

## Image Quiz for Surgeons

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# Intermesenteric Appendicular Abscess, a Diagnostic Challenge; Case Report and Review

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## Rezumat

### *Abscesul intermezenteric apendicular, o provocare diagnostică; caz clinic și review*

Etiologia apendiculară a abscesului intermezenteric este rareori stabilită preoperator, datorită prezentării clinice atipice și sensibilității reduse a explorărilor paraclinice. Un bărbat de 43 ani a fost internat pentru durere recentă și sensibilitate la palparea epigastrului, leucocitoză (nu s-au efectuat determinări pentru proteina C-reactivă), cu aspect normal la radiologia abdominală pe gol. Ecografia abdominală și endoscopia: irelevante. Abdomenul a devenit ușor dureros și meteorizat. O nouă explorare radiologică pe gol: aroenterie și discretă pareză intestinală. CT (cu contrast oral), ziua a 3-a: infiltrare edematoasă mezenterică și a unui segment digestiv (jejunal, sigmoidian?) situat în flacul stâng, având în vecinătate o mică colecție fluidă (cu nivel hidroaeric) și anse dilatate (paretice), cec jos situat fără modificări parietale sau ale grăsimii înconjurătoare; rezultat CT inconcludent (perforație diverticulară sau neoplazică?). Aspect irigografic normal, inclusiv al cecului. Instalarea febrei vespérale, a durerii și sensibilității abdominale la palpare concomitent cu dezvoltarea unei pseudoformațiuni centro-abdominale, au decis explorarea prin laparotomie mediană: un voluminos abces intermezenteric secundar perforației unei apendicite gangrenoase retroileale.

Apendicectomie, cu evoluție favorabilă. Un tablou clinic atipic (febră; ileus; prezența sau dezvoltarea unei pseudotumori periombilicale), asociat constatărilor CT (abces; imagine gazoasă extralumenală; ileus), ridică suspiciunea unui abces apendicular intermezenteric.

**Cuvinte cheie:** apendicită acută, abces apendicular, pseudotumoră intermezenterică

## Abstract

The appendicular origin of an intermesenteric abscess is rarely suspected prior to surgery, due to atypical clinical presentation and poor sensitivity of exploratory methods. A 43-year-old male was admitted for recent pain and mild tenderness in the epigastrium, slight emesis, leucocytosis (C-reactive protein was not determined), with no pathological findings on simple abdominal radiological examination (Rx). Abdominal ultrasound (US) and endoscopy were irrelevant. The abdomen became moderately tender, distended; diffuse enteric gas, slightly impaired bowel movement could be demonstrated by a new Rx. CT (oral contrast) was performed in the 3<sup>rd</sup> day: edematous infiltration of the mesentery and of a left-flank digestive loop (jejunal, sigmoidian?), small-size fluid collection (with extraluminal air-level) and paretic loops in the proximity, but normal wall-appearance of the caecum and its surrounding fat; the CT result was inconclusive (perforated diverticulosis or malignancy?). Barium enema: normal, including the caecum. Installation of vesperal fever, progressive mid-abdominal pain, tenderness and formation of a mass were the rationale for open mid-line laparotomy, discovering a large intermesenteric abscess, secondary to perforated gangrenous intermesenteric appendicitis. Surgical outcome of appen-

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dectomy was normal. A high index of suspicion may be suggested by: atypical clinical presentation (fever; ileus; presence or formation of a tender, periumbilical, mass) and CT findings (abscess; extraluminal air; ileus).

**Key words:** acute appendicitis, appendicular abscess, intermesenteric mass

## Introduction

About 2-7% of appendicitis-patients manifest complex features, such as related to an abscess, with a significant risk of rupture and potential septic shock. Proper management can be selected according to surgeon's preference (emergency operation, delayed operation or follow-up) (1). The vermicular appendix has various anatomical positions, so an appendicular abscess/mass may be a great imitator, often able to masquerade other pathologies.

