

Impacted golf tee shaped appendiceal fecalith causing appendiceal non-visualization and mimicking cecal mass: A case report

Sindhuja Sivanandham, Shriram Jakate

ABSTRACT

Introduction: When fecaliths occur in the appendix, they commonly cause obstruction and bacterial overgrowth leading to appendicitis presenting as right lower quadrant pain. Fecaliths can be identified radiographically, and their presence raises high suspicion of appendicitis in the right clinical setting.

Case Report: A 25-year-old Caucasian male presented with persistent lower abdominal pain, which was suspected to be a cecal mass on colonoscopy. Radiography by X-ray and computed tomography (CT) scan described a non-visualized appendix and no evidence of a fecalith. Colonoscopy was performed, and biopsies revealed an inflamed colonic mucosa with fecalith-like material. Subsequent right hemicolectomy revealed no cecal mass but an impacted golf tee shaped appendiceal fecalith which caused neither obstruction nor appendicitis due to its unique structure.

Conclusion: This case report describes an appendiceal fecalith that grew in the form of a golf-tee starting at the tip, growing to the appendiceal orifice, and deviating from every known clinical and radiographic presentation of appendiceal fecalith with unusual pathogenesis. Specifically, this uncommonly shaped fecalith rendered the appendix difficult to visualize radiographically, mimicked a cecal mass on coloscopy, and caused persistent lower abdominal pain, in the absence of obstruction and without leading to appendicitis. This

novel presentation widens the spectrum of appendiceal pathologies and clinical signs and symptoms that may be caused by a fecalith.

Keywords: Appendicitis, Appendicolith, Cecal mass, Fecalith

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INTRODUCTION

Appendicitis is a common acute abdominal emergency, causing right iliac fossa pain, vomiting, and fever [1]. It is thought to result from the luminal obstruction of the appendix caused either by a fecalith or lymphoid hyperplasia, which leads to accumulation of mucin distal to the obstruction, bacterial overgrowth, and inflammation. This eventually causes increased intraluminal pressure, ischemia, and perforation of the appendix [2, 3].

Fecaliths play a vital role in the pathogenesis of appendicitis [3] and can be identified through computed tomography (CT) [2]. Thus, diagnosis of acute appendicitis is based on clinical signs and symptoms and radiographic evidence of fecalith and/or radiographic features of acute appendicitis [1, 4]. The strong association between the presence of a fecalith and acute appendicitis has, in essence, led to the usage of radiographically evident fecaliths as a pathognomonic sign of acute appendicitis [2]. Commonly, the shape of the appendiceal fecalith is

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oval or rounded and is lodged within the mid-appendiceal lumen causing obstruction.

We present a case of an unusual golf tee shaped appendiceal fecalith mimicking a cecal mass on colonoscopy, causing chronic lower abdominal pain. This fecalith induced neither obstruction nor acute appendicitis. On radiography, the fecalith caused non-visualization of the appendix without any signs of acute appendicitis, and intriguingly, no evidence was present to suggest a fecalith.

CASE REPORT

A 25-year-old Caucasian male with past medical history of Hashimoto's thyroiditis on treatment, operated on for a right-sided inguinal hernia, a treated *Helicobacter pylori*-induced peptic ulcer, and a remote history of hypertensive episodes, presented with over a month of loose stools, occasional rectal bleeding, and bilateral lower abdominal pain not improving with bowel movement. On physical examination, the abdomen was soft, non-distended, non-tender, with no palpable masses or hepatosplenomegaly. X-ray of the abdomen showed non-obstructive bowel gas pattern, no evidence of other abnormalities, and no sign of a fecalith (Figure 1A). Laboratory tests performed during the episodes of lower abdominal pain did not reveal any signs of infection or inflammation. White blood counts were within the reference range. Stool examination and microbiology did not reveal any pathogens. Ultrasonography of the abdomen revealed a normal study. Computed tomography showed non-visualization of the appendix, a small hiatal hernia, and no bowel wall thickening or fat stranding (Figure 1B). He continued to have abdominal pain and loose stools, although the rectal bleeding had stopped. Initial work-up through colonoscopy revealed an erythematous and swollen appendiceal orifice and a submucosal necrotic appearing cecal "mass" (Figure 1C). The initial biopsy from this lesion only showed overlying inflamed cecal mucosa without submucosa or the endoscopically suspected neoplasm. A repeat biopsy targeting deeper submucosal tissue showed multiple fragments with inspissated mucin and fecalith-like material and additional pieces of focally inflamed colonic mucosa (Figure 1D). Importantly, there was no evidence of dysplasia or neoplasia in any of the biopsies. Hence, the nature of the cecal "mass" remained clinically indeterminate. The patient reported no improvement with proton-pump inhibitors and continued to experience burning and crampy lower abdomen pain which then worsened with bowel movements, along with diarrhea and night sweats. Due to the patient's remote history of hypertensive episodes, chills, loose stools, and submucosal nature of the mass, blood testing was performed for serotonin, chromogranin-A, and plasma metanephrines, the results of which ruled out a neuroendocrine process. Due to the initial colonoscopy finding of a cecal mass

with a nonspecific pathology, the patient felt anxious, and a decision was made to proceed with laparoscopic right hemicolectomy. Gross examination of the resected specimen showed a 1.8 cm lesion at appendiceal orifice with a central indentation and a mildly and diffusely distended appendix (Figure 2). Serial sectioning of the appendix showed that the entire appendix was filled with an impacted golf tee shaped fecalith (Figure 3A). No other gross abnormalities were identified. The final pathology

