Aortitis caused by b-lactamase producing Haemophilus influenzae type b

We report a fatal case of perforated abdominal aortic aneurysm with b-lactamase producing Haemophilus influenzae capsular type b isolated from multiple blood cultures.

Case report

A 75 year old man was admitted with a 12 month history of angina on exertion, and a one month history of bilateral shoulder pains and epigastric discomfort not relieved by antacid. He had been treated for hypertension for 10 years and had smoked 20 cigarettes a day for 50 years.

On examination his blood pressure was 160/90 mmHg and the only abnormal finding was mild epigastric tenderness. Initial investigations showed a white cell count of 18.4 x 10⁹/l and an erythrocyte sedimentation rate (ESR) of 125 mm in the first hour. During the next three days his temperature reached 37.5°C and he complained of chest discomfort despite antianginal treatment. A chest x-ray picture was normal and blood cultures were not done. A computed tomography scan of abdomen and thorax and an Indium-111 labelled white cell scintogram were normal. Immunoglobulin concentrations were: IgM less than 0.3 g/l (normal range 0.4-2.2), IgG 8.8 g/l(6-13), and IgA 3.9 g/l(0.8-3.7). In view of his prominent shoulder girdle myalgia a presumptive diagnosis of polymyalgia rheumatica was made and prednisolone 60 mg a day was started. The temperature and pain settled and he was discharged home. When seen in the outpatient department after three weeks he was still complaining of shoulder aches, his white cell count was 12.8 x 10⁹/l and his ESR was 60 mm in the first hour. Prednisolone was continued at 30 mg a day.

He was readmitted three months later complaining of severe abdominal pain with radiation to his back. He had a fever of 37.5°C and was tender in the epigastrium and lower abdomen. Four out of five sets of blood cultures grew b-lactamase producing Haemophilus influenzae capsular type b after 24 hours’ incubation. The minimum inhibitory concentration of cefotaxime was less than 0.3 mg/l. An echocardiogram showed normal valves but a presumptive diagnosis of infective endocarditis was made and cefotaxime 2 g three times a day was given intravenously. Two days later he collapsed and resuscitation was unsuccessful. At necropsy the heart valves were unremarkable and the spleen was normal, but the abdominal aorta was severely athromatous with an aneurysm 4.0 cm in diameter which had ruptured on the right side. Microscopical examination showed that the aneurysm had a typical atherosclerotic structure, but it also contained areas of abscess formation with a dense polymorph infiltrate extending beyond the wall into periaortic fat (figure). This was interpreted as evidence of secondary bacterial infection in an atherosclerotic aneurysm. Attempts to show the presence of organisms in the tissue by specific immunofluorescence with anti-type b capsular antiserum (Central Public Health Laboratory, Department of Microbiological Reagents and Quality Control) were unsuccessful.

Haemophilus influenzae is an uncommon cause of invasive disease in adults and has not previously been described as a cause of aortic infection. Seventeen cases of infective endocarditis with this organism have been reported, only one with a b-lactamase producing strain of unspecified type, and there have been no other reports of endovascular infection. Ampicillin resistance in United Kingdom strains of Haemophilus influenzae type b is increasing, with 12 of 66 (18%) strains producing b-lactamase in a 1986 survey. The commonest isolate from infections of the abdominal aorta is Salmonella spp, but many other organisms have been implicated including Staphylococcus aureus and various coliforms, streptococci, mycobacteria and fungi. Microbes may reach the aorta by embolism from infective endocarditis (“mycotic” aneurysm) or, occasionally, directly from adjacent septic foci, but the
most common route nowadays is by bacteraemic infection of pre-existing aneurysms or other lesions.\(^1\) Organisms have been grown more frequently from the contents of perforated rather than from electromicroscopically resected aortic aneurysms, which suggests that infection may be an important predisposing factor to rupture,\(^2\) but in many case reports it has been impossible to tell whether the aorta was aneurysmal before infection occurred.