Common periappendicular abscesses are located in the right-iliac fossa or pelvis. Appendiculo-cutaneous fistula (appendicitis necessitates) is exceptional (2,3); so is right hemi-scrotal abscess in boys, secondary to rupture of a right-iliac fossa collection that can use a patent processus vaginalis as route for self-propagation (4,5). Untreated pelvic abscesses spontaneously discharge through the rectum, vagina, even uterus (6). Surgery is considered as first-choice treatment, but non-invasive methods (percutaneous US and CT-guided) are equally efficient for instant and temporary relief drainage. Pelvic endoscopic ultrasonography (EUS) - guided drainage through the large bowel (using stents and catheters) is demonstrated as feasible, efficient and safe (7).

Periappendicular abscess in a hernia sac is always a surgical surprise; sudden local tenderness and irreducibility (mimicking hernia strangulation) is associated with significant inflammatory changes (regional abscess, even necrotizing fasciitis). Isolated incarceration of the appendix, however, does not cause bowel obstruction. Indwelling of a periappendicular abscess within an indirect inguinal-scrotal hernia is referred as Amyand's hernia and associated with elderly male patients (8-10). The equivalent for a femoral hernia is called De Garengeot's hernia, occurring mostly in women, but it can also affect old males (11). There are also reports of similar cases with obturator (12) or umbilical hernia (13).

About 65% of the appendixes are retrocaecal (14). Progression of a retroperitoneal abscess originating from acute perforated appendicitis is unusual, difficult to diagnose (lack of classical symptoms of acute appendicitis at the onset of the disease; significant interval between the onset of symptoms and diagnosis; no peritonitis; final diagnosis of retroperitoneal perforation often achieved only during surgical exploration) and a potentially lethal condition especially in elders and debilitated persons, ex: diabetes mellitus (15-17). Extension of a large retroperitoneal abscess in the loose connective tissue of the retro-visceral space, along the spine and psoas muscle up to

the diaphragm and laterally to the abdominal wall and groin (with no anatomical barriers limiting its penetration), remains one of the most serious complications of acute appendicitis and responsible for lumbar and perinephric abscesses (18-20), abscesses of the thigh (subcutaneous emphysema, necrotizing fasciitis) (14,21-22) or gluteal abscess with cellulitis (23).

Intermesenteric abscess is a common surgical complication of appendectomy for acute appendicitis- open (24) or laparoscopic, but a rare event reported as secondary to perforation of mesocolic (retroileal) appendicitis. Typical clinical findings (suggesting acute appendicitis or perforation) are absent, or may be replaced by: periumbilical pain; ileus, no muscular guarding; less severe symptoms and signs than expected. However, an intermesenteric mass may lead to ileal obstruction (25), rupture of the abscess in the small intestine (26) or retroperitoneal space (27).

## Case report

*A 43-year-old male, with no medical history, was admitted as surgical emergency accusing recent (12 hours) acute epigastric pain and slight emesis. He had a normal body temperature, normal bowel movements and stool emissions. Abdominal examination evidenced only mild tenderness in the epigastrium, with no muscular guarding or localizing abdominal signs. Laboratory tests revealed elevated white cell count (WBC: 15.2/mm<sup>3</sup>), neutrophil count (NC: 12.0/mm<sup>3</sup>, 79.1%); C-reactive protein (CRP) was not determined. Simple Rx examination of the abdomen showed no pathological findings. A mild episode of acute pancreatitis was suspected; oral intake was interrupted for 12 hours and symptomatic medication was administered.*

*Next morning he felt much better, but the conclusion of the abdominal examination was the same. WBC: 9.2/mm<sup>3</sup>, NC: 7.6/mm<sup>3</sup>, 82.6%. Normal abdominal US; only an abundant bile reflux was demonstrated by endoscopy. Twelve hours later, the patient accused, again, abdominal pain; the abdomen was distended and tympanic. Simple Rx examination was repeated: diffuse enteric gas, slightly impaired bowel movement, and two air-fluid images in the left abdominal flank.*

