Section: Radiology

Case Series

ULTRASONOGRAPHIC SPECTRUM OF PAEDIATRIC ABDOMINAL PAIN: A CASE SERIES OF EIGHT CASES

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ABSTRACT

Background: Abdominal pain in children has a wide clinical spectrum, ranging from benign self-limiting disorders to urgent surgical and infective conditions. Because symptoms are often nonspecific and localization of pain may be unreliable, imaging plays an important role in diagnosis. Ultrasonography (USG) is particularly valuable in paediatric patients because it is radiation-free, repeatable, widely available, and cost-effective.

Case Series: We describe a case series of eight paediatric patients presenting with abdominal pain, in whom ultrasonography helped identify diverse abdominal pathologies. The patients ranged from 2 to 16 years of age and presented with variable symptoms, including periumbilical pain, right iliac fossa pain, suprapubic pain, right hypochondrial pain, vomiting, fever, urinary symptoms, and colicky abdominal pain. Ultrasound findings in these cases included enlarged mesenteric lymph nodes, intussusception showing target sign, vesical calculus with mild cystitis changes, acute uncomplicated appendicitis with a non-compressible dilated appendix and peri-appendiceal inflammatory changes. One interesting case showed dengue-related mild ascites with diffuse gall bladder wall edema. The cases included uncomplicated cholelithiasis, nephrolithiasis and hepatic abscess involving the right lobe of the liver. In all these cases ultrasonography enabled localization of disease as well as differentiation of surgical from non-surgical causes.

Conclusion: This case series highlights the broad diagnostic utility of USG as a first-line imaging modality in children with abdominal pain. Its safety, accessibility and ability to evaluate multiple abdominal systems make it particularly useful in paediatric cases in resource-limited settings. However, it is important to correlate ultrasound findings with clinical and laboratory parameters. Moreover, CT or MRI should be considered when USG findings are equivocal or complications are suspected.

Keywords: Abdominal Pain, Appendicitis, Child, Intussusception, Ultrasonography.

INTRODUCTION

Abdominal pain is one of the most common presenting complaints in the paediatric age group and remains a diagnostic challenge because the clinical spectrum ranges from benign, self-limiting disorders to life-threatening surgical emergencies. Children often present with nonspecific symptoms, and younger children may be unable to localize pain or describe associated complaints accurately. The differential diagnosis of abdominal pain varies with age and common causes include gastroenteritis, mesenteric adenitis, urinary tract infection, renal calculus, hepatobiliary disease, appendicitis, intussusception and intra-abdominal inflammatory conditions. Many cases of abdominal pain in paediatric age group resolve with conservative management. However delayed recognition of surgical causes such as appendicitis, volvulus, obstruction or intussusception can increase morbidity. Therefor imaging is essential in evaluation of these cases. Imaging including USG plays an

important role in supplementing clinical assessment, narrowing the differential diagnosis and identifying complications thereby guiding timely management.[1] Ultrasonography is the initial imaging modality of choice in children presenting with abdominal pain because it is safe, non-invasive and radiation-free. It's also capable of providing real-time and dynamic assessment of abdominal and pelvic organs. This advantage is important in children because of their vulnerability to the cumulative effects of ionizing radiation in case follow up imaging is required. USG allows evaluation of bowel loops, appendix, mesenteric lymph nodes, peritoneal fluid, solid organs, hepatobiliary system, urinary tract, pelvis, and vascularity using Doppler techniques. It can be performed at the bedside, usually does not require sedation or intravenous contrast, and is relatively less expensive than CT or MRI. In developing countries and resource-limited settings, CT and MRI may not be widely available because of high equipment cost, maintenance requirements, limited trained personnel, and greater out-of-pocket expenditure; therefore, USG represents a practical and accessible first-line investigation. Other modalities such as plain radiography, contrast studies, CT, and MRI have important roles in selected situations but are best reserved for suspected perforation or obstruction, complicated disease, trauma, or equivocal USG findings.[2]

