Case report

Ventriculotomy and resection for left ventricular thrombus infection with *Salmonella*

Patrick Mathieua, Richard Marchandb, Jean-Claude Tardifc, Louis P. Perraulta,b,*

aDepartment of Surgery, Montreal Heart Institute, 5000 Belanger Street East, Montreal, QC H1T 1C8, Canada
bResearch Center, Montreal Heart Institute, 5000 Belanger Street East, Montreal, QC H1T 1C8, Canada
cDepartment of Cardiology, Montreal Heart Institute, 5000 Belanger Street East, Montreal, QC H1T 1C8, Canada

Received 20 March 2000; received in revised form 12 May 2000; accepted 16 May 2000

Abstract

We report the case of a patient with a left ventricular thrombus infected by *Salmonella*. The diagnosis was suspected from a gallium scan demonstrating an intense activity in the lower left parasternal area. A transesophageal echocardiogram confirmed a calcified left ventricular aneurysm with a mural thrombus containing pus and heterogeneous material. The patient underwent a successful left ventricular aneurysmectomy, thrombectomy and endocardial resection under cardiopulmonary bypass which brought the infection under control.

Keywords: *Salmonella*; Left ventricular thrombus; Cardiac surgery

1. Introduction

Infection of a mural left ventricular thrombus with *Salmonella* species is a rare occurrence [1]. We describe such a case, which was successfully treated surgically and is, to the best of our knowledge only the fifth survivor of surgery for this type of infection, in the literature [2–5]. The current diagnostic and therapeutic approaches are discussed.

Three months prior to admission at the Montreal Heart Institute, a 59-year-old man presented diarrhea, fever and chills lasting for 6 days. Subsequently, he was admitted to a primary care hospital suffering from general malaise, chills and fever. He had a history of myocardial infarctions and severe left ventricular dysfunction with an ejection fraction of 15% and left apical thrombus documented 7 years prior.

Upon admission, *Salmonella* was cultured from blood samples. Intravenous ampicillin was started, but the patient remained septic despite intravenous ampicillin treatment for 3 weeks. A gallium scan demonstrated an increased capta- tion in the lower left parasternal area. The patient was transferred to the Montreal Heart Institute with a suspicion of a *Salmonella* endocarditis and intravenous antibiotics were continued during the evaluation. A transesophageal echocardiography (TEE) demonstrated the presence of a calcified left ventricular aneurysm with an echodense mass at the apex of the left ventricle which filled half of the left ventricular cavity with mobile heterogeneous material (Fig. 1). The left ventricular ejection fraction was 20%. A coronary angiogram showed non significant stenosis of the left anterior descending and right coronary arteries.

Surgical treatment was recommended for control of sepsis and because of the risk of embolism. After median sternotomy, a large segment of pericardium was harvested and bathed in gluteraldehyde. Under cardiopulmonary bypass (CPB), the aorta was crossclamped and normothermic antegrade blood cardioplegia was administered before any manipulation and dissection of the heart to avoid embolization of infected debris from the left ventricle. The epicardial surface of the left ventricle was inflammatory and friable and the apical myocardium was thinned and under tension. After isolation of the pericardial cavity from the ventriculotomy site with sponges, the left ventricular aneurysm was incised and a large amount of turbid fluid (thrombi with pus and necrotic material) was released and sent for cultures (Fig. 2). Extensive endocardial calcification of the left ventricle was resected on the anterior, posterior and septal wall taking care to preserve the mitral valve apparatus. The left ventricular cavity was then washed out extensively with warm saline and debrided. After complete excision of the left ventricular aneurysm, the ventricle was closed using a running mattress suture plus a running over and over suture of 3-0 polypropylene over
two strips of autologous pericardium treated with gluteraldehyde. An intraaortic balloon pump (IABP) was inserted to decrease the LV wall tension before weaning from cardio-
pulmonary bypass with moderate doses of inotropic drugs. The crossclamp time was 32 min and total CPB time was 53 min. The IABP was removed 2 days later and there was no
evidence of bacteremia postoperatively. Microscopic examination revealed abundant polymorphonuclear infiltrate in the thrombus, and extensive fibrosis of the ventricular wall. The patient was retransferred to the referring center 10 days after the surgery and received a 6-week course of intravenous antibiotics postoperatively. During that stay, an echocardiogram documented an ejection fraction of 20%, a competent mitral valve and no recurrence of left ventricular thrombus. He was readmitted 2 months after the operation with pulmonary edema and succumbed to global heart failure. At that time, he was off antibiotics with no evidence of fever, leucocytosis or sepsis. There was no autopsy performed, cardiac failure was the cause of death.

2. Discussion

Localized infections occur in 10% of the patients infected with Salmonella and may become apparent days to months after the initial bacteremia and include arteritis, endocarditis and pericarditis. Sustained bacteremia or persisting fever, while under antibiotic treatment, should raise suspicion that a localized site may be maintaining the septic process. The use of an indium-labeled white-cell scan, or a gallium scan, may be helpful in identifying the localized inflammatory process [5]. TEE is helpful in further defining the site of the infectious process.

Thrombi infected with Salmonella carry a high mortality rate when medical treatment with antibiotics alone is pursued [5]. Surgical drainage and excision of the infected tissue is the recommended treatment for patients who can sustain the procedure. In the four surviving patients with a left ventricular thrombus infected with Salmonella reported in the literature, sepsis persisted despite appropriate courses of intravenous antibiotics. All underwent left ventricular aneurysmectomy and excision of the infected tissue. In the present case, surgical excision also brought the infectious process under control. Closure of the ventricle with autologous pericardium buttresses minimized the amount of foreign prosthetic material at the site of repair. Complete resection of infected tissue as well as secondary antibiotic treatment are the mainstay of treatment to achieve successful control of sepsis. Despite adequate treatment of sepsis, the long-term outcome of this procedure is determined by the underlying condition and residual ventricular function after ventriculotomy.

References