CASE REPORT

The iatrogenic caecal polyp: can it be avoided?

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SUMMARY

A 60-year-old farmer was admitted with symptoms and signs suggestive of appendicitis. The diagnosis was confirmed at open appendicectomy where the appendix base was ligated and inverted into the caecum with a purse-string suture. Following an uneventful recovery and discharge, a barium enema identified a 2 cm filling defect in the caecal pole. A subsequent colonoscopy revealed only a tiny sessile polyp in the caecum with histology demonstrating normal colonic mucosa. This case report discusses the rare occurrence of an inverted appendix stump mimicking caecal pathology and the rationale of post-appendicectomy colonic investigation in the elderly patient.

BACKGROUND

Acute appendicitis is a common surgical emergency and in a small proportion of elderly patients may be the first presentation of an occult colonic cancer. For this reason, post-appendicectomy colonic investigation is often performed in the older patient.

Traditionally, during open appendicectomy, the base of the appendix is inverted into the caecum with a purse-string suture. This operative step can deform the caecal wall and may result in misdiagnosis of caecal pathology on post-appendicectomy imaging. Inversion of the appendix stump is not performed in laparoscopic appendicectomy.

This case is important because it highlights the rare situation where an inverted appendix stump may masquerade as a caecal polyp, necessitating a further diagnostic colonoscopy, which is invasive, and not without risk. It also highlights the disparity in practice between open and laparoscopic appendicectomy, and questions the evidence for appendix stump inversion in modern surgery.

CASE PRESENTATION

A 60-year-old farmer presented with a 2-day history of right iliac fossa pain, with one associated episode of vomiting. His abdomen was tender in the right iliac fossa with localised abdominal guarding and rebound tenderness elicited. A positive Rovsing's sign was noted, further suggesting right-sided peritoneal irritation. A low-grade fever was recorded and digital rectal examination was unremarkable.

The patient's medical history included hyperlipidaemia, reflux oesophagitis with hiatus hernia and osteoarthritis, for which he had undergone bilateral hip resurfacing arthroplasties. His regular medications included a statin, several antihypertensives and a proton pump inhibitor. Interestingly, his grandfather had died, at the age of 93 years, of a 'ruptured appendix'.

The patient was an exsmoker (40 pack-year history) who lived with his wife and drank alcohol occasionally.

There was no preceding change in bowel habit, rectal bleeding or weight loss, nor any family history of colorectal cancer.

INVESTIGATIONS

The patient's white cell count was elevated on admission at $16 \times 10^9/L$, with a C reactive protein raised at 90mn/L; haemoglobin, and liver and renal function tests were normal.

DIFFERENTIAL DIAGNOSIS

- ▶ Acute appendicitis
- ▶ Caecal tumour
- ▶ Diverticulitis with redundant sigmoid reaching into the right iliac fossa

TREATMENT

Given the short history of the symptoms, typical examination findings and supportive inflammatory markers, an open appendicectomy was performed under general anaesthetic. Intravenous antibiotics were administered in theatre and surgery was performed supine.

A transverse Lanz incision was made at McBurney's point (one-third of the way along an imaginary line connecting the anterior superior iliac spine to the umbilicus) and a muscle splitting approach taken to enter the abdomen. An acutely inflamed non-perforated appendix was identified, with no other right colonic pathology noted at operation. The appendix base was ligated with an absorbable suture, appendicectomy was performed and finally the remnant base inverted with a purse-string suture into the caecum. The abdomen was then closed sequentially in layers (peritoneum, internal oblique, external oblique, Scarpa's fascia, skin).

OUTCOME AND FOLLOW-UP

The postoperative recovery was routine and uneventful with hospital discharge occurring the following day. Given the patient's age, and as he had initially declined a colonoscopy, an outpatient barium enema was arranged 6 weeks later to image the whole of the colon and rectum to exclude an occult neoplasm.

The double contrast barium enema demonstrated a rounded filling defect in the caecal pole, about 2 cm in diameter, with features of a large caecal polyp (figures 1 and 2). No other colonic lesions were identified.

Colonoscopy was advised for further assessment and this revealed only a tiny sessile polyp in the

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Figure 1 Double contrast barium enema films demonstrating a smooth filling defect in the caecal pole.

caecum with no evidence of the large polyp previously noted on the barium enema. The appendix orifice was not seen. Histology from the polyp revealed normal colonic mucosa with no evidence of dysplasia. Histology of the appendix noted acute suppurative appendicitis.

