the appendix, since distal appendicitis may otherwise be missed. Occasionally, a normal appendix may be slightly larger than 6 mm in diameter but will remain compressible.

Figure 1. (a) US image shows a normal appendix (arrowheads) as a tubular viscus less than 6 mm in diameter in the RLQ. (b) US image shows the distal blind-ending tip of the appendix (arrow) draped over the right iliac artery (ia). It is important to visualize the blind-ending tip. (c) US image shows the bulbous tip of a normal appendix (arrowheads) that measured 5 mm in diameter. The free fluid (FF) is a nonspecific finding and can be seen in many conditions other than appendicitis.
Figure 2. Acute appendicitis. (a) US image shows an appendix (calipers) that measured 12 mm in diameter. An outer wall diameter of more than 6 mm under compression is the most accurate US finding of appendicitis. (b) Color Doppler US image shows hyperemia within the appendiceal wall. (c) US image shows echogenic periappendiceal fat (arrowheads), a finding that is sometimes referred to as a “hyperechoic halo” and indicates inflammation. Ap = appendix, FF = free fluid. (d) US image shows a dilated appendix (calipers) that contains an echogenic appendicolith (arrow) with associated posterior acoustic shadowing.

The most accurate US finding for acute appendicitis is an outer wall diameter greater than 6 mm under compression, with reported positive and negative predictive values of 98% (13). Less sensitive and specific US findings for appendicitis include hyperemia within the appendiceal wall on color Doppler images, echogenic inflamed periappendiceal fat, and the presence of an appendicolith (Fig 2) (2,6,13). The presence of an appendicolith in a child with appendicitis has been associated with earlier, and a higher rate of, perforation (14). The appendix may not be recognizable as a discrete structure if perforation has occurred. Clinical history and
Figures 3, 4.  (3) Ruptured appendicitis. (a) US image shows a heterogeneous RLQ collection (calipers). Ruptured appendicitis may be unrecognizable at US. (b) CT scan reveals an abscess (arrows) as well as reactive lymph nodes (*), which were not seen at US. CT has proved to be more reliable in evaluating these and other complications of appendicitis, although a skilled sonographer can depict many of the same findings. (4) Ruptured appendicitis in a 12-year-old boy with fever, leukocytosis, and a 5-day history of RLQ abdominal pain. (a) US image shows a small amount of free fluid (FF) in the RLQ, with no definite visualization of an appendix or well-defined collection. (b) CT scan clearly demonstrates a gas-containing abscess (arrows). The patient proved to have ruptured appendicitis.

secondary findings at US can help in making the diagnosis, although such complications are often better delineated with CT (Figs 3, 4).

An alternative diagnosis for a child’s presenting symptoms may often manifest itself during appendiceal US. Mesenteric adenitis has been reported as the second most common cause of RLQ pain after appendicitis (15), although the diagnosis is somewhat controversial and is not universally accepted. The clinical presentation
Figure 5. Nonsurgical mimics of appendicitis. (a) US image shows multiple prominent mesenteric lymph nodes (*) in the RLQ, findings that may signify mesenteric adenitis in the absence of other disease. ia = iliac artery, iv = iliac vein, psoas = psoas muscle. (b) US image obtained in another child who presented with onset of RLQ pain shows a prominent, thickened terminal ileum (calipers). Such a finding (due to underlying infection [eg, from *Yersinia*, *Salmonella*, or *Campylobacter* species] or Crohn disease) can be mistaken for an incompletely visualized inflamed appendix. ia = iliac artery.

may mimic that of appendicitis; however, it is a benign self-limiting condition that does not require surgery. US findings consist of multiple enlarged RLQ mesenteric lymph nodes in the absence of other disease (Fig 5a). It should be emphasized that mesenteric adenitis is a diagnosis of exclusion. Enlarged, reactive mesenteric lymph nodes may be present in the setting of an overlooked inflamed appendix.

