CASE REPORT

Chronic inflammation masquerading as an appendiceal tumour with peritoneal metastasis: the challenge of diagnosis and the lessons learnt

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SUMMARY

Advanced radiological imaging has largely replaced exploratory operations and has become an essential diagnostic tool clinicians routinely rely on. However, physicians are faced with a lot of radiological findings without histological proof, and assuming a more serious diagnosis may lead to unnecessary investigations and emotional stress for patients. We report an unusual presentation of chronic appendicitis with a synchronous peritoneal nodule on CT in a 76-year-old woman who presented with poor appetite, weight loss and a mass in the right iliac fossa. The coincidental finding of the nodule in addition to the suspicious appearance of the appendix raised concerns for primary appendiceal cancer with peritoneal metastasis. The case illustrates the patient's management and reflects on the learnt lessons with regard to careful use of invasive radiology-guided biopsies and interval imaging, as these could sometimes delay the diagnosis and management of a readily treatable disease.

BACKGROUND

Acute appendicitis is, by far, the most common primary condition of the appendix. However, other inflammatory (appendiceal diverticulitis, inflammatory bowel disease) and non-inflammatory (eg, neoplasia) conditions can also affect the appendix.¹ Differentiating infection from other conditions that might affect the appendix can sometimes be difficult radiologically,² leading to a diagnostic challenge. Unequivocal radiological assessments leave clinicians debating on how best to proceed with patient management. While assuming a more serious diagnosis might seem appropriate, consequent unnecessary investigations and surgical interventions could create significant trauma for patients—both physically and emotionally.

We report an unusual presentation of chronic appendicitis with a synchronous inflammatory peritoneal nodule in a 76-year-old woman presenting with poor appetite, weight loss and a mass in the right iliac fossa. The coincidental finding of a solitary peritoneal nodule with a 2 cm mass in the tip of the appendix raised the suspicion of a malignant aetiology. Despite the patient's colonoscopy and peritoneal nodule biopsies both coming back normal, there was still uncertainty about the diagnosis, and the patient ultimately had a right hemicolectomy and an excision of the peritoneal nodule. The histological assessments showed

chronic appendicitis and a benign peritoneal nodule with no signs of neoplasia.

To the best of our knowledge, this is the first case in the literature to report chronic appendicitis with a coincidental distant suspicious peritoneal nodule masquerading as appendiceal cancer with peritoneal metastasis. Besides, the diagnostic challenge this case has imposed and the important lessons learnt from it about the use of invasive radiology versus surgery make it exceptionally educational.

CASE PRESENTATION

A 76-year-old woman was referred from primary care to our surgical outpatient clinic with a 2-month history of chronic pain and fullness in the right iliac fossa associated with weight loss, poor appetite and diarrhoea. The patient denied any rigours or fever. She had previously undergone a hysterectomy to treat heavy periods but was otherwise well with no significant comorbidities.

Considering the above symptom, the patient was triaged straight into colonoscopy. The colonoscopy

Figure 1 (A and B) Axial images from the first contrast-enhanced CT show a grossly thickened appendix (*) extending to involve the caecal wall. Both are avidly hyperenhancing (white arrows). Minor pericaecal and periappendiceal fat 'stranding'/oedema. No abscess or free fluid seen on this CT. (A) In the left iliac fossa there is a rounded soft tissue lesion on the anterior peritoneum (long white arrow). Diagnosis of peritoneal metastasis from a pericaecal/appendiceal tumour is suggested.

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Figure 2 (A and B) Second CT after a 3-month interval shows the peritoneal nodule (large white arrow) has increased in size (from 1.3 to 2 cm) during the interval. (B) Appendix (*) and caecal changes persist with minimal change from the initial scan.

was aborted due to excessive pain encountered during the procedure and the patient was scheduled to have a CT colonography. The scan showed a prominent appendix with a 2 cm mass at its tip in addition to a peritoneal deposit on the left side of the abdomen. The appearance was suggestive of either an inflammatory process or a malignant aetiology in keeping with a peritoneal malignancy probably of an appendiceal origin. Therefore, a CT scan of the thorax, abdomen and pelvis was performed, which confirmed the CT colonography findings and showed no evidence of any lymph nodes or distant metastases (figure 1).

