



Late infective endocarditis after cholecystectomy in a patient with repaired tetralogy of Fallot: a case report

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Received 13 November 2003; accepted in revised form 29 May 2004

Key words: cholecystectomy, infective endocarditis, tetralogy of Fallot

Abstract

Late endocarditis after surgical repair of tetralogy of Fallot is rare. We describe a case of endocarditis following cholecystectomy in a 22-year old patient with repaired tetralogy of Fallot. After cholecystectomy, the patient was referred to a cardiology clinic with unexplained fever and suspicion of endocarditis. Echocardiography revealed a large mass at the basal level of interventricular septum. Endocarditis was diagnosed on the basis of clinical and echocardiographic findings and antibiotic treatment was initiated immediately. Nine days later, the clinical status of the patient deteriorated and urgent surgery was performed. Patch dehiscence which mimicked a large vegetation, and multiple vegetations on the patch were found during operation. The patch was removed and ventricular septum defect was repaired with a new dacron patch. *Enterobacter agglomerans* was isolated in the vegetation cultures.

Abbreviations: *E. agglomerans* – *Enterobacter agglomerans*; ECG – electrocardiography; IVS – interventricular septum; TOF – tetralogy of Fallot; TTE – transthoracic echocardiography

Introduction

Tetralogy of Fallot (TOF) is the most common cyanotic congenital heart disease in which survival into adulthood is possible [1–3]. Incidence of infective endocarditis after surgical repair of TOF is rare but once endocarditis occurs, the associated mortality is high [1, 3, 4]. Accordingly, careful prophylaxis should be considered in all patients with TOF, when indicated.

Case report

A male patient (22-year old) with a history of complete correction of TOF 16 years ago underwent cholecystectomy with a diagnosis of acute cholecystitis. The patient had not been given prophylactic antibiotics for endocarditis periopera-

tively and after cholecystectomy he was placed on a regime consisting of intravenous cefazolin (1 g q6 h), gentamicin (160 mg daily) and clindamycin (600 mg q12 h). On the fifth postoperative day, the patient was referred to our clinic with unexplained fever and a suspicion of endocarditis. On examination, blood pressure was 100/60 mmHg, pulse was 106 beats/min and he had 38.2 °C fever. A grade 3/6 pansystolic murmur was heard over the fourth left sternal border. The leukocyte count was 23,000 μl^{-1} with a left shift and erythrocyte sedimentation rate was 71 mm/h. Electrocardiogram showed right ventricular hypertrophy. Transthoracic echocardiographic (TTE) examination revealed a mass with a size of 19 × 22 mm at the basal level of the interventricular septum (IVS) (Figure 1). The mass was protruding into the right atrium. Colour Doppler echocardiography showed



Figure 1. Apical four-chamber transthoracic echocardiography shows dehiscence of patch (arrow) which mimics vegetation. Bulging of the atrial septum towards the left side as a sign of pulmonary hypertension is also seen.

a left-to-right shunt at the basal level of the IVS and 3/4 tricuspid regurgitation. Severe pulmonary hypertension was suggested by echocardiography. The pulmonary artery systolic pressure was estimated to be 92 mmHg. Bulging of the atrial septum towards the left side as a sign of pulmonary hypertension was also detected. A series of six blood samples were sent for culture.

The antibiotic regimen was changed in ciprofloxacin (200 mg daily) and sulbactam-ampicillin (1.5 g q6 h). All blood cultures were negative. Urgent surgery was planned, but the patient initially refused surgical therapy. Nine days later, right heart failure and hypotension developed with possibly multiple septic pulmonary emboli. The clinical status of the patient deteriorated and the patient underwent urgent open heart surgery. Through a midline sternotomy, extracorporeal circulation was instituted with aortic and bicaval cannulation and tepid (isothermic) blood cardioplegia. Right atriotomy was performed. During exploration, it was seen that the sutures securing the apical three-quarters of the patch were broken. There were neither a mass nor vegetation in the right atrium. The patch which was attached only at its basal aspect was mobile and it was protruding into the right atrium. The mass which was protruding into the right atrium during echocardiographic examination may therefore not have been vegetation, but the dehiscent ventricular septal defect patch. There were multiple vegetations with a diameter of up to 5 mm on the superior edge of the patch. The dacron patch was removed and the remnant of the vegetations on the septum were cleared. The ventricular septal defect was repaired with a new double velour patch. The patient was weaned off cardiopulmonary bypass in a stable hemodynamic state. *Enterobacter agglomerans* (*E. agglomerans*) was isolated from the vegetations. The antibiogram showed that this microorganism was sensitive to gentamicin, amikacin, aztreonam, ceftriaxone and imipenem. The antibiotic regimen was changed again to Gentamicin (80 mg q8 h) and ceftriaxone (1 g q8 h).

Discussion

Late endocarditis is rarely seen in patients with repaired TOF and it has been estimated to occur at

a rate of 0.07% per patient year [3, 5]. Transthoracic echocardiography provides important information for both the diagnosis and the management of endocarditis. Positive echocardiographic findings are major criteria for diagnosis of endocarditis [6]. In addition to vegetations or intracardiac abscesses, TTE also provides information for valvular structure, pathological flow and ventricular function. In our patient, dehiscence of the patch, which was already suggested by TTE, was seen at the basal level of the IVS during surgery. There were multiple vegetations on the patch. The partially dehiscent patch was mimicked as a pedunculated vegetation. Dehiscence of the patch can be mistaken for vegetations in patients with surgically repaired congenital heart diseases.

