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CASO CLÍNICO

Omental infarction, unusual cause of abdominal pain

Infarto omental, causa poco común de dolor adbominal

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What do we know about the subject matter of this study?

In pediatric patients, omental infarction is one of the causes of acute abdominal pain, whose diagnosis is increasing due to advances in imaging tests. The management of these patients is extrapolated from that of adults, and management of choice is conservative rather than surgical.

What does this study contribute to what is already known?

This entity is little known in pediatrics. Given that its diagnosis has become more feasible, and that acute abdominal pain is a frequent reason for consultation in pediatrics, it is important to raise awareness of this pathology. This is a review of a clinical case.

Abstract

Omental infarction describes ischemic torsion of the distal portion of the omentum and constitutes an infrequent cause of acute abdominal pain in childhood of which few cases are known. **Objective:** To analyze through a clinical case the characteristics and management of this pathology, to consider this entity in the differential diagnosis of acute abdominal pain. **Clinical Case:** An 11-year-old child consulted the emergency department due to a 48-hour history of continuous abdominal pain, which had progressively increased. On the physical examination, the patient presented pain in the right side of the abdomen and the epigastric area, with no signs of peritoneal irritation, and was overweight (BMI 91st percentile). Biochemical analysis showed a slight increase in c-reactive protein (CRP) 41.31 mg/L (reference value < 3.0 mg/L) without leukocytosis and normal ultrasound study, without visualization of the appendix. Due to persistent pain, increased CRP, and absence of appendix visualization in the ultrasound, the study was completed with an abdomen and pelvis CT scan which showed trabeculation of the fat of the anterior right subhepatic space, thus diagnosing omental infarction. The patient was hospitalized for conservative management with analgesia, anti-inflammatory drugs, and fluid therapy, presenting good evolution in the first 48 hours. **Conclusion:** Omental infarction is an infrequent cause of acute abdominal pain in childhood. Imaging studies play a fundamental role in the differential diagnosis of this entity with other clinical conditions of similar course, thus avoiding unnecessary surgical interventions.

Keywords:
Abdominal Pain;
Acute Abdomen;
Infarction;
Omentum;
Peritoneal Cavity

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Introduction

Acute abdominal pain is one of the main reasons for consultation in pediatric emergency departments. The differential diagnosis is very broad, including omental infarction as one of the causes. In recent years, although little has been reported, the improvement in imaging techniques has allowed an increase in the diagnosis of this pathology[1-3].

The omentum is a mobile extension of the peritoneum that begins at the level of the stomach, descends anterior to the small intestine, and ascends back to the transverse colon. It can turn in on itself, which occurs more frequently on the right side, causing venous obstruction, edema, compression, and infarction, resulting in what is known as omental infarction[4,5]. It can be classified as primary or secondary and has been associated with several risk factors, with obesity as the most relevant in childhood[1,3].

Clinically, it usually presents as abdominal pain of sudden onset and increasing intensity, located in the right lower quadrant of the abdomen or periumbilical region. Pain increases with movement of the abdominal wall. It may be associated with signs of peritoneal irritation and other symptoms such as fever, nausea, and vomiting in up to 50% of cases[1,5].

The signs and symptoms presented by these patients may also correspond to other entities, and laboratory studies do not provide information, therefore, imaging tests have become a fundamental tool for diagnosis[1,7].

Although abdominal pain is a frequent reason for consultation in pediatric emergency departments, there are few described cases of omental infarction in children, therefore, we had to extrapolate the management of our patient according to the references found in the adult population, ranging from conservative treatment to surgical intervention.

The objective is to analyze through a clinical case the characteristics and management of this condition, in order to make this entity known and incorporate it into the differential diagnosis of acute abdominal pain in the pediatric age.

Clinical Case

An 11-year-old boy, with no relevant personal history, presented to the pediatric emergency department due to 48-hour epigastric pain. He had been evaluated for the same symptoms 24 hours earlier in another hospital, where blood tests, urine sediment, and abdominal ultrasound were normal, so he was discharged with a diagnosis of nonspecific epigastralgia, with indication of home treatment with omeprazole.

