CASE REPORT

Concurrent presentation of appendicitis and acute cholecystitis: diagnosis of rare occurrence

Jamish Gandhi,¹ Jeffrey Tan²

¹Department of General Surgery and Gynaecology, Hutt Hospital, Lower Hutt, New Zealand
²Waikato Hospital, Hamilton, New Zealand

Correspondence to
 Dr Jamish Gandhi,
 j.gandhi@xtra.co.nz

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SUMMARY

A 67-year-old woman presented with a 2-day history of central abdominal pain migrating to the right upper and lower abdomen. On examination she was normothermic but tachycardic. Inflammatory markers were noted to be elevated with a white cell count of $18.5 \times 10^9/L$ and C reactive protein of 265 mg/L. A CT scan revealed dual pathology of appendicitis and acute cholecystitis, which was confirmed intraoperatively and histologically.

associated gallbladder mucocoele. The gallbladder wall was thickened at 8 mm, consistent with acute cholecystitis (figure 2). There were no abscess or fluid collections seen in the abdomen.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis was of appendicitis or acute cholecystitis occurring as a single entity.

BACKGROUND

This case is unusual in that two different acute pathologies occurred synchronously. This is uncommon and is important to be aware of the possibility so appropriate and timely management can be undertaken.

CASE PRESENTATION

A 67-year-old woman presented with a 2-day history of central abdominal pain which subsequently migrated to the right upper and lower quadrants. The pain increased on movement. It was not related to food. She had associated nausea, anorexia and her bowel habit was unchanged. She denied any history of jaundice or previous episodes of pain. Her medical and surgical history included long-standing hypertension, hysterectomy for dysfunctional uterine bleeding and bilateral total hip joint replacements, none of which were performed over the preceding months. She has otherwise been well with no recent hospital admissions prior to presentation.

On physical examination, she was tachycardic with a heart rate of 100 bpm, but afebrile, normotensive and with normal oxygen saturations on room air. Her abdomen was soft to examine but tender to percussion over the right upper quadrant and right iliac fossa. Rovsing's sign was negative.

INVESTIGATIONS

Full blood count revealed an elevated white cell count of 18.5 (normal range $4-11 \times 10^9/L$), neutrophil count of 16.8 (normal range: $2-7.5 \times 10^9/L$) and normal haemoglobin of 144 g/L. Biochemistry panel revealed normal renal and liver function tests but an elevated C reactive protein count of 265 (normal range: $0-5$ mg/L). Urine tests were unremarkable.

CT of the abdomen and pelvis with intravenous contrast revealed a thickened pelvic appendix that was 10 mm in total diameter with surrounding fat stranding (figure 1). There was a concurrent 5 mm impacted calculus in the cystic duct with an

TREATMENT

The patient went for a laparoscopic appendectomy and cholecystectomy. The ports were placed in their respective locations as for a traditional laparoscopic appendectomy and cholecystectomy. Intraoperative findings were of an acutely inflamed non-perforated appendix and an inflamed gallbladder with mucocoele. Intraoperative cholangiogram revealed no filling defects.

Histological analysis of the appendix revealed transmural acute inflammatory exudate with ulceration of the mucosa and with inflammatory infiltrate extending focally into the attached mesoappendix.

Histological analysis of the gallbladder revealed transmural acute inflammatory exudate extending into the surrounding adventitial connective tissue.

The final histology was consistent with concurrent appendicitis and acute cholecystitis.

Figure 1 Coronal CT image with a solid arrow pointing to an inflamed appendix in the right lower quadrant. The oval shape encircles an inflamed gallbladder. The broken arrow pointing to the small bowel.

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Figure 2 CT scan confirmed (axial image) acute lithiasic cholecystitis in the same patient. There is an arrow pointing to a thickened gallbladder and a gallstone within it.

OUTCOME AND FOLLOW-UP

The patient made an uncomplicated recovery and was discharged home 2 days postoperatively with follow-up with her general practitioner.

DISCUSSION

Appendicitis and acute cholecystitis are among the most common conditions admitted under surgical services. A literature search using MEDLINE with titles containing both 'cholecystitis' and 'appendicitis' revealed that concurrent presentation of acute cholecystitis and appendicitis is rare. Patients can present as acalculous¹ or calculous^{2–6} cholecystitis along with concurrent appendicitis. The articles were assessed and only cases of concurrent acute calculous cholecystitis and appendicitis were included and further analysed.

We found five articles^{2–6} with similar presentation and pathology as our case. Table 1 highlights the patient demographics, comorbidities, imaging modality, mode of intervention and final histology. There was a female predilection and also three of five patients were 55 years or older although the numbers were small. Four of five patients did not have a chronic illness, and one of the female patients was 10 weeks pregnant at the time of presentation.

The clinical history and examination for the diagnosis of appendicitis and cholecystitis can be very different, with certain features more predictive of one or the other.

