Efficacy of Long-term Antibiotic Suppressive Therapy in Proven or Suspected Infected Abdominal Aortic Grafts

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We have reviewed our experience of long-term antibiotic suppressive therapy in patients who underwent repair of an abdominal aortic aneurysm (AAA) and developed proven or strongly suspected infection of a graft. Five patients with abdominal aortic repair complicated by proven or suspected graft infections were treated with continuing antibiotic suppressive therapy based on microbiology culture reports. Two patients developed infection of an established graft, two patients had a graft inserted into an infected area and one patient was thought to be at high risk of developing infection of a recently placed graft. All patients had severe co-existent medical problems and were considered too ill to tolerate further definitive surgery. Response to therapy was monitored by absence of symptoms, fever, inflammatory markers and survival. All patients are alive with a median survival of 32 months, the longest having survived for 6 years. In selected patients with abdominal aortic graft infections, indefinite antibiotic suppressive therapy may be an acceptable alternative to further surgery.

Introduction

Infection of an arterial graft is one of the most feared complications of vascular surgery. Patients with an infected aortic graft have a mortality rate of 15–75% and a leg amputation rate of 8–75%. Complete excision of the infected aortic graft with extra-anatomical bypass has been the benchmark against which other therapies have been compared. This procedure is associated with serious morbidity in 75% of patients and more than one-third of patients require amputation. Other techniques have included graft excision with in situ replacement and direct irrigation of the infected aortic graft with antibiotics.

Some patients are poor candidates for complete excision of the graft because of underlying severe medical problems such as congestive heart failure, severe ischaemic heart disease or pulmonary insufficiency and would be expected to have a high operative mortality. In some patients a graft may have to be placed in an infected area resulting in inevitable infection of the graft. Finally, another group of patients who might benefit from prolonged antibiotic therapy are those in whom a diagnosis of graft infection is strongly suspected but not proven. This paper reports the outcome of long-term antibiotic suppressive therapy in five such patients.

Cases

Case 1

A 77-year-old male underwent emergency repair for a leaking abdominal aortic aneurysm (AAA) with the insertion of a bifurcated aortic graft. Five years later he developed ischaemic bowel which was resected. The thrombosed left femoral artery was bypassed with a right to left femoral cross-over graft. Five years later he complained of severe claudication in the right leg for which he underwent femoro-popliteal bypass grafting from the right limb of the aorto-bifemoral graft. Four months later he developed a left inguinal sinus. Fluid cultures from the sinus grew mixed aerobic bacteria. Clinical examination suggested an ultrasound study confirmed the presence of a false aneurysm near the junction of the cross-over graft and the left limb of the aorto-bifemoral graft. The erythrocyte sedimentation rate (ESR) was 107 mm/h. The false aneurysm was repaired and the femoro-femoral interposition and the left limb of the aorto-bifemoral graft were both resected but the aortic graft and its right limb were left intact leaving some prosthetic material in an infected area. *Staphylococcus* aureus was isolated from cultures of the false aneurysm as well as from both the cross-over graft and the left prosthetic limb. He was treated with intravenous vancomycin for 2 weeks and subsequently begun on oral flucloxacillin for life, initially in a dose of 500 mg four times daily then reduced over 12 months to 500 mg twice daily: 3 5 months later he is well.

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Case 2

A 77-year-old male developed severe abdominal pain and hypotension. A computed tomography (CT) scan of the abdomen was consistent with a large leaking infrarenal AAA. The aneurysm was repaired and the post-operative period was uneventful. Ten years later he presented with fever and abdominal pain of 1 week’s duration. A CT scan of the abdomen revealed gas locules adjacent to the graft (Fig. 1). Enterococcus faecalis was isolated on blood cultures. The ESR and C-reactive protein (CRP) were 63 mm/h and 72 units/ml respectively. No surgical intervention was made in view of his age and poor general condition. He was treated initially with vancomycin for 10 days intravenously then changed to long-term oral antibiotic therapy with amoxicillin/clavulanic acid 500 mg/125 mg three times daily: 32 months later he remains well.

Case 3

A 56-year-old male presented to the emergency service with left hip pain for the preceding 2 weeks and a fever of 1 week’s duration. Staphylococcus aureus was isolated on blood cultures. Flucloxacillin therapy was initiated and the fever settled within 48 h. He was discharged from hospital and advised to take flucloxacillin for a further 2 weeks. Six months later he presented to the emergency service with fever, hypotension and abdominal pain. A CT scan of the abdomen revealed a large para-aortic collection surrounding a 7 cm infrarenal aortic false aneurysm (Fig. 2). He underwent emergency AAA repair with a dacron graft at which time a diagnosis of a mycotic aneurysm with posterior erosion was made. Histopathological evaluation of the aortic wall indicated a chronic inflammatory reaction. The para-aortic fluid grew S. aureus on culture. He was treated with flucloxacillin together with gentamicin intravenously for 2 weeks. Since the risk of recurrence of infection in the graft was considered high he was treated indefinitely with oral flucloxacillin in a dose reducing over 2 years from 1 g three times daily to 0.5 g twice daily. Six years later he is well and his ESR has fallen from 150 to 23 mm in the first hour.

