

Appendicitis in Umbilical Hernia: A Case Report

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Abstract

Appendicitis and umbilical hernias are common and usually well recognizable surgical entities. However, when both are combined it may be more difficult to determine correct diagnosis and treat both entities concomitantly.

We report the case of a patient who was diagnosed with an acute appendicitis within an umbilical hernia sac. The infection was limited to the hernia sac and treated by antibiotics and emergency incision and drainage of an accompanying abscess after which the patient recovered. The hernia, still containing the appendix, was corrected at a later stage, together with removal of the appendix.

Appendicitis in umbilical hernias is an extremely rare surgical entity. Imaging techniques will contribute to revealing correct diagnosis. The condition may be treated surgically or conservatively in the acute stage, followed by delayed correction of the hernia with or without interval appendectomy.

Keywords: Appendicitis; Umbilical Hernia; Treatment; Imaging

Abbreviations

BMI: Body Mass Index; CT: Computed Tomography

Introduction

Appendicitis and incarcerated umbilical hernias are common surgical emergencies. Diagnosis and treatment of these conditions are relatively simple, but when both are combined the symptoms and signs can obscure diagnosis and it may be difficult to treat both at the same time effectively. We report a case of appendicitis within an umbilical hernia and review the literature on the treatment of this rare entity.

Case Report

A 70-year-old man presented at the emergency department with a three-day history of abdominal pain and general discomfort. This was associated with an increased size of his earlier diagnosed umbilical hernia which was known for ten years and was previously small, reducible and asymptomatic. There were no symptoms of intestinal obstruction such as nausea, vomiting or distension of the abdomen, nor were there defecation problems.

Medical history revealed hypertension, obesity (BMI 42), a right nephrectomy via lumbotomy incision because of a small renal cell carcinoma twenty-five years before and radiation therapy because of prostate cancer 13 years before.

On physical examination, there was a hemodynamically stable patient with a large, erythematous and painful mass in the umbilical area demonstrating cellulitis. The mass was not reducible. Aside from the painful umbilical area, the abdomen was soft and non-tender without signs of peritonitis.

Routine blood tests showed elevated inflammatory parameters: leucocyte count of $11.3 \times 10^9/L$, C-reactive protein level of 372 mg/l. Other values such as hemoglobin level, liver function tests, lactate, creatinine, urea and electrolyte levels were normal, as was dipstick urine analysis.

In order to obtain additional information about intra-abdominal expansion of the infected region and the contents of the umbilical hernia a computed tomography (CT) of the abdomen was performed. This CT-scan showed an umbilical hernia containing a tubular structure with mural thickening associated with surrounding fat stranding and some free fluid and air-bubbles. The tubular structure had its origin intra-abdominally at the caecum pole and was diagnosed as an inflamed appendix with small abscesses around the tip. Thus, an acute appendicitis within an umbilical hernia was diagnosed (Figure 1). There were no other bowel segments within this hernia. The hernia defect was relatively small and measured at 2 cm.



Figure 1a and 1b: CT-scan images of the inflamed appendix within the umbilical hernia sac. The appendix is in the hernia sac from its caecal root to the tip. The surrounding fat is inflamed and there are small air and fluid collections suggesting an abscess.

Since the infection was limited to the hernia sac and the patient was hemodynamically stable without signs of peritonitis, emergency incision and drainage of the small abscesses was performed and pus and even a small faecolith of the appendix was relieved. In addition, the patient was treated with intravenous antibiotics.

After a few days the condition of the patient improved, the painful umbilical mass decreased, the infection parameters decreased and the patient could be discharged from the hospital.

Three months after the acute episode, a laparoscopy was performed. Our primary goal was to reduce the hernia and repair the abdominal wall defect. During laparoscopy the pre-operative diagnosis of the umbilical hernia containing the appendix was confirmed (Figure 2). However, due to the appendicitis the appendix was too adherent to the hernia sac and the umbilical skin and it was not possible to reduce it into the abdomen. Therefore, via a small subumbilical incision appendectomy and correction the umbilical hernia were performed. After the procedure the patient recovered uneventfully. Histopathological studies of the appendix revealed an appendix with signs of previous inflammation and fibrosis, but no signs of malignancy or acute inflammation.

