CASE REPORT

Prostate cancer with an unusual metastatic affinity for the appendix, inducing acute appendicitis

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SUMMARY

Acute appendicitis induced by metastatic disease is uncommon. We present the case of an 82-year-old man with known bony metastases secondary to prostatic cancer who presents with a short history of acute abdominal pain. A CT scan was indicative of acute appendicitis and the patient underwent a laparoscopic appendectomy; a phlegmonous mass seen intraoperatively was suspicious for malignancy, and histopathology confirmed acute appendicitis as well as metastases of prostate cancer. Metastatic disease should be considered as an important differential in all patients with a known history of malignancy, as this may in turn complicate their presenting surgical complaint.

BACKGROUND

Acute appendicitis is the most common affliction of the appendix, which usually occurs secondary to obstruction of the lumen by a faecolith, calculi or lymphoid hyperplasia. Tumours of the appendix are much rarer, accounting for <1% of all malignancies.¹ Metastatic disease to the appendix is even more infrequent and to the best of our knowledge, only seven cases of prostatic metastases to the appendix have been reported worldwide to date.^{2–8} In this Australian case, we present a patient found to have an appendicular tumour with prostatic deposits who initially presented with signs and symptoms of acute appendicitis.

CASE PRESENTATION

An 82-year-old man presented with a 3-day history of colicky right lower quadrant abdominal pain that later became constant in nature. It was exacerbated

Figure 2 Tip of the appendix sitting in the right iliac fossa, exhibiting acute appendicitis.

by palpation and movement, however there were no other associated symptoms. On examination, the patient had localised tenderness in the right iliac fossa. The patient was known to have prostate cancer which was diagnosed in 2004, with nodal involvement and possible extension into seminal vesicles (T3c bilateral adenocarcinoma; Gleason score 9). He subsequently underwent external beam radiotherapy, high-dose rate brachytherapy and hormonal therapy at the time for locally invasive disease. Metastatic disease to the bones was identified in 2009 and the patient was subsequently maintained on Goserelin implants. The patient also had a history of multiple other malignancies including lung adenocarcinoma, squamous cell carcinoma and basal cell carcinoma.

INVESTIGATIONS

Blood tests did not show any evidence of leucocytosis; however, the C reactive protein level was 130 (normal value <5 mg/L), indicating an inflammatory process.⁹ He also exhibited chronic normocytic anaemia with a haemoglobin of 100 (normal range 135–180 g/L) and chronic renal failure with creatinine 232 (normal range 60–110 μmol/L). A prostate-specific antigen (PSA) level was not checked perioperatively. In light of the chronic renal failure, a computed tomography (CT) scan of the abdomen without contrast was performed for further investigation. A blind ending tubular structure originating from the caecum was identified, which appeared dilated with a diameter of 14 mm at the tip, associated with extensive inflammatory stranding in keeping with acute appendicitis; there

Figure 1 Appendiceal phlegmonous mass suspicious for malignancy.

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Figure 3 Stapled margin postremoval of appendix.

was also evidence of multiple sclerotic metastases within the vertebral column and pelvic bones, but no peritoneal metastases.

TREATMENT

A diagnostic laparoscopy was performed and intraoperative findings included an appendiceal phlegmonous mass adherent to loop of small bowel and the appendiceal epiploica of the sigmoid colon, that was suspicious for malignancy (figure 1).

With a combination of various techniques, the mass was dissected off adjacent structures (figure 2) and the appendix was removed using staples across the base (figure 3) with a pelvic drain left in situ.

Histopathological examination revealed signs of transmural acute inflammation, mucosal ulceration and fibrinopurulent exudate (figure 4). No faecolith was identified. In addition to the features of acute suppurative appendicitis, the tip of the appendix exhibited malignant glands that were mainly centred on the mesoappendix but extended to involve the submucosa (figure 5). Staining was positive for PSA and prostate-specific acid phosphatase (PSAP) (figure 6), while it was negative for chromogranin A, cyto-keratin (CK) 7, CK20, CDX2 and CD56, in keeping with metastatic prostatic adenocarcinoma.