The sonographic spectrum of paediatric abdominal pain is broad and includes both surgical and non-surgical conditions. In suspected appendicitis, graded-compression USG may demonstrate a blind-ending, non-compressible tubular appendix, outer diameter greater than 6 mm, wall thickening, peri-appendiceal echogenic fat, hyperaemia, appendicolith, free fluid, phlegmon, or abscess formation. USG is also valuable in identifying mimics of appendicitis such as mesenteric lymphadenitis, terminal ileitis, Meckel's diverticulitis, omental infarction, and gynaecological pathology in adolescent girls.[3] In intussusception, USG typically demonstrates the characteristic target or doughnut sign on transverse section and pseudo kidney appearance on longitudinal section, while also helping to assess bowel viability, free fluid, and possible lead points.[4] Additional findings in paediatric abdominal pain may include bowel wall thickening, dilated bowel loops, ascites, hydronephrosis, renal or ureteric calculi, gallbladder pathology, pancreatitis-related changes, ovarian cysts, torsion, and intra-abdominal collections.

Despite its advantages USG has certain limitations the most important of which is It is operator dependent. Moreover, diagnostic accuracy may be reduced by presence of excessive bowel gas, obesity, severe abdominal guarding or poor patient cooperation. It is worth noting that non-visualization of the appendix on USG does not completely exclude appendicitis particularly when secondary inflammatory signs are present or clinical suspicion remains high. Therefore, it is crucial that SUG imaging findings must always be interpreted along with clinical examination, laboratory parameters and disease progression. In cases where USG findings are equivocal further evaluation with CT or MRI may be required. CT provides excellent anatomical detail and is useful in complicated cases but radiation exposure limits its routine paediatric use. MRI is radiation-free and useful but cost, time, availability and need for expertise restrict its widespread use particularly in developing regions.[5]

Although the role of USG in specific paediatric emergencies such as appendicitis and intussusception is well established, there remains a relative paucity of localized data describing the overall spectrum of ultrasound findings in children presenting with abdominal pain, particularly in smaller case series and resource-limited settings. Disease patterns, referral practices, availability of advanced imaging, and thresholds for surgical intervention may vary between institutions and regions. Documenting the USG findings in a case series of eight paediatric patients can therefore provide practical insight into the range of abdominal pathologies encountered, the diagnostic contribution of ultrasound, and the situations in which further imaging may be necessary. This study intends to address this knowledge gap by analysing the USG findings in children presenting with abdominal pain.

CASE SERIES DESCRIPTION

This case series includes eight paediatric patients below 18 years of age who presented with abdominal pain and underwent abdominal ultrasonography in the Department of Radiology, Dr KNS Memorial Institute of Medical Sciences, Barabanki, Uttar Pradesh. Cases were selected to demonstrate the varied sonographic spectrum of paediatric abdominal pain. Ultrasound examination was performed using grayscale imaging and color Doppler evaluation wherever required. The abdomen and pelvis were assessed systematically, including bowel loops, appendix, mesentery, hepatobiliary system, urinary tract, peritoneal cavity, and solid abdominal organs. Final diagnoses were made by correlating ultrasound findings with clinical presentation, laboratory parameters, and subsequent clinical course wherever available.

Case 1: Mesenteric Lymphadenopathy

Brief History: A 7-year-old boy was brought with complaints of mild to moderate abdominal pain for 3 days. The pain was predominantly located in right lower abdomen and periumbilical region. Pain was intermittent in nature and was not associated vomiting or loose motions. The child also had history of low-grade fever and reduced appetite for 3-4 weeks. There was no history of abdominal distension, constipation, burning micturition or previous similar episodes.

Clinical Findings: Clinically the child had mild fever but he was hemodynamically stable. Abdomen

was soft with mild tenderness in the periumbilical region. There was no features s/o guarding, rigidity or any palpable abdominal lump. Bowel sounds were normal.

Ultrasound Findings: USG of the abdomen showed presence of multiple enlarged oval and hypoechoic mesenteric lymph nodes. These enlarged mesenteric lymph nodes were concentrated in the right lower quadrant as well as in periumbilical region. The largest lymph node measured approximately 22.1 mm in diameter. The lymph nodes showed preserved central echogenic hilum. No necrosis, matting, abscess, or surrounding collection was noted. Bowel loops were not significantly dilated. The appendix was not thickened, and no peri-appendiceal inflammatory changes or free fluid were seen.