The source of the *Haemophilus influenzae* in this case is unknown. Presumably there was bacteraemic seeding of an atheromatous lesion in the patient's undilated aorta, which progressed to perforation of the arterial wall. This may have been encouraged by steroids. A normal abdominal computed tomography scan should not exclude the diagnosis of infective aortitis.

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Is thrombocytopenia seen in patients with leptospirosis immunologically mediated?

Thrombocytopenia is a complication of severe leptospirosic infection.\(^1\) Initially it was suggested that thrombocytopenia developed following platelet activation at the sites of endothelial damage, resulting in a disseminated intravascular coagulopathy,\(^2\) but more recent studies have failed to support this theory.\(^3\) Infection with leptospirosis results in an initial septicaemic phase followed by a later immunological phase associated with widespread damage to the vascular endo-thelium. It was therefore suggested that immune mediated mechanisms may be responsible for the thrombocytopenia,\(^4\) and we report a case in support of this hypothesis.

**Case report**

A 52 year old man, who had been in close contact with vermin, was admitted with a typical history of frontal headaches, rirors, myalgia and increasing jaundice. Initial investigations showed renal impairment (serum urea 20-3 mmol/l, normal range 4-8; serum creatinine 400 ìmol/l, normal < 110), and thrombocytopenia (platelet count 45 \(\times\) 10\(^9\)/l, normal range 150–350 \(\times\) 10\(^9\)/l). Treatment with benzyl penicillin was begun (1-2 g six hourly) and continued for 10 days, during which time the diagnosis was confirmed with increasing titres for leptospira icterohaemorrhagica (complement fixation test from 1/10 to 1/1280 and microscopic agglutination test from 1/80 to 1/2560).

He developed anuric renal failure and became mildly confused. Following haemodialysis, he became comatose, a computed tomogram of the brain suggested cerebral oedema and he was electively hyperventilated. His renal failure was managed with continuous haemofiltration. Porcine heparin was used as the anticoagulant, the infusion rate titrated to achieve whole blood clotting times of 100–140 s with a thrombotest reaction (median heparin dose 1000 IU/hour).

A lumbar puncture showed both an increased total protein concentration of 90 mg/dl (normal \(<\) 4) and an IgG to albumin ratio of 32% (normal \(<\) 16%). Tests for serum immune complexes were also positive (polyethylene glycol extraction 20%, normal \(<\) 4%). A trial of pulsed methyl prednisolone was therefore started.

He had remained thrombocytopenic since admission and the platelet count had fallen to below 20 \(\times\) 10\(^9\)/l despite the transfusion of 24 units of platelets (figure). Bone marrow examination showed an active marrow with plentiful megakaryocytes, Coombs' tests were negative as was a screen for disseminated intravascular coagulation. Platelet antibodies were sought before administration of steroids, and these were positive for both IgG at 740 ng/10\(^6\) platelets (normal 2–10 ng/10\(^6\) platelets) and IgM at 333 ng/10\(^6\) platelets (normal \(<\) 2-5 ng/10\(^6\) platelets). C3d was also bound to the platelet surface at 40 ng/10\(^6\) platelets (normal \(<\) 3-3 ng/10\(^6\) platelets).

The peripheral platelet count responded to four daily doses of 1 g methyl prednisolone and fell again when the steroids were stopped. Further treatment with hydrocortisone (50 mg six hourly) was associated with both an increase in platelet count and an improvement in consciousness.

Platelet antibody titres were repeated on discharge from the intensive care unit when the peripheral platelet count was in the normal range at 150 \(\times\) 10\(^9\)/l. All titres had fallen: IgG to 74 ng/10\(^6\) platelets, IgM to 26 ng/10\(^6\) platelets, and C3d to 5-5 ng/10\(^6\) platelets, and no circulating immune complexes were detected.

This case supports the role of immune mediated platelet destruction as the cause of

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**References**

Aortitis caused by beta-lactamase producing Haemophilus influenzae type b.
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