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Evaluation of mesenteric lymph nodes in children with abdominal pain

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Summary

Background: The aim of this study was to evaluate the prevalence of enlarged mesenteric lymph nodes seen on pediatric abdominal ultrasound examinations performed in children with abdominal pain.

Material/Methods: Ultrasound was performed with Sonoline Elegra and Philips iU-22 units with convex-array 2–5 MHz transducer for the general abdominal examination, and in addition with convex 5–8 MHz or linear 7.5 MHz transducers specially to detect lymph nodes.

Results: Enlarged lymph nodes were found in 248 (21,2%) out of 1171 symptomatic patients. In 53 patients some other abnormalities were found. The nodes were mostly disc-like and oval in shape. They had usually a homogeneous appearance and were iso- or hypoechoic relative to the surrounding tissues and intestinal loops.

Conclusions: Mesenteric lymphadenitis is commonly reported in children with acute, chronic or recurrent abdominal pain and no evidence of other pathologies, and has been reported as one of the most common explanation for acute right lower quadrant abdominal pain.

Key words: mesenteric lymph nodes • ultrasound

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Background

Acute abdominal pain is one of the most common physical complaints of children and the reason of applying to the emergency department. As a routine test abdominal ultrasound is usually performed, to confirm or exclude organic disease. In the majority of children no organic cause for the pain is found. Appendicitis is the most frequent organic cause of acute abdominal pain, followed by gastrointestinal and gynaecological diseases. Enlarged mesenteric lymph nodes are frequently seen in children with abdominal pain and, in the absence of other disorders, have been attributed to primary mesenteric lymphadenitis [1]. The aim of this study was to evaluate the prevalence of enlarged mesenteric lymph nodes seen on pediatric abdominal ultrasound examinations performed in children with abdominal pain.

Material and Methods

During the 12 month period in 2006 year, abdominal ultrasound was performed in 1171 children (496 male, 675 female), with ages ranging from 5 to 18 years, referred for the study because of abdominal pain. All abnormal findings were noted, also the presence of enlarged mesenteric lymph nodes.

Ultrasound was performed with Sonoline Elegra and Philips iU-22 units with convex-array 2–5 MHz or 5–8 MHz transducers for the general abdominal examination, and in addition with a linear 7–10 MHz transducer specially to detect bowel changes, including enlarged lymph nodes.

Results

Enlarged lymph nodes were found in 248 (21.2%) out of 1171 symptomatic patients. In some of them another abnormalities were found, like appendicitis (18), ileal wall thickening (6), intussusception (5) or ascites (24), which gives the total of 195 children (16.6%) with mesenteric lymphadenopathy as the only finding. The lymph node was considered enlarged when their long axis exceeded 10 mm in diameter, and if there was three or more lymph nodes in the nearest location.

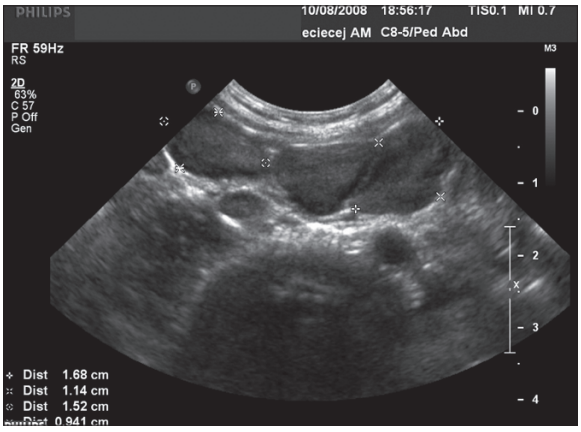

Figure 1. The group of three enlarged mesenteric lymph nodes in ileocecal region.

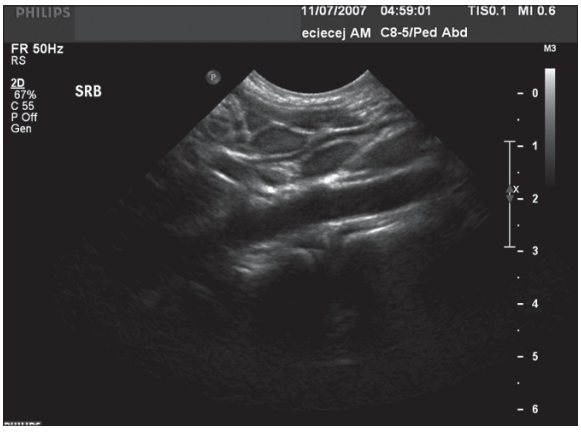

Figure 2. Normal mesenteric lymph nodes in para-aortic region.

The enlarged nodes in all examined children were mainly located in the ileocecal region (n=206 out of 248, 83%) (Figure 1), para-aortic and para-caval areas (n=67, 27%), rarely in other regions, (n=12, 4.8%). The nodes were mostly disc-like and oval in shape (n=235, 94.7%). They had usually a homogeneous appearance and were iso- or hypoechoic relative to the surrounding tissues and intestinal loops.

