**Original article :**

# Acute Appendicitis Versus Non specific Mesenteric Lymphadenitis: Role of Abdominal Sonography

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**Abstract**

Background/Objective: The diagnosis of acute right lower quadrant pain in a pediatric population is a challenging presentation. There are a myriad of clinical conditions presenting in such a manner. The purpose of this study was to determine the role of ultrasonography in differentiating acute mesenteric lymhadenitis from acute appendicitis in children presenting with acute right lower quadrant abdominal pain.

Material and Methods: From March 2010 to February 2012, we prospectively evaluated 40 children who presented with acute onset of right lower quadrant abdominal pain and were clinically suspected as acute appendicitis with abdominal ultrasound. The size, the number and the morphology of mesenteric lymph nodes were also evaluated. Non-specific mesenteric lymphadenitis was diagnosed on ultrasonography if more than three mesenteric lymph nodes with diameter more than 4 mm and/or thickening of terminal ileum (>8mm with maintained gut signature) were seen without any radiological signs of appendicitis or any other source of inflammation.

Observation: On abdominal ultrasound, enlarged mesenteric lymph nodes were detected in 15(37.5%) of these children and 6 of these also showed thickening of terminal ileum. The final diagnosis of mesenteric lymphadenitis was confirmed after medical management and follow-up. The longitudinal diameter of the lymph nodes ranged between 9mm and 21 mm. There was no case of false positive diagnosis.

Conclusion: Abdominal sonography proved to be of pivotal role in avoiding negative surgical laparotomies and thus also prevented postoperative morbidity, hospital stay and health care costs.

**Keywords**: Pediatric, mesenteric lymphadenitis, Appendicitis, ultrasound.

**Introduction**:

Acute right lower quadrant abdominal pain is one of the most common presenting complaints in emergency in children, often posing a diagnostic challenge. The most common medical cause is mesenteric lymphadenitis and the most common surgical etiology is acute appendicitis. A large number of children referred for suspected appendicitis do not actually suffer from appendicitis and may undergo unnecessary laparotomy. The challenge is to establish the accurate diagnosis of acute appendicitis early to prevent complications and at the same time reduce the number of unnecessary laparotomy .[1] Our study evaluated role of ultrasonography in differentiating acute appendicitis from mesenteric lymphadenitis in 40 children who were clinically suspected to be suffering from acute appendicitis during the period from March 2010 to Feb 2012.

**Methodology:**

The sonographic criteria for diagnosis of appendicitis and graded compression technique were first described by Puylaert et al[2]. In our study, all the children with clinically suspected acute appendicitis underwent sonographic evaluation on Toshiba Aplio XG machine. Initially, the patient was asked to point out the site of maximal

tenderness[3]. A linear or curved array transducer (5 or 7.5 MHz) was used to gradually compress the right lower quadrant resulting in displacement and compression of normal bowel loops. Scanning began in the transverse plane with identification of the ascending colon. Normal small bowel loops are compressible and displaced and the external iliac vessels were identified as the appendix usually lies anteriorly to these vessels. Color Doppler images also help in looking for inflamed appendix. The ultrasound evaluation included the whole abdomen and pelvis to look for free fluid, abscess, perforation or potential other complications. The normal appendix is compressible, blind-ending, and measures 6 mm or less in maximum diameter. It has a tubular appearance on long axis scans and a target appearance in the axial plane [4]. And on color flow Doppler imaging, there is no appreciable flow. On the other hand the inflamed appendix appears as a fluid-filled, noncompressible tubular structure with one blind end and a diameter of greater than 6 mm. Periappendiceal fluid or fluid in pelvis also supports the diagnosis as well as the presence of appendicolith, with posterior acoustic shadowing. Inflammation may be demonstrated as increased color flow. Echogenic mesentery, collection or abscess and enlarged perifocal mesenteric lymph nodes can also be seen. Mesenteric lymphadenitis was diagnosed when the only sonological finding was enlarged mesenteric lymph nodes with no other associated findings of appendicitis or inflammation.They were considered enlarged when at least three nodes with the long axis diameter at least 4mm were seen. In a few cases however along with enlarged mesenteric nodes, thickening of terminal ileum (>8mm) with maintained gut signature were also seen.