The clinical presentation of appendicitis varies and is inconsistent. However, patients with acute appendicitis typically describe an initial periumbilical pain which migrates to the right lower quadrant. Migratory pain is a useful discriminating

feature in a patient's history, with a reported sensitivity and specificity of 80%.⁷ Tenderness on palpation, over McBurney's point along with other signs used to elicit appendicitis, include Rovsing sign, Psoas sign, Dunphy sign as well as the rarely performed Markle sign. The Markle sign or heel drop test had a reported sensitivity of 74% for acute appendicitis.⁸ However, their absence should never be used to rule out appendiceal inflammation.

Older patients with appendicitis are more likely to present with generalised pain, longer duration of pain and rigidity. Elderly patients often have altered perceptions of pain and incorrectly believe pain to be a normal process of ageing and hence pain may be under-reported. Interestingly, a meta-analysis by Gibson⁹ of over 50 studies examined sensitivity to induced pain in people of different ages and showed an increase in pain threshold with advancing age. A multicentre prospective study found a similar delay in presentation of appendicitis among the elderly population¹⁰ resulting in a higher incidence of perforation.^{11 12}

Biliary tract disorders including cholecystitis is the most common indication for surgery in the older population due to an increased prevalence of gallstones, increased lithogenicity of the bile, a greater percentage of pigmented stones, and an increased common bile duct diameter.^{13–15}

Patients with acute cholecystitis characteristically present with a short history of pain in the right upper quadrant or epigastrium. It often occurs in patients with prior attacks of biliary colic. On clinical examination, Murphy's sign which has a high sensitivity for acute cholecystitis^{16–18} may be elicited. Interestingly, indicators such as right upper quadrant pain and Murphy's sign are less accurate in older patients.^{19 20} A retrospective case series of 168 patients older than 65 years with acute cholecystitis concluded that over 60% of patients did not have back or flank pain and 5% had no pain at all. Over 40% of patients did not experience nausea and more than one half were afebrile. Thirteen percentage of patients with acute cholecystitis had no abnormal liver function tests, fever or leucocytosis.²¹

An ultrasound scan (USS) of the abdomen would be a good first-line imaging modality if we were clinically suspecting a single pathological entity of acute cholecystitis. USS is inexpensive, has no associated radiation exposure, and is highly sensitive for detection of gallstones.^{22 23} However, several studies have shown that CT improves the final diagnosis and management of non-pregnant adult patients presenting with abdominal pain^{24–30} and is superior to clinical evaluation. CT interpretation was correct in 90–96% of cases, while clinical evaluation was correct in 60–76% of cases.^{31–33}

Given the patient's age, clinical presentation, laboratory markers and questionable diagnosis, the need for a quick and definitive diagnosis is considerably heightened. A CT of the

Table 1 Summary of similar case reports

Article	Age (in years) and sex	Comorbidities	Imaging modality	Mode of intervention	Histology
DeMuro ²	45, female	Previous breast cancer with mastectomy	CT of the abdomen and pelvis	Laparoscopic	Acute cholecystitis with appendicitis
Lee <i>et al</i> ³	78, male	None	CT of the abdomen and pelvis	Percutaneous cholecystostomy	None
Grimes ⁴	36, female	None	None	Laparotomy	Acute cholecystitis with perforation and appendicitis
Black ⁵	76, female	Diabetes mellitus	None	Laparotomy	Acute cholecystitis with appendicitis
Rubin ⁶	55, female	None	None	Laparotomy	Acute cholecystitis with appendicitis

abdomen and pelvis was requested to confirm our diagnosis before committing our patient to surgery.

We can only hypothesise the pathogenesis of concurrent presentation of appendicitis and acute calculous cholecystitis. There has been published literature with regard to appendicitis causing impairment of bile salt excretion from the liver, and the possibility of certain Gram-negative bacteria like *Escherichia coli* exerting direct damage at a cholangiolar level.³⁴ This occurs via progressive bacterial invasion into the muscularis propria of the appendix, causing either direct invasion or translocation into the portal venous system.^{35–36} This is further evidenced by the fact that there is five times greater number of organisms isolated from patients with gangrenous appendicitis than those with suppurative appendicitis.^{37–38} This could be a potential mode of pathogenesis with the acute episode of appendicitis leading to acute cholecystitis.

Another potential pathogenesis is that the presence of an impacted gallbladder calculus and mucocoele in our patient could have been a nidus for infection and completely unrelated to the appendicitis. It is possible to have two unrelated pathologies occurring at the same time although this is rare.

Acute inflammatory exudate was present in both histological specimens and this indicates a similar onset and progression of inflammation. Microbiological analysis was not performed and no organisms were isolated from the specimens.

Learning points

- Concurrent presentations of appendicitis and acute cholecystitis are very rare, and when faced with a diagnostic dilemma on clinical history and examination, the clinician must be open to the possibility of a dual pathology occurring. If there was a doubt on selecting the appropriate imaging modality in non-localised abdominal pain and raised inflammatory markers, CT scan with intravenous contrast is the imaging modality of choice.
- This is to avoid multiple scans which can be time consuming and expensive, and more importantly a delay in diagnosis could lead to increased morbidity and mortality.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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