Case Report

Infected Polypropylene Suture Repair of a Ventricular Aneurysm

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Infections associated with the prosthetic material used for ventriculotomy closure require repeat operation and removal of all infected material for eradication of the infection. This has consistently been reported with Teflon closure in the past and we present the first report of infection where only polypropylene suture was used for the repair. This potential also has implications for aneurysms repaired by endo-ventricular patching. (Ann Thorac Cardiovasc Surg 2002; 8: 170–2)

Key words: infection, ventricular aneurysm, ventriculotomy

Case Report

A 53-year-old man presented with acute onset retrosternal chest pain on October 23, 1998, with subsequent ventricular fibrillation in the Emergency Department. Following defibrillation, cardiogenic shock was managed with mechanical ventilation, inotrope and intra-aortic balloon pump (IABP) support.

Emergency angiography revealed extensive triple vessel disease with very poor target arteries and severely impaired left ventricular function. Gradual recovery ensued, the IABP was removed after one week and the patient resumed normal walking activities in hospital, free of angina. One month following initial presentation he underwent coronary artery bypass surgery using both internal mammary arteries and the saphenous vein. An antero-apical left ventricular aneurysm resection was performed with closure of the ventriculotomy by a 3-0 polypropylene continuous horizontal mattress and over and over whip stitch, without buttress material. Separation from cardiopulmonary bypass was achieved with inotrope support and good cardiac indices. Pericardial closure was attempted but was associated with a run of ventricular tachycardia prompting cardioversion, and so the pericardium was left open.

Postoperatively, the patient developed pulmonary dysfunction and was managed with supplemental oxygen and periods of continuous positive airway pressure. On the sixth day he was noted to have a purulent sternal wound discharge and sternal dehiscence. He underwent debridement and repair with pectorales major and omental advancement flaps. He required ongoing mechanical ventilation and underwent surgical tracheostomy. One month following the coronary artery surgery, there was persistent pulmonary dysfunction and repeat coronary angiography was performed showing patency of all six coronary bypass anastomoses, but persistent severe left ventricular impairment. He proceeded to make a gradual recovery and after three months had returned to NYHA class I.

Twelve months after the initial surgery he presented to the Emergency Department with acute dyspnea requiring institution of mechanical ventilation. Echocardiography demonstrated a large apical left ventricular false aneurysm (Fig. 1). At re-sternotomy, small retrosternal pockets of granulation tissue were noted. Cardiopulmonary bypass was established from the right atrium to the femoral artery. Despite core cooling, the patient's temperature initially rose to over 39°C. There was a large false aneurysm in the left hemithorax, containing clot and purulent debris. A 2 cm diameter defect in the left ventricular apex was closed with a polypropylene whip stitch

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Fig. 1. Transthoracic echocardiographic apical four chamber view showing the false aneurysm (white arrow) containing debris, with the orifice at the apex of the left ventricle.

with the heart in sinus rhythm. Separation from cardiopulmonary bypass was achieved with inotrope support. Following administration of protamine there was continued bleeding suggestive of coagulopathy. The surgery was prolonged while blood and other products were administered with gradual reduction in bleeding. However, despite hemodynamic stability, frothy pulmonary oedema appeared in the endotracheal tube and was followed shortly thereafter by severe hypotension without ECG changes. Resuscitative attempts were unsuccessful. An autopsy examination confirmed the operative findings but failed to demonstrate the cause of death.

Comment

A review of the literature identified 31 cases of ventricular suture line infection following cardiac surgery since 1960, although this complication is likely to have been substantially under reported. Teflon felt was identified as the nidus of infection in all cases. Infection followed repair or plication of a left ventricular aneurysm (in 28 cases), repair of a ventricular septal defect (in two cases), and ventricular venting (in one case).[1,3-6] This is the first reported case of ventriculotomy infection following closure with polypropylene alone.

As in the present case, presentation was delayed in the majority of reported cases and was at least two months after the initial operation in all but four patients. The median and mean presentation times were 12 and 18 months, respectively. There were three forms of clinical presentation.[1]

Most commonly, there were those of chest wall origin such as subcutaneous lumps, abscesses, or draining cardiocutaneous fistulae, occurring in 24 patients reported. Those of pulmonary origin presented with purulent sputum production with bronchiectasis, or hemoptysis arising from cardiobronchial fistula formation. Lastly, there were some with systemic complications such as bacteremia due to false aneurysms communicating with a ventriculotomy abscess, suggestive of bacterial endocarditis.

In the present case, infection of the polypropylene suture was presumed secondary to postoperative mediastinitis. Similarly, four cases in the literature reported latent infection of the Teflon buttresses following early postoperative mediastinitis. In these cases the time to representation ranged from 3 weeks to 12 months.[1]

Possible contributing factors to the development of mediastinitis in our case were failure to close the pericardium,[2] the use of bilateral internal mammary arteries, diabetes mellitus and poor left ventricular function. It has been suggested that the intact pericardium can prevent the Teflon strips from eroding into the lungs and becoming secondarily infected.[3]

Organisms of both high and low virulence have been reported in blood and tissue cultures, but no organism has been solely implicated in the pathogenesis of this condition. Antibiotics alone are not sufficient to eradi-

cate the infection and appropriate treatment involves complete removal of the infected Teflon and debridement of the suture line. Of 27 cases that received this treatment, 25 survived, while two died as a result of unrelated complications. Four patients did not undergo debridement and removal of foreign body material, and all died from rupture of the pseudoaneurysm, left ventricular failure or sepsis.

It is considered that the abrupt hemodynamic collapse leading to the death of this patient may have been due to endotoxic shock following direct communication between the abscess cavity and the left ventricle.

The absence of previous reports of chronic infection of polypropylene only, probably reflects the less common use of this technique in the past. However, it is clear that any permanent suture material may be associated with an infected ventriculotomy repair such that the use of endo-ventricular patches secured with full thickness myocardial sutures may also be at risk, although the condition has not yet been reported.

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