CASE REPORT

Actinomycosis of the omentum with invasion of the abdominal wall, small bowel and transverse colon mimicking malignancy

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SUMMARY

We report the case of a 59-year-old Russian man who presented with a painless, slow-growing, epigastric mass. CT revealed a large heterogeneous mass within the omentum infiltrating into adjacent tissues. During diagnostic laparoscopy, the omental mass was noted to be firm, raising the suspicion of malignancy. Surgical en-bloc resection of the mass, including the posterior rectus sheath, transverse colon and small bowel, was performed with primary anastomoses at laparotomy. Histological examination was inconsistent with malignancy and revealed the mass to be actinomycosis, confirmed by microscopy and gram staining. Surgical resection was followed by an 8-week course of penicillin and doxycycline antibiotic therapy. This treatment resulted in full clinical and radiological recovery with no complications. Although the clinical and radiological findings, in this case, were highly suspicious of malignancy, abdominal actinomycosis should be considered a differential diagnosis in patients with infiltrative abdominal masses and mild constitutional symptoms.

BACKGROUND

Abdominal actinomycosis is frequently misdiagnosed due to its rarity, non-specific and variable symptoms, and ability to clinically and radiologically mimic other inflammatory conditions and malignancy. Due to this diagnostic uncertainty, the interim period between presentation and definitive diagnosis will commonly be psychologically distressing for patients. A high level of clinical suspicion is needed for early diagnosis and to prevent delays in treatment. Abdominal actinomycosis should be considered a differential diagnosis in patients with infiltrative abdominal masses and mild constitutional symptoms.

CASE PRESENTATION

A 59-year-old Russian man presented to the general surgery on-call team referred by his GP with a painless, slow-growing abdominal mass in the epigastrium. He denied any features of weight loss, fever or changes in bowel habit. A more detailed history revealed that he first noticed the mass 3 months earlier.

The patient's medical history included high blood pressure and osteoarthritis. There was no previous history of dental disease or treatment, surgery, smoking, immunocompromised or abdominal pathology and he took no regular medications. He was a lecturer in maths and married with two children.

On examination, the patient generally appeared well. Vital signs were within normal limits, and he was afebrile. He had a palpable mass in the epigastric region which was non-tender. The mass was approximately 6 cm × 3 cm in size.

INVESTIGATIONS

Laboratory investigations showed minimally elevated inflammatory markers (white blood cells $6.7 \times 10^9/L$, C reactive protein 11 mg/L and erythrocyte sedimentation rate 22 mm/h).

A CT scan of the thorax, abdomen and pelvis with contrast revealed a large 6.1 cm × 3.2 cm × 4.4 cm heterogeneous mass within the omentum of the left upper quadrant (figure 1). The lesion had extensive inflammatory changes in the surrounding fat tracking to the mesenteric border of the transverse colon, anterior abdominal wall and was intimately related to adjacent small bowel loops. Fat was enfolded within the mass and there were two small foci of calcification.

Urgent outpatient colonoscopy was performed only revealing mild sigmoid diverticulosis and a 1 mm benign sessile polyp in the lower rectum.

DIFFERENTIAL DIAGNOSIS

At this stage, considering the patient's medical history and investigations, the differential diagnosis was wide and included omental infarction, peritoneal deposit, foreign body reaction, lymphoma and tuberculosis (TB). Intra-abdominal malignancy was the most likely diagnosis.

TREATMENT

A multidisciplinary meeting recommended an expedited diagnostic laparoscopy to diagnose and excise this bulky, symptomatic lesion. An R0 resection was feasible based on a multidisciplinary review of the preoperative imaging. A bulky, infiltrative omental mass was identified in the left upper quadrant, which was adherent to the posterior rectus sheath drawing in transverse colon and small bowel. The operation was converted to laparotomy, and en-bloc dissection of the mass was performed, including the posterior rectus sheath, 10 cm of the transverse colon and 10 cm of the small bowel. A colo-colo end-to-end hand-sewn anastomosis was carried out in addition to a side-to-side stapled small bowel anastomosis.

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Figure 1 CT scan in the portal venous phase of the abdomen in coronal section showing a 6.1 cm×3.2 cm×4.4 cm heterogeneous mass within the omentum of the left upper quadrant with extensive inflammatory changes in surrounding fat tracking to the mesenteric border of the transverse colon, anterior abdominal wall and intimately related to adjacent small bowel loops.

Following the procedure, the patient recovered well with no complications. The patient was informed that clinically this appeared to be a malignancy of unknown primary, causing anxiety for both the patient and his wife.

The specimen was sent for histopathology. Macroscopic examination revealed a hard omental mass. Sectioning of the mass revealed an abscess with multiple locules. Histological examination confirmed the macroscopic appearance of interconnecting abscesses associated with colonies of filamentous organisms which were gram-positive. These findings were interpreted as those of intra-abdominal abscess formation secondary to *Actinomyces* species (figures 2 and 3).

Following histopathological diagnosis, the microbiology team advised treatment with an 8-week course of amoxicillin 1g,

Figure 2 Mesenteric abscess associated with filamentous organisms (H&E ×4).