Another nonsurgical mimic of appendicitis is terminal ileitis-ileocecitis of infectious (*Yersinia*, *Salmonella*, or *Campylobacter* species) or inflammatory (eg, Crohn disease) origin. Acute or subacute RLQ pain is the predominant symptom, and diarrhea may be absent or only mild in cases with an infectious origin (16). Up to one-third of patients with Crohn disease initially present with acute onset of symptoms mimicking appendicitis (15). A thickened terminal ileum may be the only finding at US (Fig 5b), and it is imperative not to confuse terminal ileitis with a dilated appendix. Peristalsis may be diminished or scarce but is usually not entirely absent (16). In contrast, an inflamed appendix is aperistaltic and noncompressible (3). Therefore, the presence of peristalsis may help differentiate terminal ileitis from appendicitis when a blind end is not visualized at US. Occasionally, the terminal ileum can be secondarily thickened in the setting of advanced appendicitis. If the diagnosis is equivocal at US, the use of CT or MR imaging may help avoid unnecessary surgery.

**Intussusception**

Intussusception is a condition that usually occurs in children between 6 months and 2 years of age (17). The “classic” clinical triad has been described as consisting of (a) acute colicky abdominal pain, (b) “currant jelly” or frankly bloody stools, and (c) either a palpable abdominal mass (17) or vomiting (18). Many children do not present with the complete triad of symptoms. Up to 20% of children who do have intussusception may be pain free at the time of diagnosis (2), and only 30%–68% of children with suspicious clinical findings actually have the condition (17). Therefore, imaging is usually required to establish the diagnosis.
Conventional radiography can be performed in patients suspected of having intussusception, although its sensitivity has been reported to be as low as 45% (19). The presence of a curvilinear intraluminal mass in the right upper quadrant is highly specific for intussusception (Fig 6a). The exclusion of intussusception at radiography relies on accurate identification of gas or stool within a normally positioned cecum. However, the sigmoid colon is often positioned in the RLQ in infants and young children and can therefore be mistaken for the cecum, leading to a false-negative result (20). Radiography can help identify pneumoperitoneum if there are long-standing symptoms (>2–3 days) or signs of peritonitis (21). Patients with pneumoperitoneum, peritonitis, or shock should be treated surgically (22). Conversely, a finding of small bowel obstruction in a patient with intussusception is not a contraindication for attempted enema reduction.

Figure 6. Intussusception. (a) Radiograph shows a large, round soft-tissue mass at the hepatic flexure, the classic finding of ileocolic intussusception. (b) Short-axis US image shows the target (donut) sign. (c) Longitudinal US image shows the pseudokidney sign, which results when the intussusception is curved or is imaged obliquely.
Intussusception. Short-axis US image (a) and an annotated version (b) demonstrate what are believed to be the typical components of an intussusception. The intussusciptiens (receiving loop) contains the infolded intussusceptum (donor loop), which has two components: a central entering limb of bowel (E) and an edematous returning limb (R). The attached mesentery (m) is dragged between the two limbs.

At our institution, we rely on US as the primary diagnostic tool for suspected intussusception in most patients. US is a highly sensitive and specific test for intussusception and is the current imaging modality of choice (23). Intussusception can readily be identified at US in most instances, even by inexperienced users and nonpediatric radiologists. In a recent study in which a large proportion of examinations were interpreted by radiology residents and general emergency radiologists working overnight and weekend shifts, US had a sensitivity of 97.9%, a specificity of 97.8%, and a negative predictive value of 99.7% for intussusception (23). Nevertheless, we believe it is good practice, especially for the radiology resident or novice user, to reimage the patient after the US technologist’s examination to increase diagnostic confidence and avoid the serious consequences of a rare overlooked intussusception.

The course of the colon is traced with a high-frequency linear-array transducer (5–12 MHz). The RLQ—or, more specifically, the cecum—is chosen as the starting point, with the colon then traced distally to the rectum. The vast majority of intussusceptions are ileocolic and encountered in the right subhepatic region (17). The probe is held in transverse orientation, with supplemental imaging performed in other planes as necessary. When viewed transversely, the alternating concentric hypoechoic and echogenic layers of an intussusception have an appearance that is commonly referred to as the “target” or “donut” sign (Fig 6b). Longitudinal images can be obtained to confirm a bowel-within-bowel appearance. If the intussusception is curved or is imaged obliquely, the “pseudokidney” sign may result (Fig 6c) (2,17).

