Cardiology in the Young

cambridge.org/cty

Constructive pericarditis following epicardial pacemaker implant: a diagnostic dilemma

Naveed Khan[1], Supratim Sen[2] and Gaurav Kumar[3]

[1]Dept of Cardiac Anaesthesia, NH SRCC Children's Hospital, Mumbai, India; [2]Dept of Paediatric Cardiology, NH SRCC Children's Hospital, Mumbai, India and [3]Dept of Paediatric Cardiac Surgery, NH SRCC Children's Hospital, Mumbai, India

Brief Report

Cite this article: Khan N, Sen S, and Kumar G (2024) Constructive pericarditis following epicardial pacemaker implant: a diagnostic dilemma. *Cardiology in the Young* **34**: 2691–2693. doi: 10.1017/S1047951124036217

Received: 15 September 2024
Revised: 24 October 2024
Accepted: 24 October 2024
First published online: 19 December 2024

Keywords:
Congenital complete heart block; Permanent pacemaker insertion; Constrictive pericarditis; Right ventricular failure; AV dyssynchrony

Corresponding author:
Gaurav Kumar; Email: geekay.doc@gmail.com

Abstract

Constrictive pericarditis is a rare complication after cardiac surgery. It is mostly seen in adults. We report a case of constrictive pericarditis in a 3-year-old child with right ventricular dysfunction after permanent pacemaker implantation during infancy for congenital complete heart block. Suspicion of constrictive pericarditis must be kept in mind during evaluation.

Introduction

Congenital complete heart block complicates one in 15,000–22,000 live births. Permanent pacemaker implantation is the main therapy. Constrictive pericarditis is an unusual complication of cardiac surgery; its actual incidence is not well known, although it may approach 2–3%.[1] We present a case of constrictive pericarditis in a child 3 years after epicardial pacemaker implant for complete congenital heart block during infancy.

Case report

A 3-year 8-month-old female child presented with complaints of gradually progressive dyspnoea on exertion. She was an antenatally diagnosed case of complete heart block with an ostium secundum atrial septal defect in a mother with Sjogern's syndrome. She was born at 28 weeks gestation via caesarean section and stayed in neonatal ICU for 40 days due to prematurity, respiratory distress, and heart block and discharged on home oxygen therapy. She underwent single chamber (right ventricle) epicardial permanent pacemaker through a sub xiphoid incision at five months of age due to heart rate of <50/min.

Her parents noticed gradually increasing dyspnoea on exertion for the past four months without any other medical history. On examination, she had hepatomegaly and mild ascites. Echocardiogram revealed 18 mm secundum atrial septal defect with bidirectional shunt (Figure 1a) with moderate mitral and moderate tricuspid regurgitation with gradient of 22 mm Hg. (Figure 1b) Tricuspid annular plane systolic excursion was 8 mm. The inferior caval vein was dilated with no respiratory collapse. Paradoxical septal motion was seen with severe right ventricular systolic dysfunction. The left ventricular function was normal. Pericardium was thickened. There was no exaggerated respiratory variation of her tricuspid and mitral inflow velocities.

She was started on oral diuretics although her symptoms improved, the echocardiography findings remained the same. The atrial septal defect was not thought to be the aetiology of the presentation as the shunting was bidirectional, and there was severe right ventricular dysfunction in the absence of pulmonary hypertension.

The differential diagnosis was either pacing related atrio ventricular dyssynchrony and cardiomyopathy or pericardiotomy/pacing lead induced constrictive pericarditis. The ECG morphology was suggestive of optimal septal pacing and a QRS duration of 156 ms. Cardiac cath revealed elevated systemic venous pressures and elevated and equalised right and left ventricular end diastolic pressures (21 mm Hg) with mildly elevated pulmonary arterial pressures (34/20/27 mm Hg). The Qp/Qs was 2:1. It was decided to address the constrictive pericarditis along with changing the pacing to AV sequential.

Intraoperatively, the pericardium was found to be thickened and adherent to the heart (Figure 2). The pacing lead had looped over the anterior surface of the heart. Pericardiectomy and dual chamber (right atrium and left ventricular) pacing was done. Atrial septal defect was not closed to avoid cardiopulmonary bypass after pericardiectomy and the defect being amenable to device closure. There was a significant reduction in central venous pressures and improved right ventricular contractility. Histopathology of excised pericardial tissue showed fibrosis and chronic inflammation. Postoperative recovery was uneventful.

© The Author(s), 2024. Published by Cambridge University Press.

