



## A “fruitful” cause of acute appendicitis

### Un cas «fruité» d'appendicite aigüe

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#### ABSTRACT

**Introduction:** Acute appendicitis is a common health problem mainly due to a lumen obstruction. The obstruction is mainly due to fecal material, lymphoid hyperplasia or parasites. Foreign bodies and especially seeds have been rarely reported as causes of acute appendicitis and account for less than 1% of the different causes.

**Case report:** The authors described a rare case of acute appendicitis caused by seed and causing diagnostic challenge with the most frequent parasites observed in the appendix lumen. Different arguments were gathered to rule out enterobius vermicularis, taenia species, ascaris infection or schistosomiasis.

**Conclusion:** Seed-caused-appendicitis has to be known and identified by pathologists in order to avoid the diagnosis of parasites infection which may induce an overuse of antibiotics after the appendectomy.

**Key-words:** Acute appendicitis, seed, parasites, pathology

#### RÉSUMÉ

**Introduction:** L'appendicite aigüe est un problème de santé publique commun souvent occasionnée par une obstruction de la lumière. Cette obstruction peut être secondaire à du matériel fécal, une hyperplasie folliculaire lymphoïde ou des parasites. Les corps étrangers et particulièrement les graines ont été rarement rapportés comme causes d'appendicite aigüe et représentent moins de 1% des différentes causes.

**Cas clinique:** Les auteurs décrivent un cas rare d'appendicite aigüe occasionnée par une cause rare et de diagnostic délicat, dont le principal diagnostic différentiel est représenté par les parasites. Différents arguments morphologiques ont été discutés afin d'éliminer une infection par enterobius vermicularis, les espèces de taenia, l'ascaris ou des schistosomiasis.

**Conclusion:** Les appendicites aigües causées par des graines doivent être identifiées par les pathologistes afin d'éviter un diagnostic de parasitose et une utilisation excessive des antibiotiques après l'appendicectomie.

**Mots clés:** graines, appendicites, parasites, pathologie

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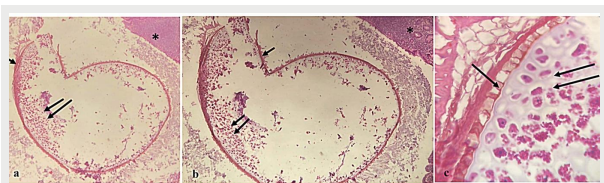
## INTRODUCTION

Acute appendicitis is a frequent health problem, whose diagnosis and management are respectively based mainly on physical examination and on laparoscopic appendectomy. The causes of appendicitis are unknown in 60% of the cases [1]. The major cause reported in the literature is represented by lumen obstruction with fecaliths, parasites and lymphoid follicular hyperplasia being the most frequent causes. Microscopic examination allows the diagnosis of the different causes taking into account the major pitfalls.

The authors reported a rare case of appendicitis caused by a seed.

## CASE HISTORY

The authors reported the case of a 14-year-old child who presented at the emergency department because of a 24-hour pain of the right lower abdominal quadrant. The patient had no particular past medical history. Physical examination revealed a tenderness in the right quadrant of the lower abdomen with a good general state. Blumberg, Grassman and Rovsing's signs were positive. The body temperature measured axillary was 38°. The laboratory tests revealed an inflammatory biologic syndrome with increased levels of acute inflammatory reactants. The white blood cell count was  $17.1 \times 10^9/L$  with a neutrophil count of 90% and a C-reactive protein of 45 mg/dL. Based on the physical examination and laboratory tests, the diagnosis of acute appendicitis was retained and a laparoscopic appendectomy was performed. The gross examination revealed a filiform 5-centimeter appendix. Many samples were performed and paraffin-embedded. Microscopic examination revealed a thickened appendiceal wall with a luminal obstruction by an ovoid body. The latter was characterized by a thick outer covering (arrow) and a bright pink-red colored starch and fat globules in various sizes (double arrow) (Figure 1).