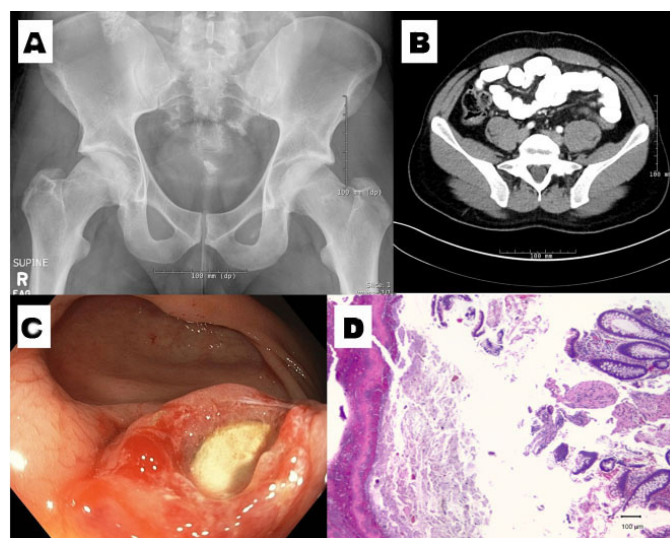


Figure 1: Radiography and colonoscopy findings: X-ray of the abdomen (A) showing no obstructive bowel gas pattern and no visualization of the fecalith; CT abdomen and pelvis with IV and oral contrast (B) showing non-visualization of the appendix; colonoscopy (C) showing erythematous swollen appendiceal orifice and a "mass-like" necrotic cecal lesion; biopsy from this mass-like lesion (D) showing inspissated mucinous/fecalith material and mildly inflamed cecal mucosa (hematoxylin and eosin stain, $\times 40$ magnification).



Figure 2: Gross pathology findings of resection: Right hemicolectomy showing 1.8 cm cecal mass-like lesion at the appendiceal orifice with a central dimple (short arrow) and mildly and diffusely distended appendix (long arrow). The entire appendix is filled with an impacted fecalith in the shape of a golf tee (inset) with the bulbous end mimicking a cecal mass.

was consistent with an impacted appendiceal fecalith (Figure 3B), mimicking a cecal mass. No microscopic evidence of appendicitis or other abnormalities were seen (Figure 3C). The patient felt greatly relieved with the benign pathological diagnosis of a fecalith and improved significantly following surgery, tolerating a general diet and having regular bowel movements. He has not had any more episodes of right lower quadrant pain in the follow-up of two years since the surgery and is overall content with the resolution of his symptoms.

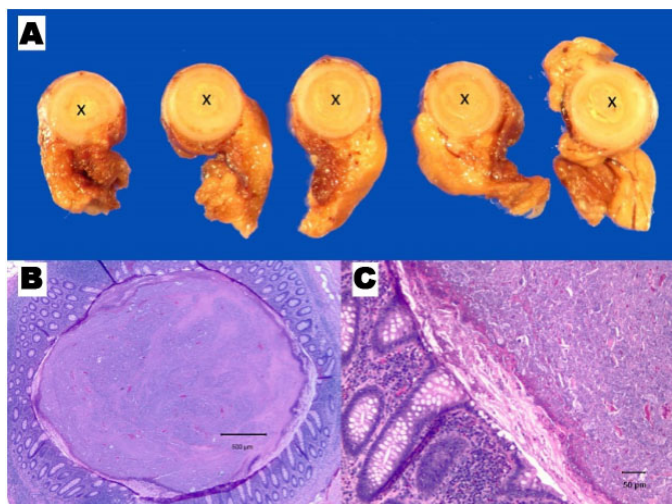


Figure 3: Gross and microscopic findings of appendix: Serially sectioned appendix (A) showing the entire length filled with luminal fecalith (marked with X). Microscopically, the impacted fecalith fills the entire lumen (B) and the mucosal lining shows no appendicitis (C) (hematoxylin and eosin stain, B $\times 20$ magnification, C $\times 100$ magnification).

DISCUSSION

Appendicitis is the most common acute abdominal emergency in the United States, with a lifetime risk of developing appendicitis estimated to be 7% [5]. Fecaliths are considered to play a key role in the pathogenesis of appendicitis [1, 3]. Fecaliths are hardened, compact, stony chunks of feces found in the intestines [3]. In the appendix, fecaliths cause obstruction of the appendiceal lumen, leading to stasis of its contents, causing bacterial overgrowth and inflammation, ultimately culminating in appendicitis [3]. Furthermore, appendicoliths significantly increase the risk of perforation, through swelling and edema by luminal obstruction causing ischemia and mucosal erosion [1]. Less common complications of appendicoliths include torsion of vermiform appendix and intussusception [3].