Figure 3 Positive Gram stain (×20).

three times a day and doxycycline, 100 mg two times a day as an outpatient.

OUTCOME AND FOLLOW-UP

A repeat CT at 8 weeks showed complete resolution with no evidence of recurrence. Outpatient follow-up at 8 weeks revealed symptoms had completely resolved and antibiotics were discontinued. The combined surgical and antimicrobial therapy had led to complete recovery.

DISCUSSION

Actinomycosis is an uncommon chronic, slowly progressive bacterial infection characterised by purulent, granulomatous inflammation and contiguous spread.¹ *Actinomyces* are filamentous, gram-positive, anaerobic bacteria that are commensal inhabitants of the oral cavity, upper respiratory and gastrointestinal tracts.²

Actinomyces israelii is the most commonly encountered species in human disease.² The main site of infection is the cervicofacial area (50%), followed by the abdominopelvic (20%) and the thoracic (15%). In abdominal actinomycosis, the ileocaecal region is the most common site.³ Actinomycosis is rare, with a reported annual incidence of 1/300 000. Infection most commonly occurs in 20 to 60 year olds. Men are predominately affected over women, in a ratio of 3:1.²⁻⁴

Actinomyces have low virulence, requiring disruption in mucosal barriers or immunosuppression to cause disease. Consequently, predisposing factors for the abdominal disease include malignancy, intrauterine contraceptive devices and foreign bodies or abdominal trauma, inflammation, surgery or perforation. Actinomycosis typically causes the formation of multiple abscesses, fistula or inflammatory masses. The patient in this case presented had no obvious predisposing factors.³

Actinomycosis is a complicated disease to diagnose preoperatively, and the diagnosis is made before surgery in <10% of all cases.⁵ Clinical findings are variable, and patients often present with non-specific abdominal and constitutional symptoms, which may depend on the tissues involved.

In a patient presenting with an abdominal mass, the differential diagnosis is wide and includes omental infarction, peritoneal deposit, foreign body reaction, lymphoma, TB and malignancy. Laboratory, endoscopic and radiological investigations are not diagnostic and are unable to distinguish actinomycosis from other inflammatory and neoplastic pathologies.^{6,7}

Abdominal CT scans are the most useful imaging modality, revealing the content of lesions and the site and extent of disease. Infiltrative masses should raise suspicions of actinomycosis, particularly in patients with mild constitutional symptoms. Additionally, CT imaging is used for both planning surgery and monitoring treatment response radiologically.^{3,7}

Diagnosis is based on either (1) histopathological identification of sulfur granules or gram-positive filamentous organisms, or (2) isolation of *Actinomyces* species in microbiological culture from specimens. Although bacteriological culture is more specific for diagnosis, samples can take 2–4 weeks to develop under the strict anaerobic conditions needed, and detection is often inconclusive with negative culture rates above 75%. Histological identification of sulfur granules although supportive of diagnosis are not pathognomonic, as they are seen in other infections including nocardiosis, *Streptomyces* and chromomycosis.^{1,3}

Surgical resection is frequently performed prior to the consideration of sole antimicrobial therapy, as actinomycosis is uncommonly diagnosed preoperatively. Where diagnosis has been established, surgery is generally reserved for bulky lesions. The combination of surgery and antimicrobial therapy leads to a complete recovery in 90% of cases.⁸

No clear standards currently exist for the antimicrobial regimen, dosage or duration. The traditional antimicrobial approach of 4–6 weeks of intravenous penicillin G (10–20 million units daily) followed by 6–12 months of oral penicillin or amoxicillin (2–4 g/day) may not be necessary for all individuals.⁸ Recent case reports and studies have demonstrated success using a modern approach, tailoring duration of the antimicrobial course to the site of infection, individual disease burden and close monitoring of the clinical and radiological response to treatment.⁹

Where penicillin allergy is present, tetracycline, erythromycin and clindamycin are appropriate alternatives. Dual-antibiotic therapy may be used in cases as other organisms such as *Aggregatibacter actinomycetemcomitans* can accompany *Actinomyces* which are sensitive to tetracyclines but not penicillins.¹⁰

In the case presented, surgical resection was performed initially as malignancy was suspected. A shorter 8-week course of oral antibiotics, doxycycline and penicillin, lead to complete resolution.

Patient's perspective

I physically felt the existence of something in my abdomen, but other than that my health was fine. I was scared at the beginning because it was unclear what it was. The operation went well and recovery was not very difficult. The news from the biopsy came as a big relief. In any case, I am happy and healthy now and can carry on with my normal life.

Learning points

- Abdominal actinomycosis is frequently misdiagnosed as it clinically and radiologically mimics other inflammatory conditions and malignancy. A high level of clinical suspicion is needed for early diagnosis and treatment due to its rarity.
- The interim period between presentation and definitive diagnosis will commonly be psychologically distressing for patients.
- Abdominal actinomycosis should be considered a differential diagnosis in patients with infiltrative abdominal masses and mild constitutional symptoms.
- Antimicrobial therapy duration can be tailored to the individual disease burden and close monitoring of the response to treatment.

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