**Ultrasonography Findings in Acute Appendicitis: A Case Study**

Angelina Vanessa Prasethio¹, Aldwin Wiranata Fam¹, Ayen Giovina¹, Hendi Fuki Lukmanta¹, Ingrid Anjani¹, Kadek Ayu Sri Purniawati¹, Komang Intania Putri Pelangi¹, Mutia Utami Ariani¹, Pinkan Al Shabrina¹, Mathias Rusli²*

**Abstract**

Acute appendicitis is one of the most common diagnosis suspected in patients with acute abdominal pain. Classic symptoms such as right iliac fossa pain, anorexia, nausea, constipation, and vomiting only occur in 50% of cases. Thus, other diagnostic modalities are still needed to help doctors conclude the definitive diagnosis that lead to prompt treatment. Ultrasound examination of the abdomen could be a good choice since it is relatively faster, cheaper, and quite accurate in diagnosing appendicitis. This study presents an example of ultrasonography examination of patient with abdominal pain suspected of appendicitis. Ultrasound imaging showed echoic inflamed fat with appendix diameter of 13.1 mm indicates acute inflammation of appendicitis. Dilated appendix which is more than 6 mm in size was one of the supportive sign to propose appendicitis. This finding was in line with the patient’s signs and symptoms, thus acute appendicitis was diagnosed. The patient went to surgery and appendectomy was performed. This study showed us how abdominal ultrasound could add diagnostic value to diagnose acute appendicitis.

**Keywords:** Appendicitis, Case Study, Diagnosis, Ultrasonography

**Background**

Acute appendicitis is one of the commonest diagnosis suspected in patients with acute abdominal pain. Acute appendicitis is also the commonest indication for an urgent abdominal intervention. Appendicitis typically presents acutely, within 24 hours of onset, but can also present as a more chronic condition. Classic symptoms include right iliac fossa pain, anorexia, nausea, constipation, and vomiting; however, these classical presentations only occur in 50% of people. Appendicitis initially presents with generalized or periumbilical abdominal pain that later localizes to the right lower quadrant (RLQ). As inflammation progresses, the signs of peritoneal inflammation developed include Rovsing’s sign, the pain in the right lower quadrant after releasing of gentle pressure on the left lower quadrant, Dunphy’s sign, the pain with coughing, the obturator sign, the pain with internal rotation of the hip, ilio-psoas sign, the pain with flexion of the hip. Ultrasoundography is currently being considered as the first line of diagnostic imaging because of its being easy to perform and relatively low cost, but limitations regarding its sensitivity and specificity in diagnosing appendicitis remain.

However, some findings are supportive to conclude the diagnosis of appendicitis, such as probe-induced tenderness with sensitivity of 74% and specificity of 97% and non-compressibility (sensitivity 85.2% and specificity 60.6%). Thus, we presented a case study of ultrasonography findings in acute appendicitis to add our body of knowledge in diagnosing appendicitis.
Background
Acute appendicitis is one the commonest diagnosis suspected in patients with acute abdominal pain. Acute appendicitis also the commonest indication for an urgent abdominal intervention. Appendicitis typically presents acutely, within 24 hours of onset, but can also present as a more chronic condition. Classic symptoms include right iliac fossa pain, anorexia, nausea, constipation, and vomiting; however, these classical presentations only occur in 50% of people. Appendicitis initially presents with generalized or periumbilical abdominal pain that later localizes to the right lower quadrant (RLQ).

As inflammation progresses, the signs of peritoneal inflammation developed include Rovsing’s sign, the pain in the right lower quadrant after releasing of gentle pressure on the left lower quadrant, Dunphy’s sign, the pain with coughing, the obturator sign, the pain with internal rotation of the hip, ilio-psoas sign, the pain with flexion of the hip. Ultrasoundography is currently being considered as the first line of diagnostic imaging because of its being easy to perform and relatively low cost, but limitations regarding its sensitivity and specificity in diagnosing appendicitis remain.

Discussion
We present a case report of a 29-years-old woman with abdominal pain. The pain originated in the umbilical region, radiating diffusely across the lower abdomen and subsequently localized to the RLQ. She had a history of anorexia, nausea, and recurrent vomiting, constipation 2 days before admission. The patient’s Alvarado score was 8 out of 10 based on anamnesis, physical examination and laboratory finding. She was diagnosed with Appendicitis Acute. Ultrasound imaging of the patient showed target-sign appearance with enlarged diameter of 13.1 mm (figure 1.A.) Ultrasound imaging also showed increased echogenicity of local mesenteric fat indicating acute inflammation of appendicitis (figure 1.B.). The patient also complained abdominal tenderness when induced by probe and the appendix was not collapsed when compressed.

Ultrasound modality could diagnose appendicitis with direct and indirect signs. Direct signs such as non-compressibility of the appendix, diameter of the appendix > 6 mm, single wall thickness ≥ 3 mm, target sign with hypoechoic fluid-filled lumen, hyperechoic mucosa/submucosa, hypoechoic muscularis layer, appendicolith (hyperechoic with posterior shadowing), and in color Doppler ultrasound shows hypervascularity in early stages of acute appendicitis and hypo- to avascularity in abscess and necrosis. Indirect signs such as free fluid surrounding appendix, local abscess formation, increased echogenicity of local mesenteric fat, enlarged local mesenteric lymph nodes, thickening of the peritoneum, and signs of secondary small bowel obstruction. In our case study, we found both direct sign of target sign appearance, dilated appendix (13.1 mm), and indirect sign of increased echogenicity of local mesenteric fat. Thus, we could diagnose the patient with acute appendicitis. The major concerns in using abdominal ultrasound to diagnose acute appendicitis are the limitations of the sonography in obese patients and the operator-dependency to find the suggestive features.

If ultrasound could not diagnose appendicitis, more extensive modalities such as Computed Tomography (CT) Scan or Magnetic Resonance Imaging (MRI) Scan could be done as alternative. However, both are relatively high-cost compared to ultrasound. Therefore, ultrasound still could be used as first-line diagnostic modality of acute appendicitis.
List of abbreviations

RLQ - Right Lower Quadrant  
CT  - Computed Tomography  
MRI  - Magnetic Resonance Imaging

Declarations

Ethics approval and consent to participate
Informed consent from the patient has been obtained before the study.

Consent for publication
Consent for publication regarding patient data has been obtained before the study. All the patient identity has been kept secret.

Availability of data and materials
Not Applicable

Competing interests
The authors declare that they have no competing interests.

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References


