

CASE REPORT

Another mistaken case of appendicitis

Nidhin Laji,¹ Richard Bowyer,² Dakshika Jeyaratnam,³ Mark Zuckerman⁴¹GKT School of Medical Education, King's College London, London, UK²Department of General Surgery, Western Sussex Hospitals NHS Foundation Trust, Chichester, West Sussex, UK³Department of Medical Microbiology, King's College Hospital NHS Foundation Trust, London, UK⁴South London Specialist Virology Centre, King's College Hospital NHS Foundation Trust, London, UK**Correspondence to**Nidhin Laji,
nidhin.laji@kcl.ac.uk

Accepted 12 October 2015

SUMMARY

In 2010, when I was 17, I presented to hospital with progressive discomfort and pain in the right iliac fossa when eating and moving, associated with mild fever and diarrhoea. Appendicitis was suspected but immediate surgery was deferred, as the inflammatory markers did not adequately support the clinical diagnosis of appendicitis. Further tests, including MRI, were then undertaken. The MRI showed evidence of terminal ileitis and a normal appendix. Crohn's disease was considered as part of the differential diagnosis. However, a *Yersinia enterocolitica* infection was subsequently confirmed. The episode highlighted several learning points including preventing unnecessary surgery and the advantages of using a multidisciplinary approach involving imaging the abdomen and microbiological input.

BACKGROUND

Appendicitis in children and young adults is notoriously difficult to diagnose, especially when symptoms are ambiguous. Many normal appendixes are removed from children with abdominal pain since it is the most common diagnosis in these age groups.¹ *Yersinia enterocolitica* is a Gram-negative bacterium that is acquired by ingesting contaminated food or water, and, less commonly, from contact with infected blood. It can cause terminal ileitis and mesenteric adenitis, both of which can be diagnostically confused with appendicitis.² Although the infection can be relatively mild, it can cause complications including severe invasive infection, liver and spleen abscesses, and reactive arthritis. Therefore, early identification and treatment is important. The reported episode highlighted several learning points including the need to prevent unnecessary surgery and possible morbidity; the use of imaging, which is not often carried out in this clinical setting, can lead to a pragmatic decision to avoid surgical exploration; and that the differential diagnosis of terminal ileitis and mesenteric adenitis is extensive and includes infections as well as Crohn's disease. In this case, collaboration with the radiology and microbiology services led to appropriate diagnostic tests, which further led to the eventual diagnosis of *Yersinia* infection, avoiding surgery and investigations for inflammatory bowel disease (IBD).

CASE PRESENTATION

Having not suffered from any related illness prior to this episode and with no family history of bowel disease, I was admitted to hospital with progressive discomfort and pain in the right iliac fossa when eating and moving, associated with mild fever and diarrhoea. There was slight tenderness in the right

iliac fossa on deep palpation. Although my general practitioner considered appendicitis as a possibility, I did not require hospital admission immediately. Over the next 2 days, I was told to rest and was given paracetamol for the constant pain. As the pain persisted, I was admitted to the hospital for further investigations.

INVESTIGATIONS

On admission to hospital, I was reviewed by two surgeons who thought the diagnosis could have been appendicitis. It was therefore decided that I should undergo exploratory surgery. However, my blood tests revealed that the only abnormality was a slightly raised C reactive protein of 30 mg/L (normal range <10) and white cell count was $8.5 \times 10^9/L$ (normal range 4–11). On this basis, it was decided that I should be monitored overnight.

An ultrasound scan showed some mesenteric lymphadenopathy with no classical signs of appendicitis, and MRI showed evidence of inflammation of the distal ileum, but no evidence of appendicitis. This averted surgery, but raised the possibility of a diagnosis of IBD. As part of the differential diagnosis of terminal ileitis, a faecal sample for ova, cysts, parasites and bacterial culture, was collected, together with a serological test for *Yersinia* antibody. *Yersinia enterocolitica* (serotype O3, biotype 4) was isolated from the faecal sample and a significant antibody titre of 1:640 to *Y. enterocolitica* O3 was detected in paired sera. Endoscopy and barium meals were deferred pending further clinical evaluation.

DIFFERENTIAL DIAGNOSIS

Mesenteric adenitis and terminal ileitis can be due to inflammation, infection or malignancy. Inflammatory conditions include IBDs such as Crohn's disease and ulcerative colitis; appendicitis; and connective tissue diseases such as reactive arthritis and vasculitides. Possible infections include *Salmonella* spp, *Staphylococcus* spp, *Streptococcus* spp, *Y. enterocolitica*, *Mycobacterium tuberculosis*, *Clostridium difficile*, *Tropheryma whipplei*, *Actinomyces* spp, rotavirus, norovirus, adenovirus and HIV.