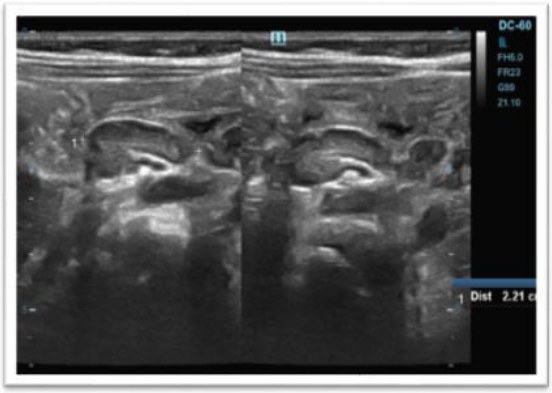

Figure 1: Ultrasound image showing enlarged oval hypoechoic mesenteric lymph nodes in the right lower abdomen. Features are suggestive of reactive mesenteric lymphadenopathy or mesenteric lymphadenitis.

Final Diagnosis: Reactive mesenteric lymphadenopathy, suggestive of mesenteric lymphadenitis.

Case 2: Intussusception

Brief History: A 2-year-old male child was brought with history of acute onset moderate to severe abdominal pain for 1 day. The pain was reported to be intermittent and associated with excessive crying and drawing up of legs by the child. It was predominantly located in right upper abdominal region. The child also had repeated episodes of vomiting and reduced oral intake. Parents also gave history of blood in stool. There was no history of trauma or urinary complaints. Passage of mucus mixed stool was noted by the parents.

Clinical Findings: On examination, he was found to be irritable and mildly dehydrated but he was otherwise hemodynamically stable. Abdomen was mildly distended with tenderness over the right side of the abdomen. A vague sausage-shaped mass was suspected in the right upper quadrant. There was no generalized guarding or rigidity. Bowel sounds were present but exaggerated.

Ultrasound Findings: Ultrasonography of the abdomen showed a bowel-within-bowel appearance in the in the region of right upper abdomen. On transverse section, a characteristic target sign was seen, formed by concentric alternating echogenic and hypoechoic rings of telescoped bowel loops. Mild proximal bowel dilatation was present. Minimal free fluid was seen. No sonological evidence of bowel perforation was noted.

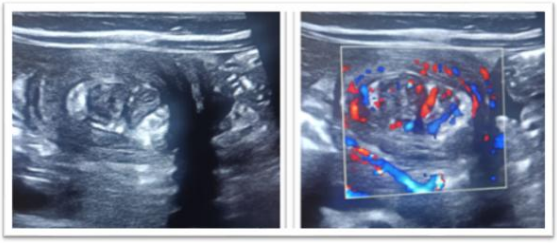

Figure 2: Grayscale ultrasound image on the left shows bowel-within-bowel appearance with characteristic target/doughnut sign in the right upper abdomen. Color Doppler image on the right shows vascularity within the intussuscepted bowel segment, suggestive of ileocolic intussusception.

Final Diagnosis: Ileo-colic intussusception.

Case 3: Vesical Calculus

Brief History: An 8-year-old male child had presented with history of lower abdominal pain for 5 days. The pain was located in the suprapubic region and it was intermittent in nature. There was also burning micturition, increased frequency of urination and occasional crying during voiding. Multiple episodes of red coloured urine were reported by the parents.

Clinical Findings: On examination, the child was found afebrile. Mild suprapubic tenderness was present. There was no guarding, rigidity, palpable abdominal mass, or renal angle tenderness. External genital examination was unremarkable.

Ultrasound Findings: USG of the abdomen and pelvis showed presence of mobile and echogenic calculus within the urinary bladder lumen. It was producing clean posterior acoustic shadowing. Mild urinary bladder wall thickening was noted, suggestive of associated cystitis. Both kidneys were normal in size and echotexture. No hydronephrosis, hydroureter, or renal calculus was seen. No free fluid was noted in the abdomen or pelvis.

Figure 3: Ultrasound pelvis showing a well-defined echogenic calculus within the urinary bladder lumen. Clean posterior acoustic shadowing is seen, consistent with vesical calculus. Cystitis changes also seen.