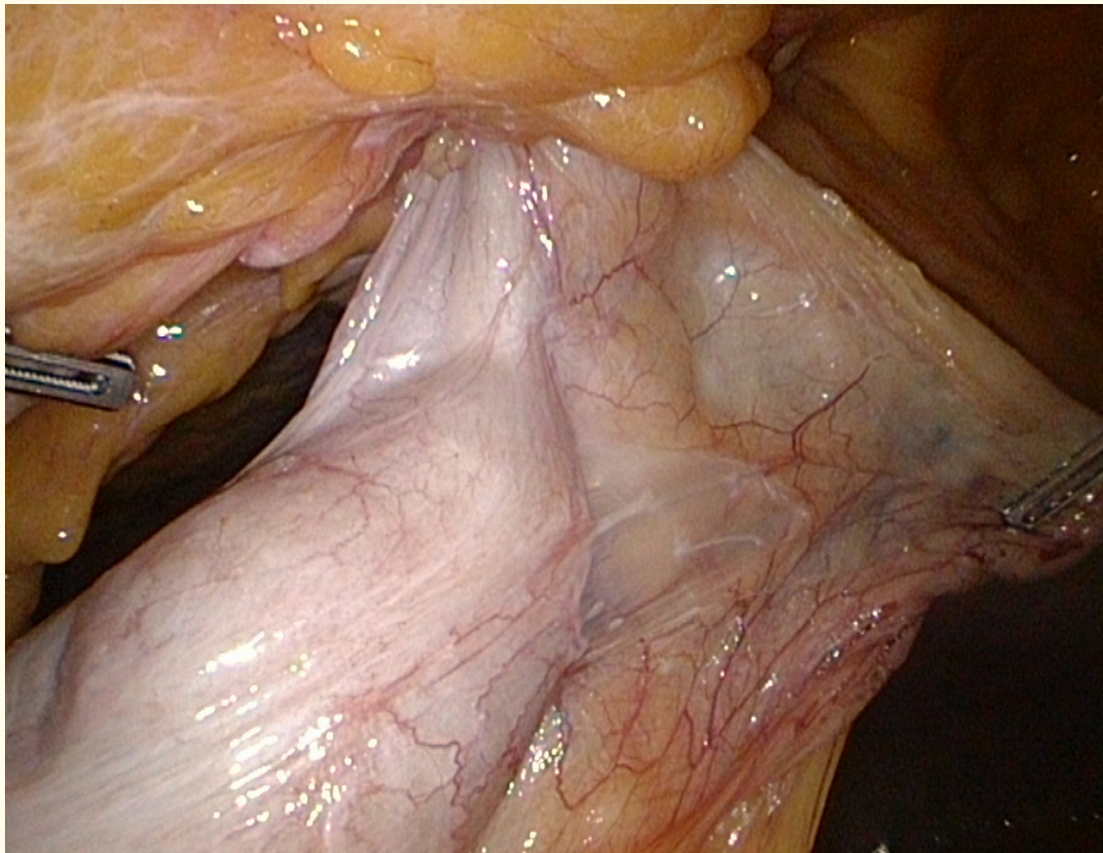


Figure 2: Per-operative photo of the umbilical hernia defect containing the appendix from its cecal root.

Discussion

The appendix has diverse anatomical positions and in some cases the appendix is located within a hernia sac, but acute appendicitis occurring within a hernia sac is rare. Appendicitis in an umbilical hernia sac is a very rare cause of a painful umbilical mass and only a few cases have been described in literature [1-5]. Appendicitis has been described in inguinal hernia (Amyand hernia) [6], femoral hernia (De Garengeot hernia) [7], Spigelian hernia [8], obturator hernia [9] and incisional hernia [10]. The first adult case of appendicitis within an umbilical hernia was reported by Doig in 1970 [1]. Since then, this rare diagnosis has been described in only a few case reports [2-5].

Clinical presentation may vary (Table 1). In 2013 Agarwal, *et al.* describe the fifth adult case in English literature of umbilical hernia appendicitis [5].

