Reminder of important clinical lesson

Infective endocarditis with co-existent acalculous cholecystitis: a rare but important association

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Summary

The authors present the case of an otherwise healthy retired male who presented with a history of fevers, rigors and right upper quadrant abdominal pain. Although haematological, biochemical and radiological investigations supported a diagnosis of acalculous cholecystitis, the underlying cause was not obviously apparent and the patient's clinical condition deteriorated rapidly over the course of a few hours despite appropriate medical treatment. Repeat clinical examination was consistent with acute pulmonary oedema in association with a new murmur throughout the whole of the cardiac cycle. Transthoracic echocardiography revealed the presence of severe aortic regurgitation, a presumptive diagnosis of infective endocarditis was made and medical therapy adjusted. Shortly after, the patient suffered a cardiac arrest and an attempt at resuscitation was unsuccessful. Postmortem examination revealed the presence of aortic valve cusp rupture secondary to bacterial endocarditis in addition to gallbladder appearances consistent with acute acalculous cholecystitis.

BACKGROUND

Infective endocarditis is a relatively uncommon clinical condition with an estimated incidence of approximately 1.7–6.2 cases per 100 000 patient years.¹ However, it can have a significant morbidity and mortality burden and often results in prolonged inpatient hospital stays. Infective endocarditis can present with a broad spectrum of non-specific symptoms and, as such, a high index of suspicion is required to make an accurate diagnosis to allow prompt initiation of appropriate treatment.

This patient had the signs and symptoms, and the investigations were consistent with a diagnosis of acute acalculous cholecystitis. Acalculous cholecystitis is a severe illness that is often a complication of another underlying medical or surgical condition.

This case demonstrates a case of acalculous cholecystitis – a recognised but extremely rare complication of infective endocarditis. It is a reminder of the myriad of ways in which infective endocarditis can present. In addition, it demonstrates the importance of looking for an underlying cause in the setting of cholecystitis without demonstrable gallstones on imaging.

CASE PRESENTATION

A recently retired, previously fit and healthy male presented to the acute surgical intake with a week's history of abdominal pain on a background of 2 weeks' history of fevers and rigors. Medical history was unremarkable, other than a recent dental abscess treated successfully with antibiotics 3 weeks prior to admission.

Clinical examination revealed a fever of 38.2°C, a tachycardia of 110 beats per minute with a blood pressure of 137/52 and localised peritonism in the right upper quadrant of the abdomen. The venous pressure was not overtly

elevated and heart sounds were documented to be normal on admission. Auscultation of the lung fields revealed no abnormality.

INVESTIGATIONS

Haematological and biochemical markers of infection were elevated on admission. Total white cell count was $15.6 \times 10^3/\text{mm}^3$ with a marked neutrophilia but the remainder of the full blood count was normal. Electrolytes were normal but renal function was deranged with a raised plasma creatinine (135 $\mu\text{mol/l}$) and raised urea (14.9 mmol/l). Tests of liver function and serum amylase levels were within the normal range for our institution but C reactive protein was markedly elevated at 270 mg/l .

Chest radiography and urinalysis on admission were normal. The ECG showed right bundle branch block with left anterior hemifascicular block.

Abdominal ultrasonography revealed a markedly oedematous gall bladder in the absence of gallstones, as well as dilatation of the hepatic veins and inferior vena cava (figure 1). The remainder of the abdominal viscera were unremarkable.

DIFFERENTIAL DIAGNOSIS

The clinical, biochemical and radiological investigations were in keeping with a diagnosis of acalculous cholecystitis of unknown aetiology.

TREATMENT

The patient was treated empirically according to hospital antibiotic guidelines for cholecystitis with tazobactam/piperacillin (Tazocin) 4.5 g every 8 h. In addition, he received intravenous fluid resuscitation using normal saline.

Figure 1 Ultrasonography of the gallbladder. 1: Liver; 2: thickened gall bladder wall measuring 9 mm (normal <3 mm); 3: gall bladder lumen.

OUTCOME AND FOLLOW-UP

On the following day after admission, the patient's clinical condition deteriorated rapidly. Repeat clinical examination suggested acute respiratory distress with a further increased tachycardia, tachypnoea and hypoxia without significant change in blood pressure. Auscultation of the chest revealed widespread crepitations with evidence of a heart murmur throughout the whole of the cardiac cycle. A diagnosis of pulmonary oedema was confirmed by chest radiography. Laboratory blood tests were unchanged but there was a marked, compensated, metabolic acidosis and lactataemia. The ECG was unchanged except for the increase in heart rate. Initial management with intravenous diuretic and nitrate infusions significantly improved the patient's symptoms without the need for positive-pressure ventilation.

Urgent bedside transthoracic echocardiography revealed a dilated left ventricle with hyperdynamic systolic function. Only two aortic valve cusps were identified and there was severe aortic regurgitation. Given the clinical history, the appearances were highly suspicious for infective endocarditis, despite the absence of any obvious vegetative lesions. Gentamicin 3 mg/kg was added to the treatment regime and arrangements made to perform urgent transoesophageal echocardiography. However, within the hour, the patient suffered a pulseless electrical activity cardiac arrest and an attempt at resuscitation was unsuccessful.

Postmortem examination revealed aortic valve cusp rupture and a large vegetation on the visible aortic valve in addition to an oedematous gallbladder containing sludgy material. Multiple blood cultures and serology to various organisms remained negative.