Given the persistence of abdominal pain and anorexia, it was decided to seek medical help again. The patient reported abdominal pain located in the right quadrant and epigastrium, continuous, and progressively increasing in intensity. The pain worsened with movement and partially improved with paracetamol. The patient was afebrile throughout, without vomiting, diarrhea, or urinary symptoms. There was no history of trauma or family epidemic environment or known recent contact with persons with SARS-COV2 infection. First- and second-line relatives with no history of interest except for the mother who was a carrier of C46T mutation of factor XII detected as part of the study after repeated miscarriages.

On admission to the emergency department, the patient was in fair general condition and appeared to be in pain. Anthropometry at admission: Weight 55.9 kg (percentile (p) 98), Height 157 cm (p98), BMI 22.68 % (p91)[6], Temperature 36.9 ºC, Heart rate 102 bpm. The general examination showed a swollen abdomen but not distended, with preserved bowel sounds, acute pain on palpation in the epigastrium, right hypochondrium, and right quadrant, with abdominal guarding on palpation, inconclusive Murphy's sign, and negative Blumberg sign. There were no palpable masses or organomegaly, negative bilateral renal fist percussion, and testicular examination without alterations. A complete examination was performed, including cardiopulmonary auscultation and oropharyngeal inspection, without significant findings.

Blood tests were performed, which showed a slight increase of CRP 41.31 mg/L (reference value <3.0 mg/L), and the rest of the biochemical studies, renal and liver function, and hemogram within normal ranges. An abdominal ultrasound was performed which ruled out abnormalities in the liver, biliary tract, and both kidneys. The appendix was not visualized, and no indirect signs of appendicitis or free abdominal fluid were observed.

Given the compromised general condition and poor pain control, intravenous analgesia was started, and the patient remained under observation for clinical monitoring. After 12 hours without clinical improvement, a new control examination was performed, with no relevant changes in blood parameters except for a slight increase in CRP from 41.31 mg/L to 60 mg/L. Finally, given the persistence of intense pain despite intravenous analgesia, an increase of acute-phase reactants, and a previous ultrasound study that did not allow visualization of the appendix, it was decided to complete the study with an abdominal and pelvic CT scan which showed normal appendix and fat trabeculation of the right anterior subhepatic space and moderate free fluid, confirming the diagnosis of omental infarction (Figure 1-2).

After reviewing the literature, it was decided to hospitalize the patient and adopt conservative management for pain control, anti-inflammatory treatment, fluid therapy, and follow-up. Given the maternal history of factor XII deficiency, although no direct relationship between omental infarction and factor deficiency has been described to date, it was decided to complete the study with basic coagulation, prothrombin time, and coagulation factors (VW, IX, XI, XII), which were normal.

After 48 hours of observation, oral feeding was restarted with good tolerance, and adequate pain control was achieved with oral analgesia allowing hospital discharge and home management of the patient.

Outpatient follow-up with clinical and ultrasound monitoring was performed 4 weeks after hospital discharge. The patient remained asymptomatic, with physical examination and abdominal ultrasound without alterations, and follow-up was completed without the need for further complementary studies.

Discussion

In childhood, omental infarction is an infrequent cause of acute abdominal pain. Its real incidence is unknown, especially in the pediatric population, which is estimated to account for 15% of the total cases reported, being more frequent in boys than in girls[1,3,7]. The low incidence and the lack of knowledge of this entity lead to a low clinical suspicion, being confused with more frequent pathologies. It is estimated that approximately 0.1%-0.5% of appendectomies performed in children eventually result in undiagnosed omental infarction[1].

Although it is possibly still an underdiagnosed entity, it seems that its detection in the pediatric population has been increasing in the last decades, which some authors relate to the increase in childhood obesity and the progress in imaging studies that allow its diagnosis[3,5,7].

