Case report

Pancarditis in a five-year-old boy affecting tricuspid valve and ventricular septum

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Abstract

A five-year-old boy with a structurally normal heart and recent history of adenotomy and gastroenteritis presented with Staphylococcus aureus pancarditis including endocarditis of the tricuspid valve and abscess of the ventricular septum. Surgical treatment consisted of debridement of the valvar vegetations and of the septal abscess. A seven-day continuous mediastinal irrigation with iodine solution was conducted to eliminate local infection sites as well as to prevent from constrictive pericarditis. The patient recovered uneventfully and is in excellent clinical condition with no residues one year after surgery.

Keywords: Endocarditis; Tricuspid valve; Pediatric; Antibiotics; Mediastinal infection

1. Introduction

Pancarditis represents a grave disease and may be related to different etiologies. Frequently, intracardiac catheters, previous cardiac operations or immunodeficiency are related to the etiology of pancarditis [1]. Independent of age the mortality in treated patients is 40%; in untreated patients with purulent pericarditis it approaches 85% [2]. Surviving patients may develop constrictive pericarditis [3].

2. Case report

The five-year old boy (body length: 105 cm, body weight: 13 kg) was admitted to the pediatric ICU with clinical symptoms of sepsis. He was lethargic and febrile (core temperature 39.8 °C). Osler nodes were located at his feet.

Recent medical history revealed adenotomy 6 weeks ago and gastroenteritis 10 days ago. In association with both events the patient had received a peripheral i.v. access for fluid replacement (in hospital as well as on outpatient basis). After initial recovery from his gastroenteritis he developed fever and nausea two days prior to admission.

Blood analysis revealed leucocytosis (15.9 G/l), markedly increased levels of C-reactive protein (178 mg/l) and procalcitonin (79.3 μg/l). Serial blood cultures were positive for Staphylococcus aureus. There was no evidence for immunodeficiency.

Transthoracic echocardiogram showed a severe insufficiency of the tricuspid valve with extensive vegetations particularly of the septal leaflet in an otherwise structurally normal heart; in addition a circular pericardial effusion was detected.

Pericardial puncture revealed 110 ml of purulent fluid positive for Staphylococcus aureus. Antibiotic therapy with flucloxacillin and gentamicin was started according to the ESC guidelines [4]. Due to the severe pancardiac manifestation rifampicin was added. In spite of the micro-organism proven sensitive for the chosen drugs, the child had positive blood cultures until surgery. The patient was cardiorespiratory stable on low doses of inotropes (dobutamine 6 μg/kg min, norepinephrine 0.3 μg/kg min), mechanical ventilation was not deemed necessary.

After four days of antibiotic treatment the clinical condition stabilized. However, serial echocardiographies revealed an increasing amount of oscillating vegetations on the tricuspid valve. Additionally an abscess of the ventricular septum had developed. Thus, indication for surgical revision was made.

A median sternotomy was performed leaving the pleural space closed and the pericardium was opened. The heart was completely covered with pus (Fig. 1). The situs was irrigated multiple times with diluted solutions of iodine (Betadine® solution 11%, Mundipharma Limburg/Lahn, Germany) and

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hydrogen peroxide (3%). The patient was placed on extracorporeal circulation using standard bicaval cannulation. The operation was performed on beating heart and mild hypothermia (32°C).

The right atrium was opened in typical fashion and the tricuspid valve was inspected. The findings were consistent with the echocardiographic observations (Fig. 2): The septal leaflet was almost completely covered and eroded (atrially and on the ventricular side) by large vegetations. The other leaflets were not affected. In addition, a subendocardial abscess in the perimembranous septum extending towards the pulmonary valve annulus was present. In the first step the valvar vegetations were carefully removed by sharp dissection. Complete removal of the valvar vegetations yielded in minor tissue loss at the septal leaflet avoiding foreign tissue or other more complex measures to maintain valve function. Therefore the residuals of the septal leaflets could be reconstructed by direct suture. In the next step the subendocardial abscess was carefully debrided. The culture of the vegetations verified the same micro-organism as in the blood culture.

The right atrium was closed and, after rewarming, the cardiopulmonary bypass was discontinued. Transesophageal echocardiography revealed mild incompetence of the tricuspid valve and no ventricular septal defect. Four irrigation tubes (two 12 F tubes retrosternal and two 12 F tubes retrocardial) were placed and for seven days a continuous irrigation with iodine solution (2%) was started. In order to monitor thyroid function T3, T4, and TSH were checked during irrigation therapy and short-term follow-up. The pericardium was not closed. Sternotomy was closed in a standard fashion. The patient was extubated after 96 h. During the seven days of continuous irrigation, irrigation fluid was negative for micro-organism. The patient recovered uneventfully and was discharged home after six weeks of dual i.v. antibiotic therapy with flucloxacillin and rifampicin.

One year after surgery the patient is in excellent clinical condition. Echocardiography revealed no abnormal findings other than a mild incompetence of the tricuspid valve.

3. Comment

Purulent pericarditis is a life-threatening disease with an incidence of 0.24 per 1000 pediatric admissions [1]. The most common organisms identified are streptococcus viridans species, staphylococcus, hemophilus and m. tuberculosis [1,2]. Commonly, it is associated with congenital heart disease and related surgical measures, intracardiac lines or immunodeficiency [1,2,5,6]. Rarely, as in our case, it occurs in pediatric patients with a structurally and functionally normal heart [7], as had also been reported in a 17-year-old patient after tonsillectomy leading to patient’s death [8].

In pediatric patients with congenital heart disease the majority of cases are treated successfully with antibiotics alone [6] but the timing and extension of surgery is a matter of controversy.

In the decision-making process the degree of endocarditis plays an important role. If endocarditis is yielding in severe valvar malfunction, related to large vegetations or substantial defects, altering the hemodynamic status, indication for surgery should be made [5,7]. Alternatively, if the patient is tolerating valvar malfunction well, it may be wise to wait for tissue consolidation and later reconstruction. Large pedicled vegetations with a risk of embolization likely require surgical removal as soon as possible. In addition, septal abscess formation adjacent to the membranous septum with a risk of perforation or damage of the conduction system, as shown by the echo in our case, should be addressed surgically.

Additionally, to prevent restrictive pericarditis after pyopericardium [3] continuous irrigation may be beneficial [9]. Continuous irrigation with iodine solution, particularly in children, may be of concern, but has been applied in other series [10] and demands monitoring of thyroid hormones.

Our case report is indicating that simply considering the diagnosis of pancarditis is of utmost importance even if the patient does not belong to a typical risk group and that early application of a radical surgical treatment including continuous pericardial irrigation with iodine solution may
lead to a complete clinical and functional recovery even in an extreme case.

References