- 1 Bain BJ. Eosinophilic leukaemias and the idiopathic hyper-eosinophilic syndrome. *Br J Haematol* 1996;95:2-9.
- 2 Weller PF, Bubley. The idiopathic hypereosinophilic syndrome. *Blood* 1994;83:2759-79.
- 3 Fauci AS, Harley JB, Roberts WC, Ferrans VC, Gralnick HR, Bjornson BH. The idiopathic hypereosinophilic syndrome. *Ann Intern Med* 1982;97:78-92.
- 4 Moore PM, Harley JB, Fauci AS. Neurologic dysfunction in the idiopathic hypereosinophilic syndrome. *Ann Intern Med* 1985;102:109-14.
- 5 Liesveld JL, Abboud CN. State of the art: the idiopathic hypereosinophilic syndromes. *Blood Rev* 1991;5:29-37.
- 6 Carlson M, Oberg G, Peterson C, Venge P. Releasability of human hypereosinophilic eosinophils is related to the density of the cells. *Br J Haematol* 1994;86:41-7.
- 7 Butterfield JH, Gleich GJ. Interferon-alpha treatment of six patients with the idiopathic hypereosinophilic syndrome. *Ann Intern Med* 1994;121:648-53.
- 8 Smit AJ, van Essen LH, de Vries EG. Successful long-term control of idiopathic hypereosinophilic syndrome with etoposide. *Cancer* 1991;67:2826-7.

A patient with fever and an abdominal aortic aneurysm

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Summary

A 55-year-old man with an abdominal aortic aneurysm presented with fever and abdominal pain 3 weeks after an episode of *Salmonella* gastroenteritis. His symptoms persisted despite antimicrobial therapy. Two abdominal computed tomography (CT) scans showed no evidence of aortitis. His abdominal pain worsened and further investigation including a third CT scan demonstrated a leaking aortic aneurysm. The wall of the aorta was shown to contain Gram-negative bacilli. This case illustrates the difficulty in diagnosing bacterial aortitis.

Keywords: *Salmonella*; aortitis

Patients with aortic aneurysms are at increased risk of bacterial aortitis, *Salmonellae* being the commonest cause.¹ The diagnosis can be difficult and a high index of suspicion is required on the part of the physician. We describe a case of *Salmonella* aortitis in a patient with a pre-existing aortic aneurysm. Despite a delayed diagnosis, the patient made a full recovery following aortic repair and antimicrobial therapy.

Case report

A 55-year-old man presented to a general surgical unit with a 3-day history of general malaise, fever and right iliac fossa pain. He had developed watery diarrhoea 3 weeks earlier and faecal culture had grown *Salmonella typhimurium* phage type 208 sensitive to ampicillin, ciprofloxacin, trimethoprim and gentamicin, but resistant to cefuroxime. He was managed conservatively by his general practitioner with resolution of symptoms prior to admission. His medical history included long-standing hypertension, an anterior myocardial infarction and quadruple coronary artery bypass grafting 6 and 8 years earlier, respectively, renal colic and a 5-cm diameter infrarenal abdominal aortic aneurysm. The latter had been diagnosed inci-

dentally the year before during a hospital admission for pneumonia and an elective repair of this aneurysm had been cancelled when he was found to have poor left ventricular function. His medications were aspirin, diltiazem, enalapril, isosorbide mononitrate, frusemide and omeprazole. On examination his temperature was 38°C. Chest auscultation was normal and abdominal palpation revealed a tender but soft right iliac fossa and a non-tender aortic aneurysm. Initial investigation showed a haemoglobin of 11.0 g/dl, a white cell count of $8.5 \times 10^9/l$ with a normal differential, a C-reactive protein of 168 mg/l and an amylase of 77 IU/l. A chest X-ray showed right basal atelectasis and an abdominal ultrasound scan revealed a 5-cm diameter infrarenal aortic aneurysm. Echocardiography showed no evidence of endocarditis. Microbiological analysis of blood, sputum, faeces and urine were negative. He was initially commenced on intravenous cefuroxime 750 mg and metronidazole 500 mg, both tid.