The diagnosis of appendicitis within a hernia sac is difficult to differentiate from an incarcerated hernia. Clinical presentation is very similar: pain and swelling of the hernia. Both conditions may have similar accompanying symptoms, such as septic shock, generalized tenderness of the abdomen and signs of bowel obstruction. Absence of these accompanying symptoms does not exclude either diagnosis. For example, an umbilical hernia with strangulated omentum will not cause bowel obstruction or generalized peritonitis, whereas infection caused by a perforated appendicitis within a hernia may extend to the general peritoneal cavity. Therefore, the diagnosis is usually made during emergency surgery [5]. However, with the common use of imaging techniques more cases may be diagnosed pre-operatively. In our case, diagnosis was revealed pre-operatively on CT-scan of the abdomen.

Treatment for an incarcerated hernia is emergency hernia repair, with or without use of a mesh. Treatment for acute appendicitis is appendectomy [11]. However, the role of conservative treatment with antibiotics with or without radiologic-assisted drainage of appendiceal abscess has also been studied and found to be a useful treatment strategy in appendicitis [12,13].

Since most cases of appendicitis within a hernia sac are diagnosed during surgery, most cases in literature underwent an acute appendectomy. However, successful conservative treatment of the acute appendicitis within a hernia has also been described [7].

Ideally, definitive treatment of both entities, hernia and appendicitis, can be performed at the same time. However, hernia correction may be complicated in a severely contaminated area caused by necrotic or infected contents of the hernia which is the case in an acute appendicitis. The use of mesh repair in contaminated areas is subject of debate. Therefore, one would ideally create better circumstances for optimal hernia repair and lower risks for mesh infection.

Most cases of appendicitis within hernia sac describe that infection was limited to the hernia sac. This implies that it is a localized infection in an enclosed compartment without expansion to the rest of the intraperitoneal cavity. In our case CT-scan revealed that infection was limited to the hernia sac. This allowed us to adjust treatment plan to controlling infection by incision and drainage of the infected area which could be performed under local anesthesia in the emergency department. In a second stage the hernia repair and appendectomy were performed.

In our case laparoscopic hernia repair proved not feasible because of adhesions to the hernia sac. However, successful laparoscopic appendectomy and concomitant hernia repair in cases with appendicitis within an inguinal hernia sac have been described [6,14].

Conclusion

In conclusion, appendicitis in an umbilical hernia sac is very rare and sometimes misdiagnosed as a strangulated hernia. Imaging techniques may help in revealing correct diagnosis and enable considering conservative and operative treatment options accordingly.

Conflict of Interest

There are no conflicts of interest.

Author	Clinical presentation	Management	Final outcome
Doig [1]	63-year-old male with red painful swelling in umbilical region. Irreducible painful lump close to the umbilicus.	Surgery: appendectomy No information provided about the hernia repair.	At one-month follow-up the patient was well. No extended follow-up described.
Atabek [2]	25-year-old male with fever and vomiting. Abdominal distention with non-reducible mass in umbilical area.	Surgery: appendectomy, primary closure of the umbilical hernia.	Post-operative period was uneventful. No extended follow-up described.
Al-Qahtanit [3]	NA: only abstract available.	Open appendectomy and hernia repair	NA: only abstract available.
Arnaiz [4]	61-year-old obese female with erythematous plaque in umbilical region Ultrasound: abscess umbilical region CT-scan: gas forming abscess with caecum inside umbilical hernia sac	Surgery: appendectomy No information provided about the hernia repair	No follow-up described.
Agarwal [5]	54-year-old female with vomiting, abdominal pain and irreducible paraumbilical swelling. Ultrasound: aperistaltic bowel with wall thickening within umbilical hernia sac	Surgery: appendectomy, double breasted repair of hernia defect (2.5 cm).	Hospital discharge after 3 days. No extended follow-up described.
Huntington [15]	41-year-old morbidly obese (BMI 69) male, periumbilical pain and new bulge. Tender area of firmness peri-umbilical region CT-scan: strangulated umbilical hernia with appendix	Antibiotics combined with laparoscopic appendectomy and primary closure of the hernia defect	Hospital discharge after 3 days. No extended follow-up described.
Pilgrim [16]	63-year-old male with right lower quadrant pain, severe pain in umbilical region CT-scan: umbilical hernia with bowel, but initially the appendix was not visualized.	Surgery: open appendectomy and primary hernia repair.	Hospital discharge after 5 days. No extended follow-up described.

Table 1: Cases with appendicitis in an umbilical hernia.

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