

Omental Infarction in Children

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Objectives To analyze the clinical presentation, radiologic features, management, and outcome in children diagnosed with omental infarction.

Study design This was a retrospective chart review of patients diagnosed with omental infarction in a tertiary care pediatric emergency department. Images and reports of the radiologic investigations were re-examined by a staff radiologist and analyzed for sensitivity.

Results A diagnosis of omental infarction was made in 19 children (mean age, 9.3 ± 3.5 years). The presentation was acute right lower quadrant pain in 47% of the children and associated gastrointestinal symptoms in 63%. The sensitivity of abdominal ultrasound (US) to detect omental infarction at our institution was 64%, and the sensitivity of abdominal computed tomography was 90%. Fourteen children were treated conservatively without complications after an accurate diagnosis of omental infarction done by imaging examination. Only 5 children underwent surgery based on clinical suspicion of appendicitis.

Conclusions Early identification of omental infarction by abdominal US appears to prevent unjustified surgical procedures and reduce the length of hospital stay. (*J Pediatr* 2009;155:427-31).

Abdominal pain is a common complaint in children presenting to the emergency department (ED), and identification of an acute abdomen is the most important step in management. The differential diagnosis includes serious pathologies, such as acute appendicitis, intussusception, malrotation, acute cholecystitis, and torsion of the gonads, which may require surgical intervention. Radiologic investigations, including abdominal radiography, ultrasound (US), and computed tomography (CT), are performed to identify the cause of acute abdomen.

In children, omental infarction is rarely considered as part of the differential diagnosis for acute abdominal pain, because of its rare occurrence.^{1,2} The distinction between different etiologies of omental infarction and their pathogenesis has been abandoned due to a lack of clinical variance in presentation, management, or outcome.^{1,3} Right epiploic vessels are involved in 90% of known cases of infarction, explaining the predilection for right-sided omental infarctions.¹ Obesity, associated with a heavily fat-laden omentum, seems to be a major risk factor in the development of omental infarction in children.⁴ A male predominance is seen in children as in adults,^{1,4} presumably related to the greater omental fat accumulation in males compared with females.⁵

The diagnosis of omental infarction is not a clinical one. Because of the disorder's low incidence and poor clinician awareness, many cases have been identified intraoperatively.⁶ But previous studies have shown that omental infarction can be diagnosed using imaging techniques, including abdominal US and CT,^{1,7} reducing the need for surgery.

We reviewed the clinical presentation, imaging features, surgical and pathological findings, and outcomes in a large group of children with omental infarction in an attempt to determine the value of imaging and how this might facilitate changes in the management of this condition.

Methods

Hospital records were searched for children diagnosed with omental infarction using International Classification of Diseases (ICD)-10 classification code K55.0 (acute vascular disorders of intestine) and ICD-9 classification code K557.0 (acute vascular insufficiency of intestine) between April 2000 and March 2008. The charts of children with omental infarction were selected for the final analysis. The diagnosis was verified using clinical records, radiologic investigations, and pathology reports. The charts were reviewed to collect data on patient demographics, clinical history and physical examination findings, comorbid disease states, laboratory test results, radiologic investigation reports, histopathology findings, and case management details. Radiologic images were reexamined by a staff radiologist who was blinded to the original report.

The presence of omental infarction was defined by the finding of a hyperechoic mass within the omentum on US (Figure 1). The CT findings were most

CT	Computed tomography
ED	Emergency department
ICD	International Classification of Diseases
US	Ultrasound

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Figure 1. US of a patient with omental infarction showing an echogenic mass (electronic cursors) within the omentum on the right.