In simple terms, intussusception is best described as a “telescoping” or invagination of bowel into itself. The intussusciptiens (“receiving loop”) contains the infolded intussusceptum (“donor loop”), which has two components: a central entering limb of bowel and an edematous returning limb more peripherally (Fig 7) (17). The attached mesentery is dragged between the two limbs and sometimes contains lymph nodes. This process results in a “mass” that usually exceeds 4–5 cm in diameter.
Most childhood cases of intussusception are idiopathic, with no anatomic abnormality except hypertrophied lymphoid tissue. Only 5% of patients have an underlying mass (eg, Meckel diverticulum, duplication cyst, polyp, or tumor) that serves as a lead point for the intussusception (9). Lead points are more common in neonates (<30 days old) and in older children (>5 years old), both of which groups are outside the usual age range of patients affected by intussusception. A focal lead point may cause recurrent intussusception and is an indication for surgical management (Fig 8).

The initial treatment option of choice for intussusception is nonsurgical reduction with an air or hydrostatic enema. Several factors have been reported to decrease the chances of successful enema reduction, including long duration of symptoms (>48 hours), significant dehydration, radiographic evidence of small bowel obstruction, and patient age less than 3 months or greater than 5 years (17). When seen at US, fluid trapped between the layers of the intussusception (Fig 9) has been shown to correlate with (a) greater likelihood of failure at

Figure 8. Juvenile polyp (hamartoma) as a lead point for intussusception in a 3-year-old girl who presented with a 3-day history of diarrhea and bloody stools. (a) Sagittal US image demonstrates the target sign of intussusception in the region of the splenic flexure. After attempts at air enema reduction failed, the patient underwent laparoscopy, which revealed no intussusception and seemed to indicate spontaneous resolution. (b) US image, obtained 6 days later after the patient’s symptoms had returned, shows recurrent intussusception with a solid lead point (arrowheads) now apparent. (c) Color Doppler image shows internal vascularity. The patient underwent open surgery with excision of the lead point. Final pathologic analysis revealed a juvenile polyp (hamartoma).
enema reduction, (b) bowel ischemia, or (c) a lead point, compared with cases in which such fluid is absent (24). The absence of color flow within the intussusception, as the result of progressive constriction of mesenteric vessels by edematous loops, also correlates with bowel necrosis and irreducibility (25). The presence of lymph nodes within the intussusception has not been consistently shown to affect reduction outcome (24). Likewise, a small amount of free fluid within the peritoneal cavity is a relatively common finding and does not affect reduction rates (25).

It is important to be aware that intussusception may recur in up to 10%–15% of patients following initial nonsurgical reduction, during the first few days in two-thirds of cases (26,27). US remains the best imaging modality for documenting recurrent intussusception. In cases of recurrent intussusception, management should initially consist of a repeat attempt at nonsurgical reduction. Surgery is reserved for patients in whom nonsurgical reduction fails, those with a suspected pathologic lead point, and selected cases with several episodes of recurrence (27).

As with the other conditions discussed in this article, mimics of ileocolic intussusception are occasionally seen. Thickening of the cecum or ascending colon due to an inflammatory or infectious process can occasionally produce an appearance at US that resembles the target sign of intussusception (Fig 10). Small bowel intussusceptions are sometimes encountered at US and, like ileocolic intussusceptions, may have a target or donut appearance. However, these small bowel intussusceptions are typically smaller in diameter than ileocolic intussusceptions, are more centrally located within the abdomen, and are often incidental findings. Those that are less than 3.5 cm in length are usually asymptomatic and may reduce spontaneously within minutes (28).