Figure 4 Section showing fibrin and inflammatory cells, suggestive of ulcerative acute suppurative appendicitis.

Figure 5 Prostate adenocarcinoma infiltrating the periappendiceal fat, with normal appendiceal mucosa at the inferior edge.

OUTCOME AND FOLLOW-UP

The patient was subsequently discharged on oral antibiotics on day five of admission, and he had ongoing review by his private oncologist, although the management plan was not altered given he already had incurable disease. The patient died approximately 2 years post discharge, with squamous cell carcinoma with metastases listed as the primary diagnosis and other contributory causes including prostate carcinoma, ischaemic heart disease, chronic obstructive pulmonary disease and chronic kidney disease.

DISCUSSION

Acute appendicitis secondary to obstruction of the lumen from a faecolith is a common clinical entity, accounting for a large proportion of abdominal surgeries. The lifetime risk of appendicitis ranges from 6.9% to 8.6% in women and men, respectively.¹⁰ Luminal obstruction then precipitates mucin production leading to increased intraluminal pressure and subsequently causing venous outflow obstruction, mucosal oedema, wall

Figure 6 PSA immunohistochemical stain showing strong, diffuse positivity in the tumour cells, confirming prostatic origin of the appendiceal malignant deposit. PSA, prostate-specific antigen.

ulceration and bacteria migration. Secondary arterial occlusion leads to appendiceal wall infarction and gangrene.¹¹

Malignancy of the appendix, however, is much rarer. In a retrospective clinicopathological analysis of nearly 8000 appendectomies over a 16-year period, the incidence of incidentally diagnosed malignancy was only 0.9%.¹² Carcinoids are the most common accounting for more than 50% of cases, with cystadenocarcinoma, adenocarcinoma, adenocarcinoid, signet ring, lymphoma, paragangliomas and mucinous carcinomas also noted. In this analysis, less than 15% of all appendiceal tumours were secondary to metastatic disease, none of which were identified as originating from the prostate.

Prostate cancer, however, is the most common male cancer diagnosed in Australia with one in seven men being diagnosed before the age of 85 and almost 17 000 new cases in 2017. The 5-year survival rate for those with localised disease is up to 95%,¹³ and increased screening and surveillance has led to earlier detection and treatment of the disease. Prostate cancer is known to commonly metastasise to lymph nodes, bones, lung, brain, liver and adrenal glands,¹⁴ yet metastatic disease to the appendix has only been reported in seven cases worldwide.^{2–8}

In six out of the seven published case reports, there was no macroscopic evidence of malignancy intraoperatively, and as such a routine appendectomy was performed with diagnosis made by means of histopathology. Infection and malignancy can exist together (figures 4 and 5); in this case, we hypothesise that there was luminal obstruction by the metastatic prostate deposit which subsequently led to acute infection. Cancers have characteristic staining patterns with cells expressing varying tumour markers. As in our case, immunohistopathology positivity for PSA suggested the diagnosis of metastatic prostatic adenocarcinoma (figure 6), while negativity for chromogranin A, synaptophysin and neuron-specific enolase (NSE) excluded possible adenocarcinoma or carcinoid tumours.¹⁵

This is an Australian report of a patient with acute appendicitis secondary to prostatic cancer metastases, where a suspicious

malignant lesion was also identified during the operation. As our patient had complicated appendicitis with a phlegmonous mass, he subsequently underwent an appendectomy with staples at the base, as literature suggests, in order to obtain a complete resection of the affected tissue.^{16 17}

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Learning points

- Metastatic prostate cancer to the appendix leading to appendicitis is rare.
- As cancer detection rates and treatment improves, so too does the survival rate of patients.
- In patients with a history of malignancy, we must be conscious of the fact they may have metastatic disease at the time they present to the surgical department.
- If suspected intraoperatively, we must consider removing all affected tissue as we may see a surge of metastatic disease-related surgical issues, such as acute appendicitis, in the future.

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