TREATMENT

I was placed nil by mouth and given intravenous fluids in preparation for exploratory surgery. I continued to be monitored after imaging excluded appendicitis. Antibiotic treatment had not been started as I had improved overnight.



To cite: Laji N, Bowyer R, Jeyaratnam D, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2015-211861

OUTCOME AND FOLLOW-UP

The symptoms improved overnight and completely resolved over the next 10 days. A week after admission, the bacterial culture results from the faecal sample confirmed a *Y. enterocolitica* infection.

DISCUSSION

Appendicitis is the most common diagnosis in an adolescent with abdominal tenderness at McBurney's point. However, it has been reported that the majority of appendicitis presentations are atypical and are directly related to the varying position and size of the appendix in both genders.³ Furthermore, extremes of age may present with disparate symptoms.³ Although ultrasound and CT scans have been shown to be useful for determining anatomical variation and establishing a diagnosis in such patients, these investigations are not often carried out in this clinical setting in the UK.^{4 5}

In my case, the imaging investigations excluded appendicitis and prevented unnecessary surgery. Having demonstrated the presence of terminal ileitis, the clinical team then considered the differential diagnoses. Bacterial serology and faecal culture, using special media, led to a diagnosis of a *Y. enterocolitica* infection.

Y. enterocolitica infections are associated with a wide variety of clinical manifestations including self-limiting diarrhoea in young children, and terminal ileitis and mesenteric adenitis in older children and adults. *Y. enterocolitica* was cultured in one study⁶ from appendixes removed from patients diagnosed with appendicitis at a rate higher than that from faecal specimens from patients with diarrhoea, demonstrating that *Y. enterocolitica* infections can cause pseudoappendicitis. In another study of 205 patients with acute abdominal disease referred to hospital with abdominal pain suggestive of appendicitis, *Y. enterocolitica* biotype 4 was grown from the faeces of eight patients and the appendixes of nine others.⁷ Five further patients had *Yersinia* antibody titres indicative of yersiniosis.

Imaging investigations are often not instigated in this clinical setting for cost reasons, resulting in a clinical decision to carry out exploratory surgery. However, there is evidence that mandatory imaging can significantly reduce normal appendectomy

rates.⁴ It has been reported that 1 in 10 CT scans used to evaluate suspected appendicitis may avoid unnecessary intra-abdominal surgery.⁸ A comparison of the cost of out of hours imaging with that incurred for a surgical procedure and inpatient admission is needed. Ionising radiation involved in CT scan and MRI may incur unnecessary risk in children and young adults.⁹ However, other non-ionising modalities, such as contrast-enhanced MRI and ultrasound scan, have also been shown to be of high diagnostic value.⁵ A recent study reported that routine use of ultrasonography is the most effective way to reduce normal appendectomy rates, and improvements can be made by selective use of ultrasound combined with use of the Paediatric Appendicitis Score.¹⁰

In summary, multidisciplinary collaboration with imaging and microbiology services was key to establishing the final diagnosis in this case.

Learning points

- ▶ The symptoms of right iliac fossa pain and tenderness could be due to a number of causes, the commonest being appendicitis.
- ▶ It is important to consider the differential diagnosis of mesenteric adenitis and ileitis in this clinical setting.
- ▶ Imaging is rarely undertaken in suspected appendicitis and may be useful in avoiding unnecessary surgical intervention.
- ▶ Multidisciplinary collaboration with imaging and microbiology services was key to establishing the final diagnosis.

Contributors NL was the patient in this case, he acquired the relevant patient records and wrote the first draft of the case report. RB and MZ provided critical analysis and review on the manuscript. RB was also involved in the clinical decision-making.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Patient's perspective

As an aspiring medical student at 17, I appreciated that this episode was a good, be it limited, insight into what it is like to be a patient facing diagnostic uncertainty and just how unsettling it is to be in that situation. It also showed me how resource allocation in a healthcare environment influences clinical decision-making. Although the immediacy of surgical intervention was averted by imaging, my family and I had to reconcile the spectre of a potentially life changing diagnosis of Crohn's disease. I witnessed how further collaboration with microbiology services helped establish the final diagnosis to my relief. Overall, this experience highlighted how multidisciplinary collaboration can enhance patient care and it will influence my practice in the future. A few years of medical school have made me realise just how important this experience was. Looking back, I feel incredibly lucky to have avoided the morbidity associated with surgery.

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