The case was discussed in the gastrointestinal multidisciplinary team (MDT) meeting, which decided to arrange an image-guided core biopsy of the peritoneal nodule and reattempt a colonoscopy to help establish the diagnosis. The peritoneal nodule CT-guided biopsies showed a benign peritoneum only, with no suspicious features. Similarly, the colonoscopy revealed no

abnormality at the caecum, nor at the appendiceal orifice, with normal biopsies from the area.

Clinically, the patient continued to be symptomatic despite treatment with antibiotics. A repeat CT scan (3 months from the initial CT scan) showed progressive abnormality at the caecal pole and within the appendix, and an increase in the size of the peritoneal nodule (figure 2). A surgical resection of the diseased bowel was planned to provide symptomatic relief as well as to obtain a definitive diagnosis. The patient underwent a right hemicolectomy and an excision of the peritoneal nodule.

OUTCOME AND FOLLOW-UP

At gross assessment of the right colon specimen, malignancy was one of the differentials alongside others, including inflammation, carcinoid and lymphoma (figure 3). However, the microscopic assessment revealed only an appendiceal abscess with surrounding inflammatory changes with no evidence of neoplasia (figure 4). The excision biopsy of the peritoneal nodule also confirmed a benign normal peritoneum. The patient had a good postoperative recovery, and remained well and symptom-free at 3-month postoperative follow-up.

DISCUSSION

Appendicitis is the most common general surgical emergency with an estimated lifetime risk of 7–8%.³ The accurate diagnosis of appendicitis can sometimes be challenging, with no current agreement on an individual diagnostic approach that provides adequate sensitivity and specificity.⁴

In adult patients, CT has become the most widely accepted accurate imaging strategy with sensitivity reaching 98%.⁵ In the USA, its wide use (86% of patients) has reduced the normal appendicectomy rate to 6%, in comparison with 20% in the UK, where CT scan is only used selectively.⁶

In the reported case, the patient's CT scan was inconclusive with regard to the nature of the appendiceal mass (inflammatory vs malignant), particularly in the presence of a peritoneal nodule in the left abdomen. Although positron emission tomography (PET) has significantly improved the sensitivity and specificity of detecting malignant diseases, it was not thought to be helpful in this case as both inflammatory and malignant tissues

Figure 3 (A–E) Shows thickened infiltrated wall of caecum obliterating appendix origin, with mucosal sparing. Note residual distal appendix in A and B (red arrow). Differentials include: carcinoma, carcinoid, lymphoma, inflammation and metastases.

Figure 4 Histology shows abscess in caecal wall and attached fat centred on the site of the proximal appendix, which is obliterated by the inflammation.

were F18-fluorodeoxyglucose (FDG) avid and PET scan would not help direct the diagnosis either way.⁷

Historically, patients with suspected peritoneal disease would have had an exploratory laparotomy or laparoscopy to gain diagnosis. These procedures have the advantage of providing surgical biopsy specimen and direct visualisation of the peritoneal disease in addition to the potential primary tumour. However, image-guided core biopsies of suspicious abdominal lesions have replaced a lot of these procedures in modern medicine.⁸ Evidence has shown them to be relatively safe, well-tolerated and effective interventions that allow establishing diagnosis and help in planning surgical and/or systemic therapy.⁹

In our case, despite the normal peritoneal nodule biopsies and colonoscopy, there was still uncertainty about the patient's diagnosis, and the need for definitive diagnosis via surgical intervention was definite. Arguably, an early laparoscopy in this patient might have allowed us to assess the burden of the peritoneal disease in view of the poor prediction of CT scan for small peritoneal nodules <0.7 cm.¹⁰ It would also have allowed the obtaining of an excisional biopsy of the peritoneal nodule to proceed with performing an appendicectomy ± a right hemicolectomy if this was felt to be needed. This would have potentially shortened the clinical course for our patient and the uncertainty of the diagnosis with its impact on the patient.