Discussion

The imaging characteristics of ultrasound are very good for examining lymph nodes in the abdomen. The discrimination between lymph nodes and blood vessels or intestinal loops for example, is easy with ultrasound [2]. It is important to use high-frequency transducers. Ultrasound with a sector or convex 3.5 MHz transducer cannot identify the presence of abdominal lymphadenopathy. Using higher frequency, regardless of the kind of the transducer, convex or linear, we can identify even small, normal lymph nodes in healthy people, with a long axis up to 5 mm (Figure 2). There is no uniform definition of enlargement of mesenteric lymph nodes. The criteria for distinguishing abnormal lymphadenopathy from normal lymph nodes are based on the site, number, size and shape of each nodes in the abdomen [2]. The diagnostic criteria for normal lymph nodes are usually based on size. In children, lymph nodes are considered enlarged if they are ≥10 mm in their greatest diameter [3]. Other reports have defined lymph nodes enlargement as ≥4 mm in the shortest diameter. In the study of Sivit et al. a definition for mesenteric lymphadenopathy is a cluster of three or more lymph nodes with short-axis diameter more than 5 mm [4]. In present study the long axis was evaluated, but both axis are considered to be taken into account in the next studies, because graded compression sonography might decrease the short diameter of the lymph node.

Another criterion of normal lymph node is disk-like or oval shape. Although a high incidence of round-shaped lymph nodes in patients with malignant disease has been demonstrated [5], there are few reports on the shape of normal and abnormal lymph nodes in children. In the study of Watanabe, about half of the lymph nodes in the asymptomatic younger children were round in shape, but the frequency of round nodes was higher in the older children with acute abdominal pain or acute gastroenteritis than in the asymptomatic children. These findings suggest that the shape of the mesenteric lymph nodes could serve as a parameter for distinguishing abnormal lymphadenopathy from normal lymph nodes, at least in the older child [6]. The echogenicity of the lymph nodes is more hypoechoic in malignant diseases than in benign disease, but echogenicity does not seem to be a good feature to distinguish normal lymph nodes from benign lymphadenopathy [5]. In present study the nodes were mostly oval in shape. They had usually a homogeneous appearance and were iso- or hypoechoic relative to the surrounding tissues and intestinal loops.

Mesenteric lymphadenopathy as an abnormal finding on ultrasound is often reported in children with acute abdominal pain. Quillin et al. in a review of the color Doppler ultrasound features of appendicitis and other diseases manifesting with acute lower abdominal pain, report that mesenteric lymphadenitis is one of the most common causes of acute abdominal pain in patients with a normal appendix at surgery. The cause is unknown, but in some cases Yersinia enterocolitica is found [7]. In the study of Vayner et al. the authors found a high prevalence of enlarged mesenteric lymph nodes in children examined by ultrasound for recurrent abdominal pain (61.4%). This finding was most prominent in the younger age groups. In all three groups the prevalence was significantly greater in boys than in girls [8]. Watanabe et al. evaluated abdominal lymphadenopathy in children by ultrasound, comparing this finding in healthy children, and in those who suffered from acute abdominal pain or acute gastroenteritis. The size and number of mesenteric lymph nodes were much greater in symptomatic children. They concluded that it is a nonspecific finding in children with acute abdominal pain [6]. In the study of Karmazyn et al. 28% of healthy children, evaluated by computed tomography, met the current criteria for mesenteric lymphadenitis. In most children (88%), the enlarged mesenteric lymph nodes were located in the right lower quadrant [1]. In present study the incidence of mesenteric lymphadenitis was lower than in other study, and represent only 21.2% of symptomatic children. The reason of this may be admitted criteria, taking into account only groups of enlarged lymph nodes and believing single slightly enlarged nodes of no diagnostic importance.

Enlarged mesenteric lymph nodes are associated with a variety of pathologic findings, such as Crohn's disease,

appendicitis, gastroenteritis, Yersinia enterocolica and Salmonella typhi lesions, tuberculosis, cat scratch disease, Epstein-Barr virus infection, acute hepatitis and AIDS, but it is a nonspecific finding [6–8]. Other ultrasonographic features, including mural thickening of small bowel loops, are also important to distinguish organic pathology, regardless of the presence of lymphadenopathy [4]. In particular, enlarged lymph nodes with ileal wall thickening strongly suggests an infection with Yersinia enterocolitica or Campylobacter jejuni [6].

In summary enlarged lymph nodes are frequently seen in the absence of clinical findings that would be expected to produce lymphadenopathy. It is concluded that either primary mesenteric lymphadenitis is more common than previously realized [1]. Long-term follow-up would be useful in these children to evaluate the natural history of mesenteric lymphadenopathy. Mesenteric lymphadenitis is commonly reported in children with acute, chronic or recurrent abdominal pain and no evidence of other pathologies, and has been reported as one of the most common explanation for acute right lower quadrant abdominal pain.

Conclusions

Abdomen ultrasound is useful in the evaluation of children with acute or chronic abdominal pain, enable the diagnosis or elimination of organic pathology.

Mesenteric lymphadenopathy is a common and often the only abnormal finding on ultrasound in children with abdominal pain.

The number of three or more lymph nodes in the nearest location should be accessory criterion for mesenteric lymphadenitis.

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