Cardiology in the Young

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A rare case of mycotic pseudoaneurysm in a patient post Rastelli procedure with infective endocarditis

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Abstract

Mycotic pseudoaneurysm secondary to infective endocarditis is an uncommon complication in CHD with conduit placement. We report a case of late presentation of bacterial infective endocarditis with pseudoaneurysm in an 8-year-old girl with underlying pulmonary atresia with ventricular septal defect, post Rastelli procedure done at the age of 3 years old.

Brief Report

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Case report

An 8-year-old girl with underlying pulmonary atresia with ventricular septal defect who had undergone Rastelli procedure at 3 years old. She developed the first episode of bacterial infective endocarditis at the age of 7 years old in which vegetation was noted at the conduit and pulmonary artery bifurcation on transthoracic echocardiogram during follow-up. She was otherwise asymptomatic. She was treated with intravenous antibiotics for a total of 6 weeks with no positive blood cultures and this was followed by redo surgery for homograft conduit change and vegetation removal. She recovered well and was discharged after 7 days.

She defaulted follow-up and presented 4 months later to the general hospital with high grade fever, gaping wound over the mid sternal region which was actively oozing blood, with a mass on the lower third of her sternum measuring 3 × 3 cm which was pulsatile with purplish skin discolouration (Fig 1). Her blood culture grew methicillin-sensitive *Staphylococcus aureus* from three different sites and transthoracic echocardiogram showed vegetation in the conduit, adjacent ventricular septal defect patch with extension to the pulmonary artery bifurcation point. She was started on intravenous cloxacillin and gentamicin.

She was then transferred to our centre for further management. CT thorax was performed which showed mycotic pseudoaneurysm of the conduit, mediastinal abscesses with cutaneous fistula as well osteomyelitis of the sternal bone (Fig 2).

Despite high dose intravenous antibiotics, she continued to have high grade fever, raised inflammatory markers, and worsening wound breakdown. There was new communication over the upper third of her sternum which continued to bleed as the swelling progressed in size. In view of the large abscess and the friability of the infected site, the surgery was deemed to be very high risk and she was initially treated conservatively. However, 4 weeks after completion of IV antibiotics, she developed life-threatening bleeding requiring resuscitation in ICU.

The surgeon proceeded with high-risk operation for conduit change and wound debridement. Intraoperative findings were pockets of pus and blood clot collection seen at the retrosternal region, capsulated and friable tissue. The homograft conduit was severely damaged by multiple bacterial vegetation which causes the proximal and distal sutures to dehisce with formation of pseudoaneurysm. Some parts of the conduit were ruptured and leaked into pericardial space. Histopathological examination taken from the conduit site intra-operatively showed numerous pus cells; however, there was no bacterial growth isolated from the sample.

Postoperatively she was ventilated for 2 days in the ICU with uneventful recovery. She completed 12 weeks of cloxacillin, 8 weeks of rifampicin, and 2 weeks of gentamicin in the ward. Her inflammatory markers were low and she was discharged home well. She was reviewed in the clinic after 3 months and a repeat ECHO showed no vegetation. A positron emission tomography scan surveillance was also done showed no fluorodeoxyglucose uptake at the conduit site.

Discussion

The Rastelli procedure which involves closure of ventricular septal defect and bypass of the right ventricular outflow tract using extracardiac conduit remains the procedure of choice for the repair of pulmonary atresia ventricular septal defect. The incidence of infective endocarditis is rare which is less than 1% for homograft and 5-year freedom from endocarditis has been reported to be as low as 84 to 88%.[1] Review of a population-based registry of all Oregon residents over 30 years in age group of less than 19 years old who underwent major CHD repair showed

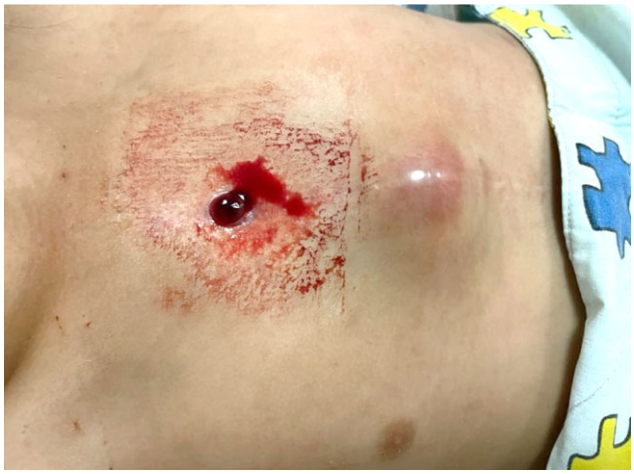

Figure 1. Gaping wound mid sternotomy wound discharging blood and subcutaneous swelling over lower third of sternum.