**Figure 1.** a/ Appendiceal lumen filled with a seed characterized by a tick coat (arrow) and an endosperm (double arrow) (Hematoxylin Eosin x100). The appendiceal wall presented a lymphoid hyperplasia (star), b/ Higher magnification of the seed within the appendix (Hematoxylin Eosin x250), c/ Details of the thick coat and the endosperm (Hematoxylin Eosin x400)

Facing these features, the major differential diagnosis consisted of parasites. The diagnosis of enterobius vermicularis was ruled out because of the absence of lateral wings in the cuticle and the absence of visible organs. Taenia species were ruled out because of the absence of the characteristic lateral protrusion known as genital pore and the absence of eggs. The diagnosis of ascaris infection was eliminated because of the absence of ascaris lumbricoides eggs. The aspects observed were also different from the schistosomiasis eggs that are usually calcified. After ruling out the latter major parasites, the components observed were identified as a seed coat for the outer covering and an endosperm for the pink-red starch and fat globules. The final diagnosis retained was an acute appendicitis caused by an undigested seed.

## DISCUSSION

The authors reported the case of an ingested seed causing appendiceal lumen obstruction and appendicitis in a 14-year-old child. Seeds represent the third cause of appendicitis and represent a major pitfall with parasites especially for unexperimented pathologists. Microscopic findings of seeds are uncommon to pathologists and may be mistaken as an unknown foreign body or even parasites. The seed's outer layer is of great consistency compared to the inner structures and could create artefacts when seeds are paraffin embedded and microtome sectioned causing different aspects depending on the seed subtype and the level of the section. The basic anatomical structure of the seeds consists of the seed coat located in the outer part of the nucleus, endosperm region that surrounds the embryo, embryo structures and convoluted cereal parts similar to parasites [2]. The outer layer may cause a pitfall with many parasites. The most common parasites in the appendix consist of Enterobius Vermicularis, Taenia subspecies, Balantidium Coli, Entamoeba histolytica, schistosoma and ascaris lumbricoides. These diagnoses were ruled out in our case. The seed is the mature ovule of flowering plants and consists of coats enclosing embryo which is made of one or 2 cotyledons, the hypocotyl (embryonic axis), the plumule (embryonic shoot) and the radicle (embryonic root). The endosperm serves as food storage organ [3]. Differentiating the seed subtypes is challenging because of the scarce bibliographic sources. Campora M, et al [3] published a kind of atlas identifying different seeds subtypes and according to their images, the seed identified in our case may correspond to a poppy (*Papaver somniferum*). Causes of appendicitis are in the majority of the cases unknown and in some cases they are related to a lumen obstruction. The obstruction may be caused by fecal material, lymphoid hyperplasia, parasites or foreign bodies [1]. The foreign bodies passing through the lumen of the appendix can't re-enter the colon because of a peristaltic motion trouble and cause appendicitis. Appendicitis caused by foreign bodies prevalence accounts for 0.0005% according to many authors [1]. Foreign bodies have been reported to be small metal objects, animal hair, toothpicks, bullets, piercings, needles, stones, seeds or tooth [1]. Collins, et al. reported 51.8% of acute appendicitis among 71,000 appendicectomies to be caused by obstruction and mainly by parasitic worms or faecoliths and only 5.5% being caused by foreign bodies [4,5]. Incidence of foreign bodies-appendicitis has been reported to account for 3% in the early 20th century [6]. The decrease of this incidence through the years may be explained by a gain of expertise and ability to identify the different causes, including parasites. According to Pogorelic, et al the most common causes of appendicitis are fecalith followed by parasites and rarely tumors. Byard, et al. reported seed-caused appendicitis in 0.07% of the cases [7]. In a study accounting for 1969 appendicitis, Engin O, et al. [8] reported appendicitis caused by seeds in 0.4% of the cases. Among foreign bodies, seeds are the most frequent cause of appendicitis [3]. The types of seeds included coca, fruits, barley, caraway, fig, date, raisin or oats [6]. Appendiceal wall may be normal or characterized by lymphoid hyperplasia, like in our case, or inflammatory. Among 8 cases of appendicitis caused by seeds and reported by Engin O, et al. appendix inflammation was reported in 2 cases and lymphoid hyperplasia in 5 cases [8]. A perforation of the mucosa caused by seeds has also been reported by Hulme P [9].

The treatment of the appendicitis caused by seeds is also based on laparoscopic appendectomy and no particular complications have been reported in the literature.

## CONCLUSION

Among the different causes of acute appendicitis, seeds are very rare and their diagnosis implicates ruling out parasites. Moreover, pathologists have to be aware of their diagnostic features and major pitfalls.

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