However, conversely, fecaliths in the appendix can also be asymptomatic, as seen in less than 3% of patients [6]. Grimes et al. reported that a fecalith can also cause chronic right iliac fossa pain without the presence of inflammation [7]. In our patient, a fecalith caused a similar presentation with chronic lower abdominal pain

without appendicitis. In their case, it was hypothesized that the fecalith caused intermittent abdominal pain through repeated cycles of temporary luminal obstruction and relief through propulsion of the fecalith when the distal appendiceal luminal pressure reached sufficient levels [7]. Though the association between the presence of radiographically identifiable fecalith and appendicitis is well documented, the presence of fecalith does not always lead to obstruction and appendicitis [2]. In addition, evidence suggests that luminal obstruction is not instrumental to the development of acute appendicitis [2, 8]. Thus, it can be inferred that appendicitis can occur without obstruction and the mere presence of fecaliths does not always lead to appendicitis. In our case, though the patient presented with chronic intermittent abdominal pain, there was no evidence to suggest that the fecalith caused any obstruction. We theorize that the lack of obstruction by the fecalith may be due to a continuous process where the fecalith started forming at the tip of the appendix and gradually extended to the proximal end, growing in the shape of a golf tee (Figure 2). The gradual and continuous nature of the appendicolith, filling the entire appendix from tip to proximal end, provided for adaptation of the tissue, leaving no means for obstruction to occur. There was also no open lumen distal to the fecalith and hence, nowhere for inspissation of mucin, bacterial overgrowth, and inflammation to occur, preventing the development of acute appendicitis. One possible explanation for the chronic abdominal pain with absence of obstruction and appendicitis could be because of the increased intra-luminal pressure caused by the accumulating fecalith, giving rise to an increase in the appendiceal wall tension.

Diagnosis of acute appendicitis based on clinical signs and symptoms has an accuracy of 70–84% as other gastrointestinal (such as Meckel diverticulitis, inflammatory bowel disease, cecal volvulus, atypical diverticulitis, etc.), urinary tract (such as renal stones, pyelonephritis, etc.), and gynecological abnormalities (ovarian torsion, ectopic pregnancy, salpingitis, etc.) can have a similar presentation [9, 10]. Misdiagnosis increases the risk of perforation, resulting in higher rates of complications, and hence a CT is usually ordered to exclude acute appendicitis [4]. Computed tomography in patients with a high suspicion for acute appendicitis has an increased diagnostic accuracy of 93–98%, making it a part of standard care in appendicitis management [4]. Some CT signs of acute appendicitis include a distended appendix (>6 mm diameter), an appendicolith, appendiceal wall enhancement, peri-appendiceal fat stranding, abscess formation, and focal cecal apical thickening [4]. However, the appendix is sometimes not visualized on CT [4, 11]. Although the visualization of normal appendix on CT has a sensitivity of only 76% [11], the incidence of appendicitis is very low in a non-visualized appendix with absence of other signs of appendicitis listed [4]. In our case, the appendix was neither visualized nor were other radiographic signs of

appendicitis present, and accordingly, our patient did not have acute appendicitis on microscopic evaluation. Interestingly, the fecalith filling the entire appendix was also not visualized on either CT or X-ray. Calcified fecaliths can be visualized on plain X-ray, whereas CT is more sensitive and can detect even non-calcified fecaliths, but only with a sensitivity of 53.1% [12]. Consequently, this elicits the need to be mindful that inability to radiographically visualize appendix and appendicoliths should not completely exclude the possibility of an appendicolith as the cause of clinical symptoms, as is verified by our case.

Lastly, a fascinating presentation of this fecalith is its resemblance to a cecal mass, near the appendiceal orifice, on colonoscopy. It is likely that the bulbous end of the golf tee shaped appendicolith mimicked a centrally necrotic submucosal cecal mass with surrounding erythema, causing the non-specific inflammation seen in biopsies. Multiple case reports have described appendicoliths resulting in appendiceal intussusception and presenting as a dimpling submucosal tumor at the appendiceal orifice [13, 14]. On that account, when dealing with an endoscopically evident submucosal appendiceal or cecal mass near the appendiceal orifice, it is also important to include fecalith sequelae in the differential diagnoses, in addition to other submucosal tumors like leiomyoma, neuroendocrine tumor, lymphoma, and gastrointestinal stromal tumor.

CONCLUSION

To our knowledge, we describe the first case of appendiceal fecalith causing chronic lower abdominal pain in the absence of radiographically identifiable obstruction and inflammation, mimicking cecal mass on endoscopy, and causing non-visualization of appendix on radiography. We bring this case to attention as it is imperative for physicians to be aware that a diagnosis of fecalith should not be excluded when encountering a cecal mass near the appendiceal orifice despite absence of radiographic signs of appendicitis, and non-visualization of appendix and of fecalith on imaging.

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Author Contributions

Sindhuja Sivanandham – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Shriram Jakate – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are

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Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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