DISCUSSION

Native valve endocarditis, defined as infection of the endocardial surface of the heart in the absence of prosthetic material, is a relatively uncommon clinical condition with an estimated incidence of approximately 1.7–6.2 cases per 100 000 patient years¹ and is associated with known valvular heart disease, poor dental hygiene, long-term haemodialysis and diabetes mellitus.² Infection with the HIV independently increases the risk of acquiring endocarditis.³ Infective endocarditis is most commonly due to infection with *Staphylococci*, particularly *Staphylococcus aureus*, or *Staphylococcus viridans*,¹ which can also be associated with other foci of infection. Only 5–7% of patients who have been given a diagnosis of infective endocarditis according to strict criteria will have sterile blood cultures.⁴ Medical and surgical complications of infective endocarditis, including cardiac sequelae, embolic phenomena and complications of hospital admission are associated with significant morbidity and mortality. Reported in-hospital mortality of patients with infective endocarditis varies from 9.6% to 26%.⁵

Acute acalculous cholecystitis is an acute necroinflammatory disease of the gallbladder which occurs in the absence of cholelithiasis and has a multifactorial pathogenesis.⁶ It accounts for approximately 10% of all cases of acute cholecystitis with a higher incidence among patients with intercurrent illnesses requiring intensive care.⁷ Acute acalculous cholecystitis is associated with a considerable in-hospital morbidity, with studies estimating an overall complication rate of either gangrene, perforation or empyema to be approximately 40%⁸ with a mortality rate of approximately 30%, predominantly in those with severe infection at presentation.⁹ Its treatment is centred around cholecystostomy

(drainage of the gallbladder) and cholecystectomy in addition to appropriate antibiotic therapy.⁷

Intercurrent infective endocarditis and acute cholecystitis is an extremely rare but recognised association. Sporadic case reports have recognised this,¹⁰ particularly in the context of *S aureus* bacteraemia.^{11 12} Given that *Staphylococci* more commonly infect foreign body material it would seem likely that this association would be more prevalent with prosthetic rather than with native valve endocarditis.¹³

This case adds to the small body of evidence that the gallbladder may be a site for septic metastasis during infective endocarditis, even in patients without immune system dysfunction. It also emphasises the considerable risk of complications with intercurrent infections at different sites and the importance of considering endocarditis as the primary infection in patients with acute cholecystitis without demonstrable gallstones on imaging.

Learning points

- ▶ Infective endocarditis can present with a myriad of clinical features and a high index of suspicion is required to make a rapid and accurate diagnosis
- ▶ Co-existent infective endocarditis and acute cholecystitis is a rare but recognised association, in which either condition can be the primary presenting illness
- ▶ A diagnosis of acute cholecystitis in the absence of gallstones on imaging should prompt the clinician to search for underlying conditions.

Competing interests None.

Patient consent Not obtained.

REFERENCES

1. **Mylonakis E**, Calderwood SB. Infective endocarditis in adults. *N Engl J Med* 2001;**345**:1318–30.
2. **Strom BL**, Abrutyn E, Berlin JA, *et al*. Risk factors for infective endocarditis: oral hygiene and nondental exposures. *Circulation* 2000;**102**:2842–8.
3. **Manoff SB**, Vlahov D, Herskowitz A, *et al*. Human immunodeficiency virus infection and infective endocarditis among injecting drug users. *Epidemiology* 1996;**7**:566–70.
4. **Hoen B**, Selton-Suty C, Lacassin F, *et al*. Infective endocarditis in patients with negative blood cultures: analysis of 88 cases from a one-year nationwide survey in France. *Clin Infect Dis* 1995;**20**:501–6.
5. European Society of Cardiology. Infective Endocarditis (Guidelines on Prevention, Diagnosis and Treatment of) ESC Clinical Practice Guidelines, 2009.
6. **Owen CC**, Jain R. Acute Acalculous Cholecystitis. *Curr Treat Options Gastroenterol* 2005;**8**:99–104.
7. **Huffman JL**, Schenker S. Acute acalculous cholecystitis: a review. *Clin Gastroenterol Hepatol* 2010;**8**:15–22.
8. **Barie PS**, Eachempati SR. Acute acalculous cholecystitis. *Curr Gastroenterol Rep* 2003;**5**:302–9.
9. **Wang AJ**, Wang TE, Lin CC, *et al*. Clinical predictors of severe gallbladder complications in acute acalculous cholecystitis. *World J Gastroenterol* 2003;**9**:2821–3.
10. **Cucchiari G**, Watters CR, Rossitch JC, *et al*. Deaths from gallstones. Incidence and associated clinical factors. *Ann Surg* 1989;**209**:149–51.
11. **Richard B**, Nadal D, Meuli M, *et al*. Acute acalculous cholecystitis in infective endocarditis. *J Pediatr Gastroenterol Nutr* 1993;**17**:215–16.
12. **Merchant SS**, Falsey AR. *Staphylococcus aureus* cholecystitis: a report of three cases with review of the literature. *Yale J Biol Med* 2002;**75**:285–91.
13. **Bortolotto LA**, Mansur AJ, Grinberg M, *et al*. Infective endocarditis related to acute cholecystitis. *Thorac Cardiovasc Surg* 1988;**36**:237–8.

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