**Observation:**

Out of 40 patients, 25 cases were sonologically confirmed as appendicitis fulfilling the sonological criteria with 3 cases being diagnosed as suspected perforated appendix .These patients underwent surgical exploration and appendectomy when the radiological diagnosis was confirmed. Isolated Mesenteric lymph node enlargement or adenitis was seen in remaining 15 patients with no other signs of inflamed appendix on sonography. Mesenteric lymph nodes were commonly visualized in the right lower quadrant, or along the mesenteric root along the course of the superior mesenteric vessels.The lymph nodes were usually hypoechoic relative to surrounding tissues and muscles, oval in shape with a central echogenic hilum, with color flow (Figure 1 and 2). Out of these 15, six cases also showed increased thickening of terminal ileum (>8mm). No other associated finding was seen in these cases. The diameter of nodes ranged from 9 to 21 mm.

Figure 1: USG image showing single enlarged (> 1cm) mesenteric lymph node.

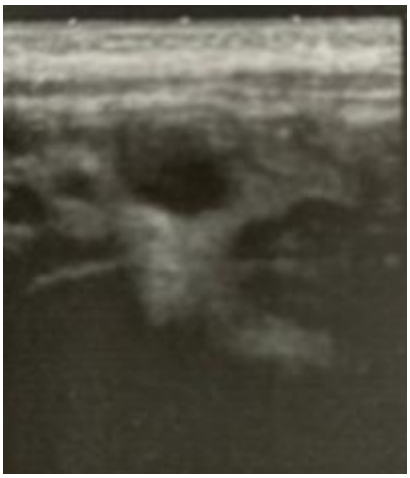
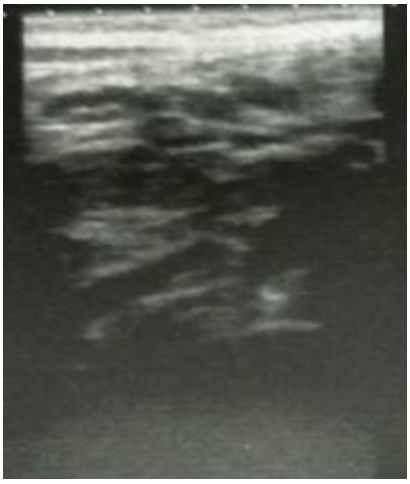


Figure 2: USG image showing multiple enlarged oval hypoechoic mesenteric lymph node with central echogenic hilum.



**Discussion**

Acute non specific mesenteric lymphadenitis in children poses a big challenge to pedriatric surgeons and physicians as a very common medical condition mimicking acute appendicitis which requires urgent surgical management. Mesenteric lymphadenitis typically occurs in children, adolescents, and young adults of both sexes, with slight preponderance in males[5,6]. Mesenteric lymphadenitis is likely more common than acute appendicitis in the first decade of life[5, 6]. It often occurs in association with an upper respiratory infection. Abdominal pain varies from a mild to a severe colic. The distribution of pain is similar to that of appendicitis, is felt both in the periumbilical region and in the right iliac fossa and even rebound tenderness may be seen and even vomiting may occur. Nonspecific mesenteric lymphadenitis is diagnosed when mesenteric lymphadenopathy is seen without an underlying cause. In these patients, there are no imaging abnormalities, except for enlarged mesenteric lymphnodes and/or slight thickening of the terminal ileum [7]. Lab investigations are usually of little help in distinguishing the two conditions with abdominal ultrasonography as the mainstay of diagnosis. The radiological criteria for mesenteric lymphadenitis is three or more lymph nodes with diameter of 4 mm or more in the right lower quadrant /mesenteric vessels region without an identifiable acute inflammatory cause [8]. More recent data suggest that using a short-axis diameter of 8 mm or more in at least one of the abnormally enlarged lymph nodes might be a more accurate[9]. Lymph node enlargement is also found in some cases of appendicitis particularly in cases presenting late but there are associated findings of inflamed appendix. Overall , enlarged mesenteric lymph nodes( diameter > 4mm), and/or associated thickening of the terminal ileum(> 8 mm) with maintained gut signature on abdominal sonography as the only abnormalities has high sensitivity for the diagnosis of non specific mesenteric lymphadenitis ruling out appendicitis. These findings could prove to be of great help in avoiding unnecessary surgery. However, as it is a great risk to miss the diagnosis of acute appendicitis the patient should be closely observed and followed up with further ultrasound studies or even abdominal CT if required. Our study was limited by the small number of patients, and further studies on bigger cohort are required to confirm our reults.

**Conclusion**

We concluded that in children presenting with acute abdominal pain and clinical features of appendicitis, sonography should be imaging modality of choice, and if no radiological criteria of appendicitis are seen along with isolated enlarged mesenteric lymph nodes (three or more ≥4mm) and thickening of the terminal ileum (≥8mm with maintained gut signature ), the diagnosis of acute non-specific mesenteric lymphadenitis should be considered preventing unnecessary surgery and negative laparotomy but caution with close observation and follow up is advised.

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