With invasive radiology becoming more available, it is feared that favouritism towards using this less-traumatic approach, in contrast to open surgery/biopsy, could sometimes unnecessarily prolong the clinical course where a readily treatable disease would likely need an operation anyway, and the extra information gained from the image-guided biopsy is unlikely to change the sequence of interventions or to provide data that are essential preoperatively.

Clearly, image-guided core biopsies of the peritoneum still have a great role to play, particularly where the 'primary cancer'

is unknown, or where the images are suggestive of a widespread peritoneal disease beyond the scope of primary cytoreductive surgery, and where histological assessment would help confirm the diagnosis and direct systemic therapies (eg, palliative chemotherapy).⁹

Learning points

- ▶ Percutaneous biopsies only sample a small part of the lesion and when they reveal a benign histology this cannot always be trusted to represent the true nature of the lesion as a whole. Therefore consideration should be made for diagnostic laparoscopic, which allows visualising the peritoneal cavity and performing excision biopsy of the suspicious nodule.
- ▶ Peritoneal nodules do not always represent cancer and thus we should not dismiss peritoneal metastases cases as these could simply be inflammatory. Histological assessment of the nodules is warranted to confirm diagnosis.
- ▶ Interval imaging is important to follow indeterminate lesions but should be cautiously used. As in this case, interval imaging can reveal interval size increases if the inflammatory process continues, and may delay the inevitable need for surgery.
- ▶ CT findings suggestive of appendicitis should trigger prompt assessment of the colon, particularly in clinically suspicious cases, if conservative treatment was followed, as the findings might be secondary to inconspicuous cancer.

Contributors MQA conceptualised the idea and wrote the first draft. AC provided the radiological images and reviewed the manuscript. JK provided the histopathological images and reviewed the manuscript. CM conceptualised the idea and reviewed the manuscript.

Competing interests None declared.

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REFERENCES

- 1 Heller MT, Hattoum A. Imaging of acute right lower quadrant abdominal pain: differential diagnoses beyond appendicitis. *Emerg Radiol* 2012;19:61–73.
- 2 Collins GB, Tan TJ, Gifford J, *et al*. The accuracy of pre-appendectomy computed tomography with histopathological correlation: a clinical audit, case discussion and evaluation of the literature. *Emerg Radiol* 2014;21:589–95.
- 3 Stewart B, Khanduri P, McCord C, *et al*. Global disease burden of conditions requiring emergency surgery. *Br J Surg* 2014;101:e9–22.
- 4 Craig S, Dalton S. Diagnosing appendicitis: what works, what does not and where to from here? *J Paediatr Child Health* 2015.
- 5 Pickhardt PJ, Lawrence EM, Pooler BD, *et al*. Diagnostic performance of multidetector computed tomography for suspected acute appendicitis. *Ann Intern Med* 2011;154:789–96, W-291.
- 6 Bhangu A, Søreide K, Di Saverio S, *et al*. Acute appendicitis: modern understanding of pathogenesis, diagnosis, and management. *Lancet* 2015;386:1278–87.
- 7 Beadsmoore C, Newman D, MacIver D, *et al*. Positron emission tomography computed tomography: a guide for the general radiologist. *Can Assoc Radiol J* 2015;66:332–47.
- 8 Sainani NI, Arellano RS, Shyn PB, *et al*. The challenging image-guided abdominal mass biopsy: established and emerging techniques 'if you can see it, you can biopsy it'. *Abdom Imaging* 2013;38:672–96.
- 9 Spencer JA, Weston MJ, Saidi SA, *et al*. Clinical utility of image-guided peritoneal and omental biopsy. *Nat Rev Clin Oncol* 2010;7:623–31.
- 10 Rose PG, Faulhaber P, Miraldi F, *et al*. Positive emission tomography for evaluating a complete clinical response in patients with ovarian or peritoneal carcinoma: correlation with second-look laparotomy. *Gynecol Oncol* 2001;82:17–21.

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