*CT with oral contrast was performed a day later (Fig. 1). Diffuse edematous tissue infiltrate, circumferentially affecting a digestive loop (jejunum, sigmoid?) with slight lumen-reduction, located in the left abdominal flank at umbilical level; agglutination and dilated, paretic peripheral loops in the vicinity; edematous infiltration of the mesentery with small-size lymph node enlargement; a 44/31 mm ill-defined, discrete, fluid collection with small extra-luminal air-level, migrating towards the root of the mesentery and pelvis were detected. Edematous thickness of the proximal sigmoid colon was noted; liquid distension of a thin-wall, low-positioned caecum, with normal surrounding fat. The CT result was inconclusive: perforated diverticulosis or malignancy?*

*The patient continued to complain of vague abdominal pain, but had normal bowel movements. A barium enema (complete preparation with polyethylene-glycol) was negative for colic diverticulosis, with no filling defects (including the*



**Figure 1.** CT scan: ill-defined intermesenteric fluid collection with small extra-luminal air, located in the left abdominal flank; no infiltration of the cecum and its surrounding fat

caecum; still, the appendix was not injected). The very next day, the case presented vesperal fever (38.5°C), an antibiotic was added to medication and all symptoms subsided; in the following two-day interval a progressive, mid-abdominal mass, could be palpated.

Open surgery (midline-abdominal laparotomy) was performed, one week after presentation. A sample of slightly-modified peritoneal fluid was sent for microbiological examinations (and proved by microbiological cultures, 3 days later, to contain *Escherichia coli*). The large epiploon was retracted upwards, exposing a common mesenteric trunk that was edematous, significantly enlarged and presenting numerous, small inflammatory lymphatic nodules. A 25-cm mid-abdominal visceral mass formed by edematous, thick-walled and slightly dilated, agglutinated, small bowel segments imposed a carefully blunt digital debridement of the friable intestines. A sudden burst of foul-smelling pus (typically for *E. coli* contamination) marked the entrance towards a purulent cavity. Following aspiration of 400-500 ml of pus and complete dissection, it proved that the cavity was delineated by: a jejunal segment; the last ileal loop (the caecum was mobile); posterior abdominal peritoneum; the right aspect of the mesosigmoid and folds of small intestine mesentery itself (Fig. 2). The source of the abscess was a 12-cm long meso-ceciac acute appendicitis, presenting a gangrenous rupture 2-3 cm distal to its insertion. A classic appendectomy (retrograde technique, stump inversion) was practiced; the peritoneal cavity was properly washed with saline solution and drained. The outcome of surgery was uneventful; the case was discharged one week later.

## Discussions

Acute appendicitis is suspected in patients presenting suggestive clinical symptoms and signs (fever, right lower-quadrant pain and tenderness, muscle guarding); however,



**Figure 2.** Surgical aspect after debridement; gangrenous perforation at the insertion of a mesoceciac appendix

especially in children and elders, diagnosis of complicated appendicitis (gangrene, perforation, abscess formation) depends on onset and interpretation of symptoms and subjective physical examination. Nonspecific symptoms result in delayed diagnosis and increased possibility of developing complicated appendicitis (28). Laboratory blood inflammatory markers and imaging substantially increase diagnostic accuracy in clinically-suspected acute appendicitis.

Inflammatory markers are nonspecific, but can aid and support diagnosis in patients with clinical acute appendicitis (right lower abdominal quadrant, typical clinical features). WBC and NC can better distinguish a normal appendix from acute appendicitis than CRP (29,30), instead a significantly elevated level of CRP is strongly suggestive for abscess (29,30) and predictive in discriminating between uncomplicated and complicated appendicitis (perforation), a relevant issue in terms of decision for prompt surgical exploration (especially in young children and elders, who frequently present with vague symptoms) (28). CRP levels are strongly correlated with inflammation severity (28,31), including CT-determined acute appendicitis findings (30). Inflammatory markers are inferior to imaging techniques (US, CT) in terms of confirming acute appendicitis (32), but may be useful tools if the appendix is not visualized or when imaging results are inconclusive (equivocal diagnosis or disease stage after CT) (30).