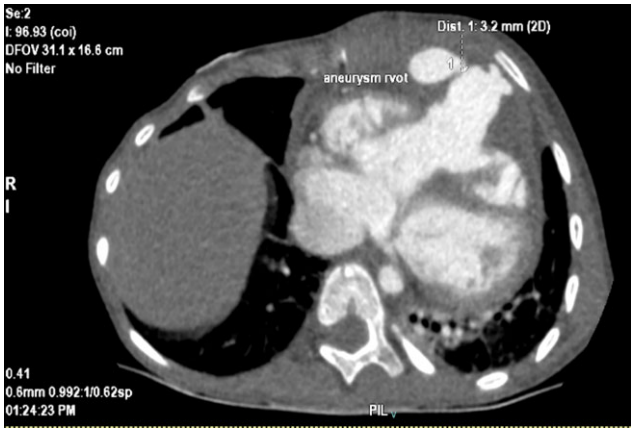

Figure 2. Pseudoaneurysm of conduit at the right ventricular outflow tract (RVOT).

cumulative risk of postoperative infective endocarditis in which for patients with pulmonary atresia ventricular septal defect the incidence of infective endocarditis post-surgery is at 6.4% at 15 years.[2] Main pathogenesis of infective endocarditis on prosthetic materials is the biofilm formation that provides a unique and complex environment for organisms to attach to and thrive on the surface. Both antimicrobial agents and immune cells have difficulty in penetrating biofilm, and the ability of antimicrobial agents to kill biofilm-associated organisms is greatly reduced. Because of this, infection relapse at a prosthetic valve site is thought to be increased in this condition.[3]

The lifetime risk of a second infective endocarditis episode has been estimated to be between 2 and 22%.[4] When the same organism is isolated during a relapse, there is often uncertainty as to whether the repeat infection is a relapse of the initial infection or a new infection.

Mycotic pseudoaneurysm which is a rare vascular pathology may develop due to infection of a pre-existing aneurysm that accounts for 13.3% of bacterial origin. The bacterial organism involved in 55% of it belongs to gram positive cocci. *Staphylococcus aureus* accounted for 45% and streptococci 10%. Salmonella accounts for 30-40%. The early presentation are fever, malaise, and weight loss. The late clinical manifestations are profound septicaemia or with consequences of rapid aneurysm expansion, rupture, and life-threatening bleeding.[5]

Our patient developed infective endocarditis 4 years after the Rastelli procedure and following the redo surgery, she relapsed 4 months later. There was a delay in seeking medical treatment and hence she already had disseminated disease secondary to methicillin-sensitive *Staphylococcus aureus* sepsis upon presentation to the hospital. She continued to deteriorate despite antibiotic therapy.

Early surgery is warranted as she has persistent sepsis, large mediastinal abscess, and mycotic pseudoaneurysm which is a rare complication of infective endocarditis.[3,6–7] However, she was treated conservatively as surgery is deemed to be very high risk. Following rupture of the pseudoaneurysm complicated by life-threatening bleeding, a high-risk operation was successfully done.

Conclusion

Mycotic pseudoaneurysm is a rare life-threatening complication of infective endocarditis that can rupture spontaneously. Early diagnosis and clinical suspicion of infective endocarditis in patients with conduit material are important in preventing disseminated disease. During clinic follow-up, clinicians will need to emphasise to the caregivers the importance of dental and skin hygiene, monitoring for surgical site infection. Appropriate antibiotics should be administered early and if there is persistent sepsis with mediastinal abscess and mycotic aneurysm early surgical intervention is warranted.[5,6–7] Patients with a history of infective endocarditis should also be monitored closely for relapse.

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Conflicts of interest. None.

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