Hypertrophic Pyloric Stenosis
HPS is seen in two to five of every 1,000 births in most white populations, with a lower prevalence in Asian and black populations (2,29). Males are affected four times more frequently than females, with a higher incidence in first-born males. There is clearly a familial predisposition, with a greater than fivefold increased incidence among first-degree relatives (29,30). Despite the common occurrence of HPS, however, neither the cause nor the evolution of this condition is fully understood. Ninety-five percent of cases of HPS are seen between the 3rd and 12th weeks of life, with peak presentation during the 4th week of life. The diagnosis is rarely made in patients less than 10 days old (31). Although HPS was once associated with a very high mortality rate, the rate has dropped to 2% since the advent of definitive surgical treatment with pyloromyotomy (29). Although suspected HPS in infants does not necessarily represent a true surgical emergency, these patients are frequently referred on an emergent basis for diagnosis.
The clinical presentation depends on the duration of symptoms. Nonbilious vomiting is initially intermittent and is often mistaken for onset or exacerbation of gastroesophageal reflux (30). Hypertrophy of the pyloric muscle eventually leads to gastric outlet obstruction and forceful or projectile vomiting after every feeding. These infants usually appear otherwise healthy, although dehydration, electrolyte imbalances, or weight loss can result if the diagnosis is delayed. It is important to try to differentiate between bilious and nonbilious emesis. Infants who present with bilious emesis should instead be evaluated for more distal causes of obstruction, including malrotation with midgut volvulus, for which a missed or delayed diagnosis can have serious consequences.

Historically, the diagnosis of HPS was made upon palpation of an olive-shaped mass in the epigastrium representing the thickened pylorus. The success of this often time-consuming task depended to a large extent on the experience of the examiner and required a relaxed, quiet infant (31). Clinicians now rely on imaging for the diagnosis of HPS in most cases. US is now widely accepted as the first-line option because it can be performed rapidly and is highly accurate, with a sensitivity and specificity approaching 100% in experienced hands (30). Because HPS does not represent a surgical emergency, facilities that do not have the resources to provide “24/7” US coverage can choose to provide supportive care and perform US when available.

Pyloric US is performed using a high-resolution linear-array transducer (5–12 MHz) positioned in a transverse oblique plane parallel to the right lower costal margin. The liver is used as an acoustic window to eliminate shadowing caused by gas distal to the stomach. Relative cephalad positioning of the probe with slight downward angulation is usually necessary to visualize the pylorus. The
Figure 11. Normal pyloric anatomy. A = gastric antrum, D = triangular duodenal bulb, sma = superior mesenteric artery, smv = superior mesenteric vein. (a) Transverse US image demonstrates a fluid-filled stomach and a normal pylorus (arrow). gb = gallbladder, ivc = inferior vena cava, panc = pancreas. (b) Transverse US image shows the free flow of liquid (arrow) from the gastric antrum into the duodenum through a normal pyloric channel.

gallbladder serves as an important landmark due to its reliable position just lateral to the pylorus (32). Right posterior oblique positioning of the infant allows gastric liquid to distend the antro-pyloric region. If the stomach is largely gas filled, the patient may need to be placed in the right anterior oblique position to allow liquid to gravitate to the antropyloric region (29). Documentation of normal anatomy can be more challenging than recognition of HPS. A careful search should be made for the normal triangular duodenal bulb just distal to the gastric antrum. Liquid is observed to pass readily from the antrum into the duodenal bulb when the pyloric channel is normal (Fig 11). If the stomach is empty, liquid such as Pedialyte (Abbott, Abbott Park, Ill) can be given orally or through an enteric tube to allow improved visualization of the pylorus (2,32).