Although US is noninvasive, widely available and inexpensive, it requires a high level of skill and expertise (it is highly operator-dependent); may be difficult in cases presenting severe pain or overlying gas; frequently it does not allow detection of normal or perforated appendixes; CT scan has high accuracy for the noninvasive assessment of patients with suspected appendicitis, particularly useful in cases with negative or inconclusive US findings (33). Depending on case-peculiarities and preference, a variety of helical CT methods are advocated: unenhanced CT; enteric contrast material - either oral or rectal; i.v. contrast material; unenhanced CT with the selective use of contrast material. Periappendicular abscess may be suggested by the presence of

a local inflammatory mass, a loculated rim-enhancing fluid collection, sometimes with mass effect on the adjacent bowel loops (34).

A few retrospective studies (comparing preoperative CT findings and surgical diagnosis) have addressed the issue of CT-criteria sensitivity and specificity, useful to differentiate perforated from non-perforated acute appendicitis; this is a difficult task, even after the advent of multidetector CT (MDCT). In one study on 94 patients (35) the presence of one or more of the five CT findings, of extraluminal gas, abscess, phlegmon, extraluminal appendicololith, and/or enhancement defect in the appendicular wall was found to be 96.4% sensitive and 100% specific for perforated appendicitis; the individual CT finding of enhancement defect in the appendicular wall was 64.3% sensitive and 100% specific. Another study on 202 consecutive patients with surgically-proven acute appendicitis (36) reported that abscess, extraluminal air, wall defect, peritoneal enhancement, extraluminal appendolith, phlegmon, localized fluid, fascial thickening are significant CT signs for predicting appendicular rupture. In a later retrospective, larger study (244 patients with MDCT scan, using surgery and pathologic examination combined as reference standard) (37), statistical analysis demonstrated that: abscess (99%), extraluminal gas (98%) and ileus (93%) had the highest specificities, however the sensitivities of these findings was low (34%, 35%, and 53% respectively) and relying on the presence of these three features alone, however, would result in missed perforation in almost half of all patients; appendicolith, free fluid, enlarged abdominal lymph nodes, and enlargement defect in the appendiceal wall were neither highly sensitive, nor highly specific; MDCT is helpful in diagnosing perforated appendicular but overall sensitivity is poor and, unless abscess or extraluminal gas is present, cannot enable the diagnosis of perforation.

## Conclusion

Intermesenteric appendicular abscess is an infrequent, but potentially lethal complication of acute appendicitis. Although a well-known surgical complication of appendectomy, it is rarely suspected as secondary to perforation of intermesenteric (retroileal) appendicitis. Due to atypical clinical presentation, it may be a diagnostic challenge and dilemma to the surgeon.

In our case, the entire evolution (perforation to abscess formation) was consumed in-hospital under clinical and exploratory observation but, similar to other instances, the appendicular etiology was not suspected prior to surgery. Right lower-quadrant pain and tenderness were absent. Clinical findings were: fever; epigastric (later periumbilical) pain and tenderness; ileus and formation of a central abdominal mass. Unfortunately, only WBC and NC were measured and the level of C-reactive protein was not determined. CT was useful in diagnosing the presence of perforation and abscess formation (edematous infiltration of a digestive loop- jejunal, sigmoidian ?, with agglutination of parietic loops in the proximity; edematous infiltration of the mesentery, fluid collection with extra-luminal air-level), but the results were misinterpreted (perforated diverticulosis or

malignancy?), presumably because of the low-position, and normal wall-appearance of the cecum and its surrounding fat. Open-surgery was performed one week after onset of symptoms, with a normal, uneventful, outcome.

A high index of suspicion for intermesenteric appendicular abscess may be suggested by: atypical clinical presentation (fever; ileus; presence/formation of a tender, periumbilical, mass) and CT findings (abscess; extraluminal air; ileus).

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