Case 4

A 64-year-old male underwent an elective AAA repair and an aorto-bifemoral graft was placed. His other significant medical problems included severe ischaemic heart disease. He presented 8 years later with a large right-sided femoral aneurysm at the junction with the graft. He had been febrile for the preceding 2 weeks. The aneurysm was resected and a dacron graft inserted. Perigraft fluid collected at surgery grew Staphylococcus haemolyticus sensitive to amoxycillin. His ESR and CRP were 69 mm/h and 12 units/ml respectively. He was treated initially with amoxycillin intravenously for 2 weeks then was placed on oral amoxycillin as life-long suppressive therapy life in a dose reducing over 18 months from 1 g three times daily to 0.5 g twice daily. 30 months later he is well.

Case 5

A 77-year-old male developed fever 10 days after an elective AAA repair in which a straight Gore-tex graft was emplaced. Investigations included a white cell count of 40.4x10^9/l with 95% polymorphonuclear cells, ESR of 71 mm/h and a CRP of 156 units/ml. Staphylococcus aureus and Bacteroides stercoris were isolated from three of four sets of blood cultures.
Staphylococcus aureus was also isolated from a resected aneurysm where a radial arterial line had been inserted. The tissue culture grew gram-positive organisms and was treated with fluocinol. Since the risk of sepsis of the graft was considered to be high the patient was treated with oral fluocinol long-term in a dose reducing over 12 months from 1 g three times daily to 0.5 g twice daily. Thirty-two months later he is well with an ESR and CRP of 7 mm/h and 3 units/ml respectively.

Identification of the organism involved is critical in the management of these patients with suppressive antibiotics. Individual antibiotic susceptibility patterns need to be determined so that the most appropriate antibiotics are chosen. There is little information on which antibiotics are the most appropriate to use. Some antibiotics such as rifampin and clindamycin are effective in the treatment of infected tissue.

Summary of Cases

Five patients with aortic graft infections have been treated with long-term antibiotic suppressive therapy. The diagnosis of graft infection was based on culture of perigraft fluid taken at surgery (three patients), or the presence of positive blood cultures in one patient with CT scan evidence of graft infection and in one patient with a recent graft emplacement who was considered at high risk of graft infection. The first two patients developed infection of established aortic grafts and were treated only with long-term antibiotics. The next two patients had a graft inserted into an infected area. The final patient had bacteraemia and was considered at high risk of developing infection of a recently placed aortic graft. The choice of antibiotic therapy was based on microbiology results. Response to therapy was monitored by observation of symptoms, temperature, inflammatory markers and survival. All patients are currently alive and are on long-term antibiotic therapy. The median follow-up period is 32 months (range: 30-72 months).

Discussion

Prosthetic graft infection is one of the most feared complications of vascular surgery. Foreign material such as vascular grafts enhances the pathogenicity of known virulent organisms by reducing the inoculum necessary to initiate infection. It also allows relatively avirulent organisms like Staphylococcus epidermidis to establish infection.

Aortic graft infection following aneurysm resection has been reported to develop in around 2% of patients. The usual therapy for vascular graft infection is surgical excision with in situ placement of a graft or extra-anatomical bypass. These procedures are associated with high morbidity and mortality. For patients with anticipated high surgical mortality, prolonged antibiotic therapy may be a better option than surgical excision. Similarly, antibiotic therapy is the only therapeutic modality left when a graft has to be inserted or re-implanted into an infected site or when the graft is in a location that cannot be excised.

Bouskoulouss et al. reviewed 532 patients with synthetic arterial grafts and found 14 patients with infected grafts. Ten patients had the graft removed and were given antibiotics. Four patients in whom infections developed within 3 weeks of surgery were treated with antibiotics alone and all recovered. However, no details were provided as to the method of diagnosis, infecting organism or the antibiotics used.

References

Superior Vena Cava Syndrome During the Treatment of Pulmonary Tuberculosis in an HIV-1 Infected Patient

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Introduction

Obstruction of venous flow through the superior vena cava provokes distension of upper body veins, facial swelling, dyspnœa, and cyanosis, known as superior vena cava syndrome (SVCS). Before the arrival of antibiotics, infectious diseases such as syphilis or tuberculosis produced most cases of SVCS, but now cancer is the main cause of this syndrome. In recent years, the AIDS epidemic has led to an increased incidence of tuberculosis and its complications. We report the case of a patient with AIDS who developed SVCS after starting treatment for tuberculosis, presumably as a consequence of a paradoxical reaction to therapy. In a review of the literature (Medline 1980–1999), we have found anecdotal reports of SVCS related to tuberculosis, but none in HIV-1 infected patients.

Case Report

A 34-year-old woman with a history of intravenous drug use, and HIV-1 and hepatitis C virus infection, was diagnosed of pulmonary tuberculosis in September 1996. Isoniazid, rifampicin, pyrazinamide and ethambutol were instituted, and initially a good response was observed. A few months later, the patient stopped therapy on her own, and in March 1997 she was readmitted because of fever, weight loss and breathlessness. On examination, prominent tender lymphadenopathies were noted in her neck and axillary regions. Blood analysis showed a haemoglobin of 8.8 g/dl with normal mean cell volume and a CD4+ lymphocyte count of 87 × 10⁶/l. Chest radiographs disclosed a diffuse interstitial infiltrate and a left upper lobe opacity. An acid-fast stain of the sputum was positive, and isoniazid, rifampicin, pyrazinamide and ethambutol were reintroduced. No antiretroviral drugs were prescribed. Twenty days later the woman experienced headache, swelling of the face and neck, distension of the neck veins, and cyanosis. A computed tomography scan (CT) of the chest disclosed multiple mediastinal and axillary lymphadenopathies (Fig. 1a), a partial collapse of the left upper lobe, and bilateral pleural effusion. Two lymph node biopsies showed granuloma formation and necrosis.

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