Final Diagnosis: Vesical calculus with mild cystitis.
Case 4: Acute Appendicitis
Brief History: An 11-year-old male child presented with history of moderate to severe abdominal pain for 2 days. The pain started around the periumbilical region and then later shifted to the right iliac fossa region. Pain was continuous in nature and reported to aggravate on movements. The child also had history of fever, nausea, and one episode of vomiting.
Clinical Findings: On examination, the child was febrile but hemodynamically stable. Moderate tenderness was present in the right iliac fossa. Rebound tenderness was also present. Minimal guarding was present. No palpable abdominal mass was noted. Bowel sounds were found to be normal.
Ultrasound Findings: USG of the abdomen showed a blind-ending, non-compressible and tubular structure in the right iliac fossa, it was seen to be arising from the caecal base. These features were diagnostic of an inflamed appendix. On ultrasound outer diameter of the appendix measured 8.1 mm. The appendiceal wall was thickened and there was increased vascularity on color Doppler. Peri-appendiceal echogenic fat stranding was noted. Minimal peri-appendiceal free fluid was seen. No appendicular abscess, mass formation, or features of perforation were identified.

Figure 4: Ultrasound abdomen showing thickened, non-compressible inflamed appendix with target-like appearance in transverse section (left) and blind-ending tubular appendix in longitudinal section with surrounding echogenic inflammatory fat changes (right).

Final Diagnosis: Acute uncomplicated appendicitis.
Case 5: Ascites with Gall Bladder Wall Edema, Likely Dengue-Related
Brief History: A 9-year-old female child presented with diffuse abdominal pain for 3 days. The pain was more prominent in the right upper abdomen as well as in periumbilical region. Pain was reportedly dull aching in nature and associated with high-grade fever. There were also complaints such as generalized body ache, reduced appetite, nausea and occasional vomiting. There was no history of jaundice, loose stools or previous similar episodes.
Clinical Findings: On examination, the child was febrile and mildly dehydrated. Mild tenderness was present over the right hypochondrium as well as in periumbilical region. There was no features of guarding, rigidity, tenderness or palpable abdominal mass. No icterus was noted. Mild abdominal fullness was seen.
Ultrasound Findings: On USG there was presence of free fluid in the peritoneal cavity suggestive of moderate ascites. The gall bladder wall was diffusely thickened and edematous. Its wall thickness measured approximately 7.4 mm. There was no e/o intraluminal calculus or sludge. No sonographic Murphy sign was elicited. Liver and spleen were normal in size and echotexture. No intrahepatic or extrahepatic biliary dilatation was seen. Both kidneys were normal, and no bowel obstruction was noted.

Figure 5: Gray-scale ultrasonography showing diffuse edematous thickening of the gall bladder wall (Right). Gray-scale abdominal ultrasonography demonstrating moderate free intraperitoneal fluid (ascites) (Left).

Final Diagnosis: Gall Bladder wall edema with ascites likely to be secondary to dengue fever.
Case 6: Cholelithiasis
Brief History: A 12-year-old female child presented with mild to moderate abdominal pain for 4 days. The pain was predominantly located in epigastric region. Pain was colicky in nature and reportedly aggravated after meals. The child also had history of nausea as well as reduced appetite. There was no history of fever, jaundice or abdominal trauma.
Clinical Findings: On examination, the child was found to be afebrile and stable. Mild tenderness was present in the right hypochondrium as well as epigastric region. There was no e/o guarding, rigidity or palpable abdominal mass. No icterus was noted.
Ultrasound Findings: On USG abdomen there was single echogenic calculus measuring 8.3 mm. It was seen within the gall bladder lumen and posterior acoustic shadowing was clearly seen. The calculi were mobile on change of patient position. Gall bladder wall thickness was within normal limits, with no pericholecystic fluid. Common bile duct was not dilated. No intrahepatic biliary radicle dilatation was seen. Liver, pancreas, spleen, and both kidneys appeared normal on ultrasound.

Figure 6: Presence of Mobile Echogenic calculus within gall bladder lumen (White Arrow)

Final Diagnosis: Uncomplicated cholelithiasis.

Case 7: Multiple Right Renal calculi

Brief History: A 15-year-old male child presented with moderate abdominal pain for 2 days. The pain was colicky in nature and predominantly located in the right flank. There was also history of pain radiating toward the groin. Additionally, there was history of burning micturition and increased frequency of urination. The parents also reported episodes of mild reddish discoloration of urine. There was no history of fever.

Clinical Findings: On examination, the boy was conscious and hemodynamically stable. On palpation mild tenderness was present in the right lumbar region. Right renal angle tenderness was present. There was no guarding, rigidity, rebound tenderness, or palpable abdominal mass. Suprapubic tenderness was minimal.