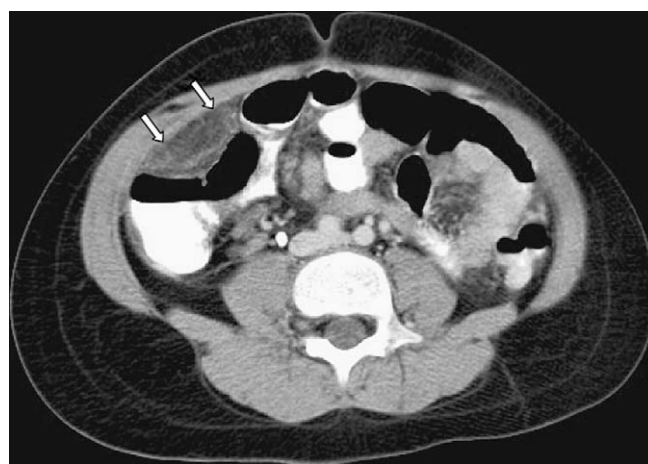


Figure 2. CT scan of a patient with omental infarction showing a hyperdense mass (arrows) within an area of omental fat on the right.

commonly described as a heterogeneous soft tissue mass within an area of omental fat (**Figure 2**). Occasional fat stranding or infiltration in the area was also noted.

To assess the changes in management over the study period, the patients were divided into 2 groups, based on the time when they were seen. The children treated during 2000-2003 (group 1) were compared with those treated during 2004-2008 (group 2) with regard to demographic information, clinical presentation, radiologic investigations, management, and outcomes. Ethical approval for the study was obtained from the hospital's Research Ethics Board before study commencement.

Results

A total of 19 children were treated for omental infarction during the 8-year study period. These included 10 males (53%) and 9 females, ranging in age from 4 to 17 years (mean $\pm$ standard deviation, 9.3 ± 3.5 years). Six of the children were referred from other hospitals, 4 with a clinical diagnosis of acute appendicitis, 1 with a diagnosis of omental infarction, and 1 with a possible abdominal mass. None of the 19 children had a significant underlying disorder, such as a hypercoagulability syndrome, an autoimmune disorder, a cardiac condition, or a congenital intestinal anomaly.

All 19 children presented with abdominal pain, which was right-sided in 14 (74%). The pain was described as right lower quadrant pain in 9 cases (47%). Other locations of pain were right upper quadrant ($n = 2$), generalized right abdomen ($n = 2$), right flank ($n = 1$), periumbilical ($n = 2$), and diffuse ($n = 3$). The median duration of pain before presentation was 48 hours (range, 12 hours to 1 month). Twelve children (63%) had gastrointestinal symptoms, such as anorexia, nausea, vomiting, and diarrhea. Only 4 children (21%) presented with fever; the highest temperature measured orally was 38.4°C . Abdominal tenderness was identified on physical examination in all children, however,

peritoneal signs were present in only 3 (16%). Eighteen children (95%) weighed above the 75th percentile for age and sex; of these, 4 weighed above the 97th percentile. The children's body mass index could not be calculated, because height measurements were not available.

Ten children (53%) had a primary diagnosis of acute appendicitis, determined by clinical suspicion. Other diagnoses considered were constipation, abdominal mass, urinary tract infection, gastritis, colitis, and pelvic inflammatory disease. Investigations included blood work, urinalysis, and radiologic imaging. Of the 16 children who had complete blood count results, leukocytosis was found in only 4 (25%). A left shift (absolute band count $> 1.5 \times 10^9/\text{L}$) was present in 65%. None of the children exhibited any electrolyte imbalances or evidence of dehydration.

Of the 19 children studied, 8 (42%) had abdominal radiographs, 16 (84%) had abdominal US, and 10 (53%) had abdominal CT scans. (Eight children had both abdominal US and CT scans.) Radiologic reports were accessible for all imaging examinations performed at our institution and the referring hospitals. All radiologic images obtained at our institution except 1 US study were available for review. Three US studies and 1 CT scan were performed at referring hospitals, and those images were not accessible for review.

Eight children in group 1 (mean age, 8.9 ± 3.6 years; 50% male) were treated for omental infarction. Of these children, 5 had abdominal radiographs, 6 had abdominal US, and 5 had abdominal CT (**Table 1**). The abdominal radiographs were considered normal in 2 children and showed nonspecific changes in bowel gas in 3 children. Abdominal US depicted an echogenic mass consistent with omental infarction in 1 child and showed a nonspecific mass in 1 child. The US was considered nondiagnostic in the other 4 children at the time of the examination; however, in our review we identified the presence of an echogenic mass consistent with omental infarction in 1 child. CT depicted

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