Isolation of a typical microorganism is one of the two major criteria for diagnosis of endocarditis [6]. Gram positive bacteria are the most commonly isolated organisms in endocarditis in grown-up congenital heart population due to dental procedures [3]. However, in our patient *E. agglomerans* was the cause of endocarditis after cholecystectomy. *E. agglomerans* is a rarely infectious agent in humans [6]. It belongs to the species Enterobacteriaceae, which are gram-negative bacilli. It is typically found on plants, foods and waters and is only a transient gut flora when ingested. Mostly it was occasionally detected as a nosocomial pathogen responsible for a variety of infections, including bacteremia, intra-abdominal infections, septic arthritis, osteomyelitis and cholecystitis. It rarely causes infective endocarditis [7]. Petakovic et al. [8] reported that *Escherichia coli* is the most frequently isolated organism in patients with cholecystectomy (55.2%). Enterobacter species are isolated in less than 1.7% of the patients. In our patient endocarditis most probably occurred due to bacteriemia during cholecystectomy.

The antibiogram is essential in the selection of antibiotics. In our patient, probably due to administration of multiple antibiotic regimens after cholecystectomy, all blood cultures were negative. The responsible pathogen *E. agglomerans* could only be isolated in the vegetation cultures.

According to the American Heart Association guidelines, complex cyanotic congenital heart

diseases carry a high risk for endocarditis and prophylaxis is recommended prior to interventional procedures [9]. Accordingly, it is recommended to use a prophylactic dose of ampicillin 2.0 g IM/IV plus gentamicin 1.5 mg/kg IV (maximum 120 mg) within 30 min before non-esophageal gastrointestinal procedures in these patients. Another dose of ampicillin 1 g IM/IV or amoxicillin 1 g PO is 6 h later. Endocarditis prophylaxis is not always protective [3], but the antibiogram obtained from the vegetation cultures showed that the microorganism was sensitive to gentamicin. If appropriate prophylaxis had been given, the patient possibly would not have developed infective endocarditis.

Repaired TOF is associated with an excellent prognosis [10, 11]. The incidence of late infective endocarditis in this patient group is rare but once endocarditis occurs, the associated mortality is high [1, 3, 4]. In such cases, urgent surgery is recommended to prevent embolic events and decrease mortality [3, 12–15].

The misdiagnosis of patch dehiscence as a vegetation, a rare organism causing infective endocarditis in human, negative blood cultures and isolation of the responsible microorganism only in the vegetation cultures are the important features of our case.

In summary, appropriate prophylaxis for endocarditis should be considered in all patients with surgically repaired cyanotic congenital heart disease.

References

- Rammohan M, Airan B, Bhan A, et al. Total correction of tetralogy of Fallot in adults-surgical experience. *Int J Cardiol* 1998; 63(2): 121–128.
- Ghai A, Silversides C, Harris L, Webb GD, Siu SC, Therrien J. Left ventricular dysfunction is a risk factor for sudden cardiac death in adults late after repair of tetralogy of Fallot. *J Am Coll Cardiol* 2002; 40(9): 1675–1680.
- Li W, Somerville J. Infective endocarditis in the grown-up congenital heart (GUCH) population. *Eur Heart J* 1998; 19(1): 166–173.
- Sohn S, Lee YT. Outcome of adults with repaired tetralogy of Fallot. *J Korean Med Sci* 2000; 15(1): 37–43.
- d'Udekem Y, Sluysmans T, Rubay JE. Tricuspid valve repair for tricuspid valve endocarditis after Fallot repair. *Ann Thorac Surg* 1997; 63: 830–833.
- Durack DT, Lukes AS, Bright DK. The Duke Endocarditis Service. New criteria for diagnosis of infective endocarditis: utilization of specific echocardiographic findings. *Am J Med* 1994; 96: 200–209.
- Porter P, Wray CC. Enterobacter agglomerans spondylodiscitis: a possible, unrecognized complication of tetracycline therapy. *Spine* 2000; 25: 1287–1289.
- Petakov G, Korica M, Gavrilovic S. Bacteriologic examination of gallbladder contents. *Med Pregl* 2002; 55: 225–228.
- Dajani AS, Taubert KA, Wilson W, et al. Prevention of bacterial endocarditis. Recommendations by the American Heart Association. *JAMA* 1997; 277: 1794–1801.
- Murphy JG, Gersh BJ, Mair DD, et al. Long-term outcome in patients undergoing surgical repair of tetralogy of Fallot. *N Engl J Med* 1993; 329: 593–599.
- Sugita T, Ueda Y, Matsumoto M, Ogino H, Sakakibara Y, Matsuyama K. Repeated procedure after radical surgery for tetralogy of Fallot. *Ann Thorac Surg* 2000; 70: 1507–1510.
- Dias AR, Pomerantzeff PM, Brandao CMA, et al. Surgical treatment of active infectious endocarditis: a study of 361 surgical cases. *Rev Bras Cir Cardiovasc* 2003; 18(2): 172–177.
- Tokuda Y, Matsumoto M, Sugita T, Yoshimura S. Methicillin-resistant staphylococcus aureus endocarditis following repair of tetralogy of Fallot. *Pediatr Cardiol* 2002; 23: 564–565.
- d'Udekem Y, David TE, Feindel CM, Armstrong S, Sun Z. Long-term results of surgery for active infective endocarditis. *Eur J Cardiothorac Surg* 1997; 11: 46–52.
- Sasaki H, Kawai H, Sawamura T, Takiya H. A case report of aortic valve and VSD Dacron patch infective endocarditis after VSD patch closure 15 years ago. *Nippon Kyobu Geka Gakkai Zasshi* 1993 Aug; 41(8): 1373–1377 (Abstract).

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