Ultrasound Findings: USG of the abdomen and pelvis showed multiple echogenic calculi in upper, middle and lower pole of right kidney. The urinary bladder was partially distended. Largest calculus measured 11.5 mm. There was associated caliectasis. Left kidney was normal in size and echotexture, with no hydronephrosis or calculus. No free fluid was seen in the abdomen or pelvis.

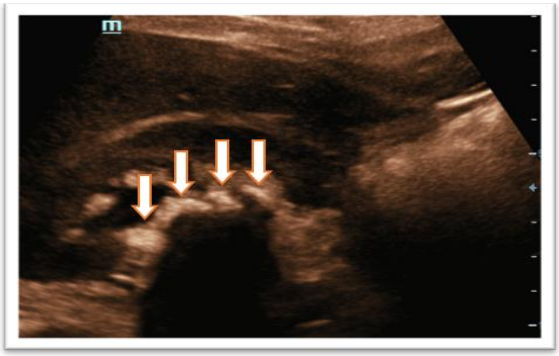

Figure 7: Multiple left renal calculi with caliectasis seen on gray scale ultrasound.

Final Diagnosis: Right multiple renal calculi with caliectasis.

Case 8: Hepatic Abscess

Brief History: A 16-year-old adolescent boy presented for 5 days history of abdominal pain. The pain was moderate in intensity and dull aching. It was predominantly located in the right hypochondrium. Additional features included chills, nausea and loss of appetite. There was no icterus.

Clinical Findings: On examination high grade fever was present. There was significant tenderness over the right hypochondrium. Mild hepatomegaly was present clinically. There was no guarding, rigidity or palpable lump. No evidence of jaundice was present.

Ultrasound Findings: USG of the abdomen demonstrated a well-defined thick-walled hypoechoic lesion in the right lobe of liver. It measured approximately 5.0 × 4.2 cm. The lesion showed presence of internal low-level echoes and debris. These imaging features were suggestive of liquefied infected collection. Mild surrounding hepatic parenchymal edema was noted. No intrahepatic or extrahepatic biliary dilatation was seen. Gall bladder, pancreas, spleen, and both kidneys appeared normal. No significant ascites was noted.

Figure 8: - Gray Scale Ultrasound Showing well-defined thick-walled hypoechoic lesion in the right lobe of liver.

Final Diagnosis: Hepatic abscess involving the right lobe of liver.

Table 1: Summary of History, clinical presentation, imaging findings and final diagnosis of paediatric patients presenting with abdominal pain

Case No.	History	Clinical Features	Imaging Findings	Diagnosis
1	7-year-old male with periumbilical/RIF pain for 3 days, low-grade fever, and reduced appetite.	Mild fever; soft abdomen with periumbilical and RIF tenderness; no guarding or rebound.	Multiple enlarged oval hypoechoic mesenteric lymph nodes in RLQ/periumbilical region, largest 22.1 mm, with preserved hilum; no appendicitis or free fluid.	Reactive mesenteric lymphadenopathy / mesenteric lymphadenitis
2	2-year-old male with acute intermittent colicky abdominal pain, vomiting, drawing up of legs, and mucus-mixed stool.	Irritable, mildly dehydrated; mild distension and right-sided tenderness; vague RUQ mass suspected.	Bowel-within-bowel appearance with target/doughnut sign, mild proximal bowel dilatation, and minimal free fluid.	Ileo-colic intussusception
3	8-year-old male with suprapubic pain, dysuria, frequency, painful voiding, and transient haematuria.	Afebrile; mild suprapubic tenderness; no renal angle tenderness.	Mobile echogenic bladder calculus with posterior acoustic shadowing and mild bladder wall thickening; kidneys normal.	Vesical calculus with mild cystitis
4	11-year-old male with pain migrating from periumbilical region to RIF, fever, nausea, anorexia, and vomiting.	RIF tenderness with mild rebound and minimal guarding.	Non-compressible blind-ending appendix measuring 8 mm, wall thickening, increased vascularity, fat stranding, and minimal free fluid.	Acute uncomplicated appendicitis