On day 2 he became hypotensive with a blood pressure of 70/40 mmHg. A central venous line was inserted for fluid management and he was commenced on intravenous ciprofloxacin 400 mg bid. Abdominal computed tomography (CT) scans on days 2 and 5 showed no evidence of either a change in size or leakage from the

Figure Abdominal CT scan showing a leaking aortic aneurysm with retroperitoneal extension

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aneurysm but did identify small bilateral pleural effusions and renal calculi. Despite continuing antimicrobial therapy he remained unwell with general malaise, and intermittent pyrexia and he developed severe left loin and iliac fossa pain. On day 13 he was transferred to the regional infectious disease unit where a bone scan showed isotope retention in the left ureter. Intravenous urography showed bilateral renal calculi and delayed emptying of the left ureter, and an abdominal CT scan confirmed an 8.5-cm diameter leaking aortic aneurysm with retroperitoneal extension causing compression of the left ureter (figure). Aortic aneurysm repair was performed using a straight celsoft/rifampicin graft. At operation the aorta and surrounding tissues were inflamed, oedematous and friable. Microscopy of the aortic wall revealed the presence of Gram-negative bacilli, although bacterial culture was negative. He was discharged home 27 days after admission. Oral ciprofloxacin 500 mg bid was continued for one month after discharge and at out-patient reviews since there has been no evidence of persistent infection. The clinical findings were consistent with a diagnosis of *Salmonella* aortitis.

Discussion

Salmonella species are the commonest cause of bacterial aortitis accounting for one third of all cases.¹ This reflects the incidence of *Salmonella* infection in the community,² the fact that 3–8% of *Salmonella* infections result in bacteraemia,^{3,4} and the predilection of *Salmonellae* to infect damaged tissues such as atherosclerotic vascular endothelium.⁵ Patients are usually male, over 50 years old and may present in a variety of ways ranging from the typical features of a rupturing aortic aneurysm to pyrexia of unknown origin. There is often no history of gastroenteritis and back or abdominal pain in a patient with fever appears to be the most consistent feature.^{6,7} A pulsatile abdominal mass is palpable in only 42% of cases.⁷ In insidious presentations a high index of suspicion in the supervising physician is arguably the most important factor in making the diagnosis, which can be confirmed in most cases by CT scanning.⁸ As in our patient, the latter may not be diagnostic and repeat scans or further imaging may be necessary. Blood culture

Learning points

- patients with known or suspected atheromatous disease of the aorta are at increased risk of bacterial aortitis
- *Salmonellae* are the commonest cause of bacterial aortitis and consideration should be given to antimicrobial therapy for gastroenteritis in at-risk patients
- patients taking gastric acid suppressing drugs are at increased risk of *Salmonella* infection
- bacterial aortitis is difficult to diagnose and a high index of suspicion is therefore important
- the most useful investigation is CT, but this may be negative
- the most appropriate management is aortic repair combined with antimicrobial therapy

is positive in three-quarters of all cases of *Salmonella* aortitis.^{6,7} Optimum treatment requires early surgical intervention and an extended course of appropriate antimicrobial therapy, ciprofloxacin being the drug of choice for *Salmonella* infections.⁶⁻⁹

The diagnosis of *Salmonella* aortitis in our patient was based on a recent history of *Salmonella* enteritis in a patient with a pyrexial illness and a leaking aortic aneurysm. The diagnosis was confirmed by the finding of Gram-negative bacilli in the wall of the aorta and it is probable that blood and aortic wall cultures were negative because of the presence of antibiotics in these specimens. Treatment with omeprazole reduces gastric acidity and thereby increases the risk of *Salmonella* infection.¹⁰ In addition, this patient was known to have atherosclerotic disease of the aorta and was therefore at increased risk of bacterial aortitis.⁵ We believe that general practitioners and hospital physicians should have a low threshold for prescribing antimicrobial therapy for the treatment of gastroenteritis in patients likely to have atheromatous disease of the aorta.

Even with modern surgical and antimicrobial management, the mortality of *Salmonella* aortitis exceeds 40%.^{6,7} This case demonstrates that in patients with an aortic aneurysm and pyrexial illness of unknown cause, bacterial aortitis should be quickly excluded.

1 Reddy DJ, Ernst CB. Infected aortic aneurysms: recognition and management. *Semin Vasc Surg* 1988;1:174–81.

2 Anon. *Salmonella* infections, England and Wales: reports to the PHLS. *CDR Weekly* 1998;8(7):58.

3 Lester A, Erikson NHR, Nielson H, et al. Non-typhoid salmonella bacteraemia in Greater Copenhagen 1984–1988. *Eur J Microbiol Infect Dis* 1991;10:486–90.