Omental infarction is classified into two groups, primary (idiopathic) and secondary. In the primary group, the main risk factor is obesity, where the accumulation of adipose tissue in the omentum causes thrombosis and ischemia. Several observational studies such as those carried out by McCusker R. et al., Nubi A. et al., and Di Nardo G. et al. confirmed this relationship between omental infarction in pediatric age and obesity[1,3,7]. Other risk factors include trauma, increased pressure due to coughing or excessive exercise, local trauma, over-distention, and sudden postural changes. The secondary group has been related to surgery, tumors, hernias, or cysts, and even because of heart disease with ventricular dysfunction and low cardiac output[5,8,9].

Observational studies have unsuccessfully examined analytical parameters such as leukocyte or acute phase reactants counts that may be useful in the differential diagnosis and help to suspect a case of omental infarction[1,3]. So far, as in our patient, laboratory studies have not proven to be a useful tool in the diagnosis.

This entity shares symptoms and clinical signs that are common to other more frequent pathologies in pediatric age that present with abdominal pain such as appendicitis, cholecystitis, diverticulitis, epiploic appendagitis, mesenteric adenitis, and gynecological pathology in women (Table 1). Therefore, in addition

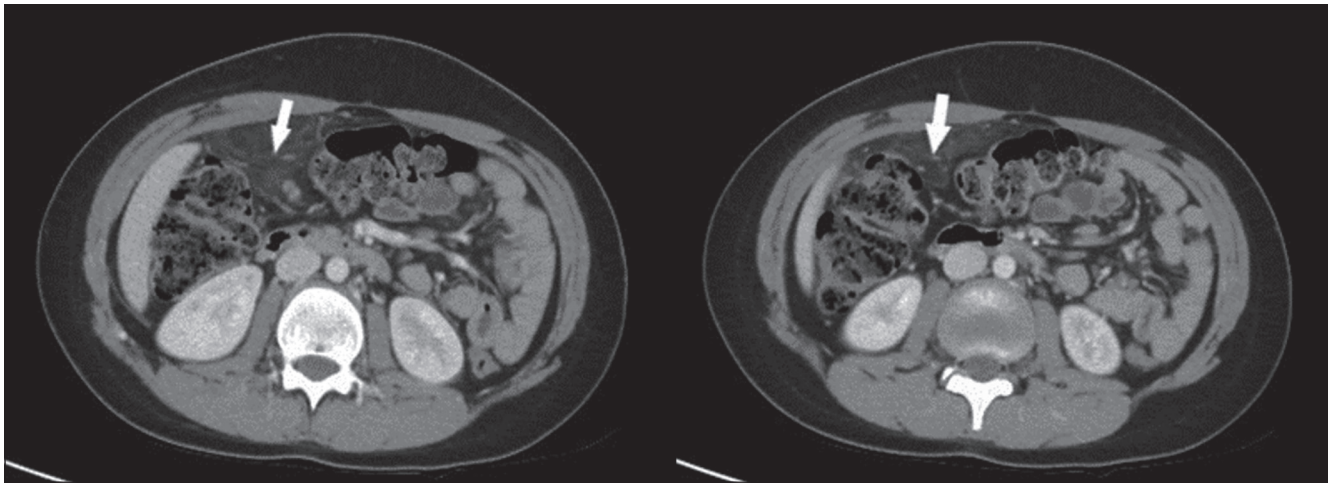

Figure 1. Axial section of Computed Tomography of the abdomen. A region, indicated by arrows, with poorly defined borders adjacent and anterior to the transverse colon with a slight increase in density compared to the fat of the rest of the abdomen, is observed.