5	9-year-old female with diffuse/RUQ pain, high-grade fever, body ache, nausea, vomiting, and reduced appetite.	Febrile, mildly dehydrated; mild RUQ and periumbilical tenderness; no icterus or peritonitis.	Moderate ascites with diffuse edematous gall bladder wall thickening of 7.4 mm; no calculus, sludge, or biliary dilatation.	Moderate ascites with gall bladder wall edema, likely dengue-related
6	12-year-old female with intermittent postprandial RUQ/epigastric pain, nausea, and reduced appetite.	Afebrile; mild RUQ and epigastric tenderness; Murphy's sign negative.	Single mobile gall bladder calculus measuring 8.3 mm with posterior acoustic shadowing; no cholecystitis or biliary dilatation.	Uncomplicated cholelithiasis
7	15-year-old male with right flank/RIF colicky pain radiating to groin, dysuria, frequency, vomiting, and haematuria.	Right renal angle tenderness.	Multiple right renal calculi, largest 11.5 mm, with caliectasis; left kidney normal.	Right multiple renal calculi with caliectasis
8	16-year-old male with right hypochondrial pain, high-grade fever with chills, anorexia, nausea, and weakness.	Febrile, mildly toxic; right hypochondrial tenderness with suspected hepatomegaly.	Thick-walled hypoechoic lesion in right liver lobe measuring 5.0 × 4.2 cm, with internal echoes/debris and surrounding edema.	Hepatic abscess involving right lobe of liver

DISCUSSION

The present case series highlights the diverse sonographic spectrum of abdominal pain in the paediatric age group. Abdominal pain in children is diagnostically challenging because symptoms are often nonspecific and may overlap between surgical, infective, inflammatory, hepatobiliary, and urinary tract conditions.

Ultrasonography is especially useful in paediatric patients because it avoids ionizing radiation and can be performed repeatedly when clinical symptoms evolve. Hijaz NM et al emphasized that paediatric abdominal pain may arise from a broad range of gastrointestinal, urinary, hepatobiliary, gynaecological, and systemic causes, and that imaging should be integrated with clinical examination and laboratory findings rather than interpreted in isolation.[6] In the present series, ultrasound contributed not only to diagnosis but also to clinical triage by differentiating self-limiting or medically managed conditions from conditions requiring urgent surgical or procedural attention. This is important in paediatric practice because delayed recognition of appendicitis, intussusception, obstructive uropathy, or intra-abdominal abscess may increase morbidity.

Mesenteric lymphadenopathy was identified in one child with periumbilical and right lower abdominal pain, low-grade fever, and preserved bowel findings. The sonographic demonstration of multiple enlarged oval hypoechoic mesenteric nodes with preserved echogenic hilum and absence of appendiceal inflammation favored reactive mesenteric lymphadenitis. This is a common mimic of acute appendicitis in children. Ultrasound is useful in this setting because it can document nodal enlargement while also assessing the appendix, terminal ileum, bowel loops, and free fluid. The absence of secondary inflammatory changes in the right iliac fossa is particularly helpful when clinical features are mild and conservative treatment is being considered.

The case of acute appendicitis in this series demonstrated classic sonographic findings, including a blind-ending, non-compressible tubular structure arising from the caecal base, increased outer diameter, wall thickening, Doppler hyperaemia, peri-appendiceal echogenic fat, and minimal free fluid. Quigley AJ et al described similar findings in paediatric appendicitis and emphasized the importance of graded-compression technique, appendiceal diameter, compressibility, peri-appendiceal inflammatory change, and secondary signs.[7] Doria AS et al in a meta-analysis, also reported that ultrasound is an important diagnostic tool in children with suspected appendicitis, although diagnostic performance depends on operator skill and visualization of the appendix.[8] In the present series, the absence of abscess, mass formation, or features of perforation supported the diagnosis of uncomplicated acute appendicitis.

Intussusception was diagnosed in a 2-year-old child with intermittent colicky abdominal pain, vomiting, excessive crying, and mucus mixed stool. The ultrasound findings of bowel-within-bowel appearance and target/doughnut sign on transverse section were characteristic of ileocolic intussusception. Daneman A et al described ultrasound as a highly valuable diagnostic modality for intussusception because it can identify the intussuscepted bowel segment, detect free fluid, evaluate possible lead points, and help assess complications.[9] Early ultrasound diagnosis is clinically important because timely non-operative reduction may be possible before bowel ischemia or perforation develops.