4 Mandal BK, Lyons M. Bacteraemia in salmonellosis: a 15 year retrospective study from a regional infectious disease unit. *BMJ* 1988;297:242–3.

5 Parsons R, Gregory J, Palmer DL. *Salmonella* infections of the abdominal aorta. *Rev Infect Dis* 1983;5:227–31.

6 Oskoui R, Davis WA, Gomes MN. *Salmonella* aortitis. *Arch Intern Med* 1993;153:517–25.

7 Katz SG, Andros G, Kohl RD. *Salmonella* infections of the abdominal aorta. *Surg Gynaecol Obstet* 1992;175:102–6.

8 Jagjivan B, Nakielnny RA. Case report: salmonella aortitis and aneurysm formation: the role of CT in management. *Clin Radiol* 1990;40:55–6.

9 Anon. *British National Formulary*. 1998;35:234.

10 Neal KR, Brij SO, Logan RFA, Hawkey CJ, Slack RCB. Recent treatment with H₂ antagonists and antibiotics and gastric surgery as risk factors for salmonella infection. *BMJ* 1994;308:176.

A lesson in the management of testicular cancer in a patient with a solitary testis

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Summary

Five per cent of patients with germ cell tumours of the testis will develop a further tumour in the contralateral testis. Standard treatment in such cases is a second orchidectomy, resulting in infertility, hormone replacement, and psychological morbidity. In this case report we explore the role of testis conservation in these patients and also show that there is a risk of removing a potentially normal testis if a histological diagnosis is not sought prior to orchidectomy.

Keywords: testicular germ cell tumours; carcinoma-in-situ; orchidectomy

With the current preference for orchidectomy in patients with suspicious testicular masses there is the risk of removing a potentially normal testis. Experience of a patient with a suspicious mass in a solitary testis which was subsequently found to have benign histology after testis-conserving surgery, prompted us to report the present case.

Case history

A 39-year-old man presented with a 6-week history of pain in the left groin and suprapubic area with increasing tenderness in the right testis. Fourteen years earlier he had undergone a left orchidectomy and chemotherapy (four cycles of bleomycin, etoposide and cisplatin) for stage 2C teratoma. Since that time he had been well apart from azospermia which had been detected prior to starting chemotherapy.

Examination on this occasion revealed a tender solitary right testis with no palpable nodule. Doppler ultrasound revealed a 4-mm lesion with normal blood flow within the right testis. Serum β -human chorionic gonadotropin (β -hCG) and α -fetoprotein were not raised but on the basis of the ultrasound findings it was felt that the lesion probably represented a tumour and he was advised to undergo an orchidectomy.

He was concerned about having to take long-term testosterone replacement, and although he was aware that the most likely diagnosis was a second malignancy, was keen if possible to pursue testis conservation. He underwent exploration of the right testis through a groin incision. Intra-operative ultrasound using a 7.5 mHz ultrasound probe was used to identify the lesion (figure 1), which was

Figure 1 Intra-operative ultrasound revealing a 4-mm hypoechoic nodule lying immediately on the surface of the exposed testis. The site was marked for excision

excised with a rim of surrounding normal tissue. A separate testicular biopsy was also performed. Despite the clinical prediction of a new primary malignancy, histology of the nodule revealed seminiferous tubules lined only by Sertoli cells and marked proliferation and hyperplasia of Leydig cells. The separate biopsy showed atrophic testis.

Discussion

This case highlights the problems of diagnosis of testicular masses. Ultrasound is the mainstay for imaging of the testis and has a sensitivity of 80–98%.¹ One of its limitations is that non-neoplastic lesions may mimic tumours. Magnetic resonance imaging (MRI) has no proven diagnostic benefit over ultrasound, but provides better localisation when partial orchidectomy is being considered (figure 2).² If this surgical approach is followed, then intra-operative ultrasound can be used, as in this case, to delimit the lesion and thus remove as little of the normal testis as possible.

Fine needle aspiration of a suspicious mass is not performed to confirm the diagnosis prior to surgery due to the theoretical risk of tracking at the needle site and scrotal recurrence, although how real this risk is with modern adjuvant treatment is unknown. Semen cytology has proved useful but is positive in only 50% of cases.³

Radical orchidectomy rather than partial orchidectomy via an inguinal approach is the operation of choice, as 90% of testicular germ cell tumours have associated carcinoma in situ (CIS) which progresses to invasive disease in 50% of cases within 5 years.³ Partial orchid-

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