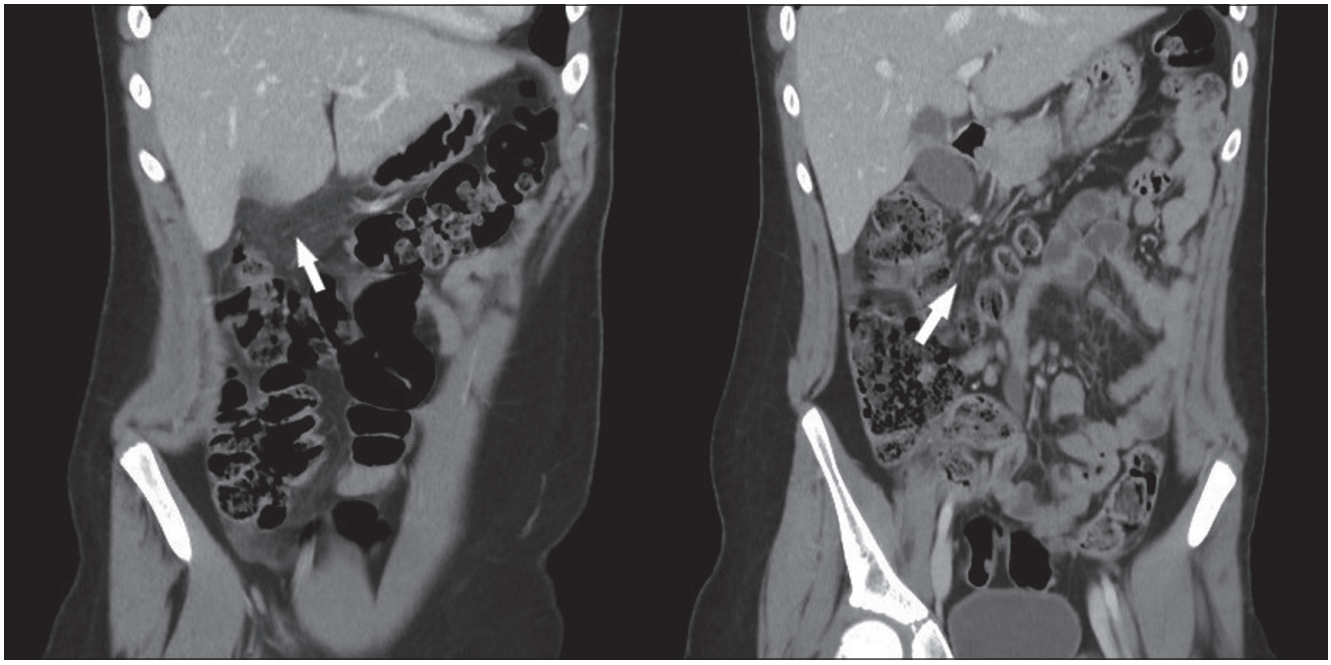

Figure 2. Coronal section of Computed Tomography of the abdomen. Subhepatic region, indicated by arrows, with trabeculation of the right anterior subhepatic fat and increased density, related to omental infarction.

to laboratory tests, it is essential to perform imaging tests, where the ultrasound is currently the most accessible tool.

In omental infarction, it is common to detect nonspecific ultrasound findings such as intraperitoneal free fluid or mesenteric hyperechogenicity, although, in certain cases, it can be diagnostic in the presence of a non-compressible hyperechoic oval mass of soft tissue with a hypoechoic border[7].

Abdominal CT scan is so far considered the gold standard and may be necessary as a complement in those cases in which the ultrasound examination has an uncertain diagnosis or has not been satisfactory, as occurs with the interposition of structures or due to significant abdominal adipose tissue, as in the case of our patient. The images show an oval fat mass with mixed attenuation between the anterior abdominal wall and the colon or the gyration pattern[7,8,10]. The irradiation of this technique must be contrasted with greater sensitivity and specificity in the diagnosis, which sometimes prevents unnecessary surgeries or better directs the area that needs to be operated on.