Vesical calculus and right renal calculi were the urological abnormalities seen on USG. In both cases, ultrasound was able to localize echogenic calculi with posterior acoustic shadowing and assess associated complications. In the vesical calculus case, the calculus was seen within the bladder lumen with mobility on positional change and mild bladder wall thickening, suggesting associated cystitis. In case of right renal calculi there were multiple calculi in right kidney. Tasian GE et al emphasized that paediatric stone disease requires careful imaging evaluation because children are vulnerable to recurrent stones

and cumulative radiation exposure.[10] Ultrasound is therefore commonly preferred as the initial imaging modality, although small ureteric calculi may occasionally be missed and further imaging may be required if clinical suspicion persists.

Hepatobiliary and systemic infective causes were also identified in this case series. One child had cholelithiasis, demonstrated as single mobile gall bladder wall calculus with posterior acoustic shadowing and no evidence of acute cholecystitis or biliary obstruction. Wesdorp I et al. noted that paediatric cholelithiasis may present with abdominal pain and can occur with several predisposing factors, although some cases may be idiopathic.[11] Ultrasound remains the primary imaging method for gall bladder calculi because it can assess stone number, mobility, acoustic shadowing, gall bladder wall thickness, pericholecystic fluid, and biliary dilatation.

The case with ascites and diffuse gall bladder wall edema was considered likely dengue-related in the appropriate febrile clinical setting. Ultrasound showed mild free intraperitoneal fluid and gall bladder wall thickening without calculus, sludge, biliary dilatation, or sonographic Murphy sign. These findings are important because gall bladder wall edema in dengue is usually related to plasma leakage rather than primary calculous cholecystitis. Rodriguez Sanchez MA et al,[12] described the role of ultrasound in dengue fever and diagnosing unusual complications such as pancreatitis. Similarly Setiawan MW,[13] described the role of ultrasound in dengue fever, particularly in detecting gall bladder wall thickening, ascites, pleural effusion, and other features of capillary leakage In endemic areas, these sonographic findings can support clinical suspicion and may help assess disease severity, especially when correlated with platelet count, hematocrit, and warning signs.

The hepatic abscess case in a 16-year-old adolescent demonstrated infected liquefied collection. Ultrasound is useful for diagnosing hepatic abscess, defining its size and location, and guiding aspiration or catheter drainage when required. Sharma MP et al described liver abscess as an important cause of fever and right upper abdominal pain in children, with imaging playing a central role in diagnosis and management planning.[14] In the present case, the absence of biliary dilatation and the localized nature of the lesion supported the diagnosis of hepatic abscess rather than obstructive hepatobiliary disease.

An important observation from this series is that ultrasound provided clinically useful information across multiple anatomical systems in a single examination. In children with abdominal pain, a focused but systematic ultrasound approach can evaluate the appendix, bowel loops, mesentery, peritoneal cavity, hepatobiliary system, kidneys, ureters, urinary bladder, and pelvis. This broad field of assessment is particularly relevant in children because clinical localization of pain may be unreliable. Younger children may present only with crying, vomiting, poor feeding, or fever, while older children may localize pain more accurately. Therefore, ultrasound findings must be interpreted in relation to age, pain location, duration, severity, fever, vomiting, urinary symptoms, bowel symptoms, and clinical examination.

The findings of this series also have practical relevance for resource-limited settings. CT and MRI are valuable problem-solving modalities but may be limited by cost, availability, need for transport, contrast use, sedation requirements, and radiation exposure in the case of CT. Frija G et al highlighted the continuing challenges in access to advanced medical imaging in low- and middle-income countries.[15] In such settings, ultrasound becomes even more important as an accessible, bedside, and repeatable imaging tool. However, ultrasound should not be viewed as a standalone replacement for clinical judgment or advanced imaging in all cases. Equivocal ultrasound findings, persistent symptoms despite negative ultrasound, suspected perforation, complicated appendicitis, trauma, deep pelvic pathology, or unclear obstruction may still require CT, MRI, contrast studies, surgical review, or follow-up imaging.

CONCLUSION

Ultrasonography is a valuable first-line imaging modality for evaluating abdominal pain in children. In this case series, USG identified a wide range of paediatric abdominal pathologies, including inflammatory, obstructive, urinary, hepatobiliary, infective, and systemic causes. Its advantages of being radiation-free, repeatable, cost-effective, and widely accessible make it particularly suitable for paediatric patients and for developing-country settings. However, ultrasound findings should always be correlated with clinical and laboratory parameters, and further imaging should be considered when findings are equivocal or complications are suspected.

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