Persistent abnormal thickening of the pyloric muscle is the most important parameter in establishing the diagnosis of HPS (33). The resultant gastric outlet obstruction may cause the stomach to remain distended several hours after the infant’s last feeding (Fig 12). The appearance of HPS on long-axis US images has been termed the “cervix” sign by some authors due to its resemblance to the uterine cervix (Fig 13a) (34). Standard measurements are performed on this long-axis view. Calipers are placed at the superficial and deep borders of a single (anterior) layer of the hypoechoic pyloric muscle, which is easily distinguished from the centrally positioned echogenic mucosa in the pyloric channel (Fig 13b). No exact consensus on lower-limit muscle thickness has been specified in the literature, but the threshold value for a diagnosis of HPS is generally greater than 3–4 mm (2,29,31). A cutoff value greater than 3.5 mm is used at our institution. The actual numeric value may be less important than the overall morphology of the canal and real-time observations (29). The length of the pyloric channel is seemingly less important, although this measurement may be of use to the surgeon performing the pyloromyotomy and in cases in which muscle thickness is borderline. An abnormal length typically measures from about 14 mm to over 20 mm (2,29).

The most common pitfall in the assessment for HPS is gastric overdistention, which displaces the antrum and pylorus posteriorly and may lead to a false-negative result (29). In this setting, the transducer can be moved more laterally toward the right flank to better visualize the displaced pylorus, although doing so can be very challenging, particularly for less-experienced operators. Gastric decompression with an enteric tube, although invasive, can be an effective method of optimizing the examination. Some authors have suggested that enteric tube decompression can be avoided by making changes in patient positioning, such as placing the infant in the right lateral decubitus position, then slowly turning him or her supine or even to the left posterior oblique position to allow the pylorus to rise to a more anterior position (2,29,34).
Figure 12. HPS in a 4-week-old male infant who presented with vomiting. (a) Left lateral decubitus radiograph demonstrates a large area of increased density in the left upper quadrant representing a fluid-filled, massively distended stomach. (b) Subsequent US image helps confirm a pathologically thickened (calipers, A) and elongated (calipers, B) pyloric channel consistent with HPS. st = stomach.

Figure 13. HPS. (a) Long-axis US image of the pylorus (calipers) demonstrates how single-layer muscle thickness and channel length are measured. This appearance of HPS has been called the cervix sign due to its resemblance to the uterine cervix. Note that the dilated, fluid-filled stomach has displaced the pylorus posteriorly, such that the antrum (A) is to the right of the pyloroduodenal junction (arrow). (b) US image obtained in a different patient shows redundant mucosa (arrows) filling the pyloric channel (*) and protruding into the lumen of the gastric antrum (A). gb = gallbladder. (c) Short-axis US image demonstrates the target sign of HPS, created by a thickened hypoechoic pyloric muscle (*) surrounding echogenic redundant mucosa.
Off-midline or tangential images may cause the pylorus to appear falsely thickened. Care must be taken to consistently measure on well-positioned long-axis views on which the hypertrophic pyloric muscle is of equal thickness on both sides of the echogenic central mucosa (32). Some authors recommend routine measurement of pyloric muscle thickness on short-axis images as well to avoid errors in diagnosis (32). In this short-axis view, the US appearance of HPS resembles the target sign (Fig 13c). Transient pylorospasm can also mimic HPS if the examination is done quickly (Fig 14). However, the muscle thickness usually does not exceed 3 mm in the setting of pylorospasm (2,34). At observation, the pylorus relaxes with a corresponding change in shape, unlike the persistent thickening seen with HPS.

The severity of muscle hypertrophy and gastric outlet obstruction is variable early in the course of HPS and progresses over time (31,32). The radiologist should take into account the patient’s age and duration of symptoms when findings are borderline abnormal but do not meet strict criteria for HPS at that time. For example, HPS may not be entirely excluded in a very young infant with a short duration of symptoms and borderline US measurements. In such cases, it is prudent to inform the caregiver or referring clinician that the study could be repeated if symptoms persist or worsen (32). In a patient with persistent unexplained emesis, an upper gastrointestinal series may be performed if indicated to evaluate for a hiatal hernia, antral web, or duodenal obstruction (29,35).

**Conclusions**

US is an important tool in the evaluation of pediatric abdominal conditions such as appendicitis, intussusception, and HPS. The lack of ionizing radiation makes US either an ideal screening modality or the test of choice in these patients. US assessment for these conditions should be considered part of a core radiology skill set for any practice that includes a pediatric population. With practice, one can quickly learn how to diagnosis or exclude each condition with confidence.

**References**

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