DISCUSSION

Inversion or invagination of the appendix stump is widely performed during open appendectomy. This common operative step predates the antibiotic era. Initial aims of invagination were to control haemorrhage, reduce adhesion formation, and prevent peritoneal contamination and subsequent sepsis.¹

An early report from the preantibiotic era of surgery reports intramural caecal abscess following invagination of the appendix stump.² A later retrospective study by Sinha¹ demonstrated a higher rate of wound infection, intramural abscess and adhesions following inversion of the appendix stump. Recently, there

Figure 2 Double contrast barium enema films demonstrating a smooth filling defect in the caecal pole.

Figure 3 Endoscopic photograph depicting an inverted appendix stump. Reprinted with permission of the Society of Laparoendoscopic Surgeons.¹⁸

have been five prospective trials comparing invagination of the appendix stump with ligation or transfixion. Of these, three found no difference in complication rates with either technique.^{3–5} The largest study by Oncu *et al*⁶ reported a higher rate of adhesions requiring reoperation when the stump is invaginated, and a significantly shorter operating time when the appendix base is simply ligated. Jacobs *et al*⁷ reported a higher wound infection rate following stump invagination compared with ligation only. The literature suggests that invagination is at best equivalent to simple ligation, and may both prolong the operation and be associated with increased risk of developing postoperative complications.

The remnant inverted appendix stump may also deform the caecal wall, creating an intraluminal indentation (figure 3), which, as in our case, can mimic the true pathology, such as a caecal polyp or cancer.

Cases of an inverted appendix stump masquerading as caecal pathology have been reported with both colonoscopy and other imaging techniques such as CT virtual colonography (CTC).^{8–10} A ‘coiled spring’ appearance with non-filling of the appendiceal lumen is reported as characteristic with double contrast barium enema.¹¹ At colonoscopy, an inverted appendix stump may have the appearance of a smooth dimpled sessile polyp with the appendix orifice absent.¹² Where the possibility of caecal pathology is identified, a colonoscopy and biopsy is necessary to obtain a definitive diagnosis. This potentially unnecessary endoscopy carries with it a concomitant risk of perforation or bleeding.

In this case, the rounded smooth filling defect noted on the barium enema was not positively identified at colonoscopy. This is probably due to necrosis of the inverted appendix stump resulting in a temporary deformation of the caecal wall, which resolved by the time of colonoscopy. Necrosis does not always occur and persistent inverted appendix stump remnants found at colonoscopy are reported in the literature.¹³

The National Institute for Health and Care Excellence guidance advises offering colonoscopy to patients without major comorbidity, or a flexible sigmoidoscopy then barium enema for patients with major comorbidity, in the investigation of

suspected colonic malignancy. A CTC can be considered as an alternative if the local radiology service can demonstrate competency in this technique.¹⁴

A colonic cancer may either directly obstruct the lumen of the appendix, exert a back pressure obstruction from a more distal tumour location, or cause occlusion of the appendix lumen by adjacent tumour inflammation, resulting in appendicitis. Arnbjörnsson found the incidence of colonic cancer in patients over the age of 40 years presenting with appendicitis to be 2.9%.¹⁵ Lai reported a 38.5-fold increase in the OR of colon cancer incidence in patients over the age of 40 years with appendicitis.¹⁶ Given that the caecum is the most common tumour location presenting with appendicitis, it is surprising that more than two-thirds of cancers may be missed at appendectomy, making post-appendectomy surveillance of particular importance in the older patient.¹⁷

During laparoscopic appendectomy, the appendix base is not inverted, but is instead ligated with an extracorporeal slip-knot (endoloop) or simply stapled across. It is our view that the traditional operative step of appendix stump inversion is unnecessary, and offers no tangible benefit except in the unusual situation where the viability of the appendix base is questionable. Furthermore, this case demonstrates that, rarely, an inverted appendix stump may mimic caecal pathology, and result in further potentially harmful and invasive investigation. It is perhaps time to consign this operative step to the history books.

Learning points

- ▶ Appendicitis is an occasional presentation of occult colonic cancer.
- ▶ An inverted appendix stump following open appendectomy can mimic a caecal polyp.
- ▶ Colonoscopy is the gold standard investigation for colonic pathology.

Competing interests None declared.

Patient consent Obtained.

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