Introduction

Omental infarction, both with and without torsion, is a rare cause of acute abdominal pain in children. This entity has been described in the adult surgical [1–4] and radiologic [5, 6] literature but has received little attention in the pediatric literature [7]. The clinical presentation often mimics acute appendicitis or cholecystitis [1, 2, 5, 7, 8], and evaluation by abdominal sonography is commonly requested. We have observed a rather unique sonographic appearance for this entity similar to the reported sonographic findings in adults (and in a single case report in a child). However, this characteristic appearance was seen as an isolated finding in only four of our nine cases. Therefore, the prospective imaging diagnosis of this condition may be difficult in the absence of a homogeneous moderately hyperechoic mass in the right lower quadrant or when areas of hyperechoic omental fat are present within or around a sonographically more complex mass.

Materials and methods

From 1992 to 1996, nine children with pathologically proven omental infarction presented to our institution and were prospectively

Abstract  Background. Omental infarction has been previously reported in the adult surgical and imaging literature; however, the imaging features of this entity in children have received little attention.  Objective. The purpose of our study was to identify the sonographic features of omental infarction in nine children who had preoperative sonography and surgically proven omental infarction.  Materials and methods. Sonographic images were reviewed and correlated with clinical information obtained from the patients' medical records, including clinical presentation, operative notes, and pathology reports.  Results. In seven of the children, sonography demonstrated a focal area of moderately increased echogenicity in the omentum of the right abdomen (a previously described finding in omental infarction). This was an isolated finding in four of these cases. In the three cases where this was not an isolated finding, the more complex sonographic appearance led to incorrect preoperative imaging diagnoses. This finding of increased echogenicity in the omental fat was not present in the two remaining patients.  Conclusion. Our study confirms that foci of moderately increased echogenicity in the omentum of the right abdomen, a sonographic finding described in omental infarction in a large series in adults (and in a single prior case report in children), can be seen in children as well. However, although this is a relatively unique finding, it may be absent in some cases or may be seen in conjunction with other sonographic findings which may preclude the correct preoperative sonographic diagnosis.
examined by abdominal sonography. All patients underwent surgery, and the diagnosis of omental infarction was confirmed. Sonographic images were retrospectively reviewed and correlated with intraoperative and pathologic findings.

Results

Clinical findings

The nine children, seven boys and two girls, ranged in age from 2 to 9 years (mean age 7 7/12 years, median age 8 1/2 years). All patients had the preoperative clinical diagnosis of acute appendicitis. All nine children presented with abdominal pain, one with diffuse bilateral abdominal pain, one with diffuse right sided abdominal pain, two with focal right upper quadrant pain, and five with focal right lower quadrant pain. Four patients were febrile at the time of presentation. Only three of the nine children presented with symptoms of nausea and/or vomiting. The abdominal pain resolved in all nine patients after omental resection and appendectomy.

Sonographic findings

In seven of the nine children, sonography demonstrated a focal area of moderately increased echogenicity in the omental fat located between the umbilicus and right colon corresponding to the point of maximal tenderness. In four of these cases, the homogeneous, moderately hyperechoic region was an isolated finding (Figs.1–3). In three cases, moderately hyperechoic omental fat was seen within or adjacent to sonographically more complex masses: in one case the moderately hyperechoic omental fat was prospectively interpreted as thick-walled bowel, and at surgery the torsed, infarcted omentum was adherent to the ascending colon; in another case the moderately hyperechoic focus surrounded a hypoechoic, noncompressible, tubular structure prospectively interpreted as an inflamed appendix, and at surgery the appendix was normal and the omentum infarcted; in a third case the moderately hyperechoic focus was adjacent to an ill-defined region of decreased echogenicity that was prospectively diagnosed as an abscess due to perforated appendicitis (Fig.4).

Of the remaining two children, one had a limited examination due to obesity, and one was prospectively diagnosed sonographically with appendicitis as a hypoechoic, noncompressible structure was interpreted as an inflamed appendix. No abnormally hyperechoic omentum was seen in these patients.

One patient had a CT scan of the abdomen which showed a focal area of right-sided omental fat containing strandy areas of increased attenuation seen surrounding a fluid-filled loop of bowel. These CT findings corresponded to a moderately hyperechoic right lower quadrant mass surrounding a bowel loop identified sonographically (Fig.5).

Surgical/pathologic findings

Omental infarction was confirmed in all nine patients intraoperatively. The operative reports in seven of the nine patients suggested the possibility of torsion of the omentum in addition to infarction. The remaining two patients were presumed to have segmental omental infarction without torsion. Histologic examination of the omentum in all nine patients confirmed omental infarction. The appendix was normal in all cases.

Discussion

The entity of right-sided omental infarction is described in the adult surgical [1–4] and radiologic [5, 6] literature. However, this entity has received little attention in the pediatric imaging literature with only a single previous case report [7]. The first reference to segmental infarction of the omentum in the medical literature is most often ascribed to Bush in 1896 [4]. Due to its infrequent occurrence, this entity has subsequently appeared in the literature most frequently as isolated case reports.

Omental infarction is usually separated into idiopathic segmental infarction of the right-sided omentum and infarction associated with omental torsion. While omental torsion is considered to be more common than idiopathic infarction, the clinical findings are identical regardless of the etiology of infarction [2]. For this reason, we did not distinguish in our patients between the seven cases associated with torsion (based on surgical and/or pathologic findings) and the two cases considered idiopathic. Although the exact etiology of the idiopathic type of segmental infarction is unknown, the leading theory suggests developmental variation in the blood supply to the right lower portion of the greater omentum which is fragile and tenuous. Kinking of the venous drainage due to positioning or engorgement after a large meal is thought to be a contributing factor for thrombosis and infarction [3].

Our imaging observations in nine children are similar to those made by Puylaert [5] in a review of 17 adult cases and those of Myers et al. [7] in the single previous case report of omental infarction in a child. The most consistent sonographic observation was a focal masslike area of moderately increased echogenicity involving the right-sided omental fat. In four of our cases, a moderately hyperechoic focus in the omental fat was seen as an isolated finding (identical to the appearance described by Puylaert and by Myers et al.). Palpation of this region with the ultrasound transducer often elicited maximal tenderness. The absence of this finding in the omental fat in two of our cases may have been related, at least in part, to our initial inexperience with this sonographic finding of omental infarction. Increased echogenicity of omental fat can also be seen in association with acute appendicitis or other primary intestinal inflammatory conditions such as inflammatory bowel disease. Therefore, more complex sonographic appearances (which included echogenic regions in the omental fat) led to the...