In the last decades, conservative management has been substituting surgical treatment since it seems to shorten hospital stays compared with more aggressive traditional management such as the surgical approach[1,3,7]. If the patient is stable and the diagnosis is clear, treatment with oral or intravenous analgesics, anti-inflammatory drugs, and fluid therapy is preferred and may be continued at home, as in the case of our patient, as soon as adequate symptom control is achieved. In this case, it will be necessary to maintain a clinical and radiological follow-up, with the option of a new ultrasound 1-4 months later or a CT scan in 1-3 years to ensure clinical resolution and rule out the appearance of possible complications such as intestinal obstruction, abscesses, and adhesions[9]. Currently, the natural evolution of the disease with conservative treatment is only partially known, but it has been observed that in subsequent imaging studies, necrotic lesions tend to diminish[1]. When the patient does not have a good evolution, especially in the first 48 hours, or when there is no clear diagnosis, exploratory laparoscopy with necrosectomy is usually indicated[9,11].

In conclusion, omental infarction is a rare but existing entity in the differential diagnosis of acute abdomen in children. The low sensitivity of inflammatory blood parameters and the minimal ultrasound findings make omental infarction a probably underdiagnosed entity and even an incidental finding in exploratory laparoscopy.

Knowledge of this pathology, the use of imaging tests, and its good evolution with conservative treatment can provide certainty in the diagnosis of acute abdominal pain and reduce the number of unnecessary surgical interventions.

Table 1. Differential diagnosis of acute abdominal pain

Cause	Basic clinical features
Appendicitis	More frequent in the 2nd decade of life and in males. Periumbilical. Irradiation to the right iliac fossa. Defense and peritonism.
Cholelithiasis	More common in women, obesity being a risk factor. Asymptomatic or colicky pain in the right upper abdomen irradiated to hypochondrium or right scapula.
Cholecystitis	Infrequent. It is related to hemoglobinopathies and cystic fibrosis. Right upper abdomen. Fever, vomiting.
Diverticulitis	Infrequent. Left iliac fossa. Fever, vomiting, rectal bleeding.
Mesenteric adenitis	Peak incidence of 2-5 years. Intermittent, periumbilical or in the right iliac fossa. Occasionally as recurring pain.
Epiploic appendagitis	More frequent in the 2nd decade of life and in males. In the lower abdomen, more frequent in the left iliac fossa. Risk factors: obesity, sedentary lifestyle or rapid weight loss.
Meckel's diverticulum	Congenital malformation of the gastrointestinal tract, usually asymptomatic. Symptomatic mainly in <2 years, more frequent in males. Abdominal pain or severe rectal bleeding.
Intussusception	Peak incidence 6-36 months, more frequent in males. Sudden pain crisis with asymptomatic periods. Decay and paleness. Feces in "currant jelly ". Mass in the right upper abdomen.
Intestinal malrotation	Peak incidence in <1 year. Obstruction. Bilious vomiting.
Incarcerated hernia	More frequent in <1 year and males. Prominent and painful mass. Associated vegetative courtship
Pancreatitis	Uncommon in childhood. Epigastralgia. It radiates to the back. It gets worse with ingestion. Elevation of pancreatic enzymes.
Inflammatory bowel disease	More frequent in adolescents and males. Diarrhea. Low digestive bleeding. Anorexia and fever. Weight and stature delay.
Inflammatory disease pelvic	More common in sexually active women. Fever. Dyspareunia, vaginal discharge.
Ovarian torsion/ ovarian cyst rupture	More frequent in prepubertal and adolescents. Sudden in the lower abdomen. Associated vegetative courtship. History of mass or adnexal pathology.
Ectopic pregnancy	Short-term amenorrhea and/or metrorrhagia.

Ethical Responsibilities

Human Beings and animals protection: Disclosure the authors state that the procedures were followed according to the Declaration of Helsinki and the World Medical Association regarding human experimentation developed for the medical community.

Data confidentiality: The authors state that they have followed the protocols of their Center and Local regulations on the publication of patient data.

Rights to privacy and informed consent: The authors have obtained the informed consent of the patients and/or subjects referred to in the article. This document is in the possession of the correspondence author.

Conflicts of Interest

Authors declare no conflict of interest regarding the present study.

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