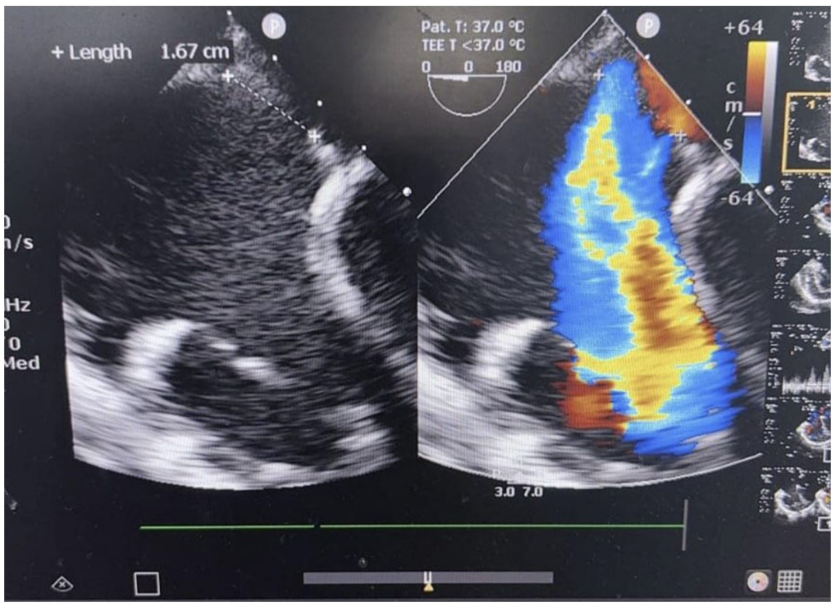


Figure 1(a). Transoesophageal echo with mid oesophageal four chamber view showing the atrial septal defect with bidirectional shunt.

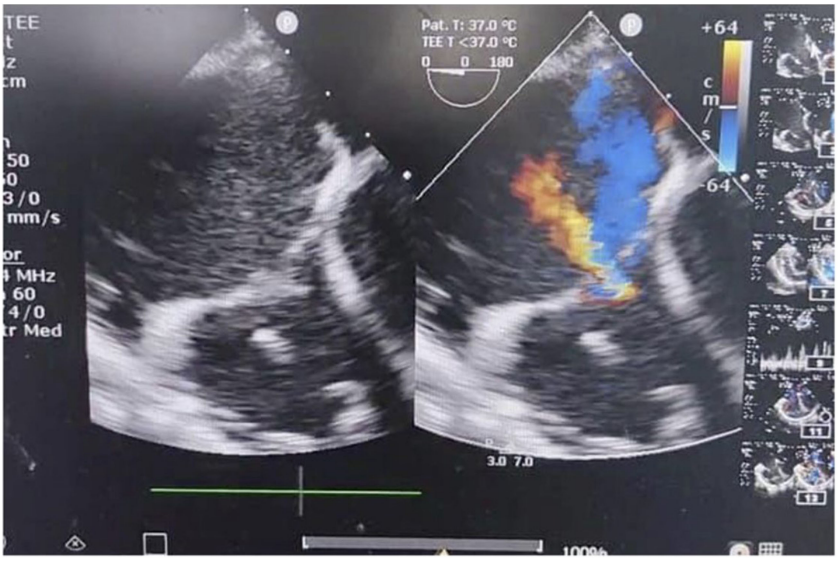


Figure 1(b). Transoesophageal echo with mid oesophageal four chamber view showing moderate tricuspid regurgitation.

Discussion

Constrictive pericarditis is a known complication of cardiac surgery. Pathophysiological determinant is not known although mechanisms like pooling of blood in the pericardium and postoperative Warfarin administration have been implicated.[1] A few paediatric cases have been reported. Siddharthan et al reported a case in a 5-year-old girl two years after atrial septectomy and pulmonary artery banding.[2] Okamoto et al reported two cases in children 5 years after ventricular septal defect closure.[3] Saiki and colleagues reported a case in an 18 year old who had undergone ventricular septal defect closure at 2 years of age,[4] and Kim et al reported a case in 14 year old 22 months after he had undergone a surgical atrial septal defect closure.[5]

Post pericardiotomy syndrome in the early postoperative period is related to later pericardial complications.[6] Post pericardiectomy syndrome is thought to be due to an autoimmune response provoked by the presence of autologous tissue or blood in the pericardial space and can happen after any procedure in which the pericardium has been opened. It typically presents as fever, chest pain, and occasionally cardiovascular compromise[7] Zeltser et al reported post pericardiectomy syndrome in 2% of children undergoing isolated pacemaker implantation. The median time from implantation to syndrome was 12.5 days (range 8 to 22 days)[7] Our patient had no features suggestive of post pericardiectomy syndrome after the first surgery.

We postulate that our patient had a gradual and subclinical pericarditis following the epicardial pacemaker, with further clinical deterioration due to right ventricular dysfunction secondary to chronic atrioventricular dyssynchrony. The atrial septal defect may have helped decompress the elevated venous pressures and mask symptoms in this case, leading to a delayed presentation.

https://doi.org/10.1017/S1047951124036217 Published online by Cambridge University Press

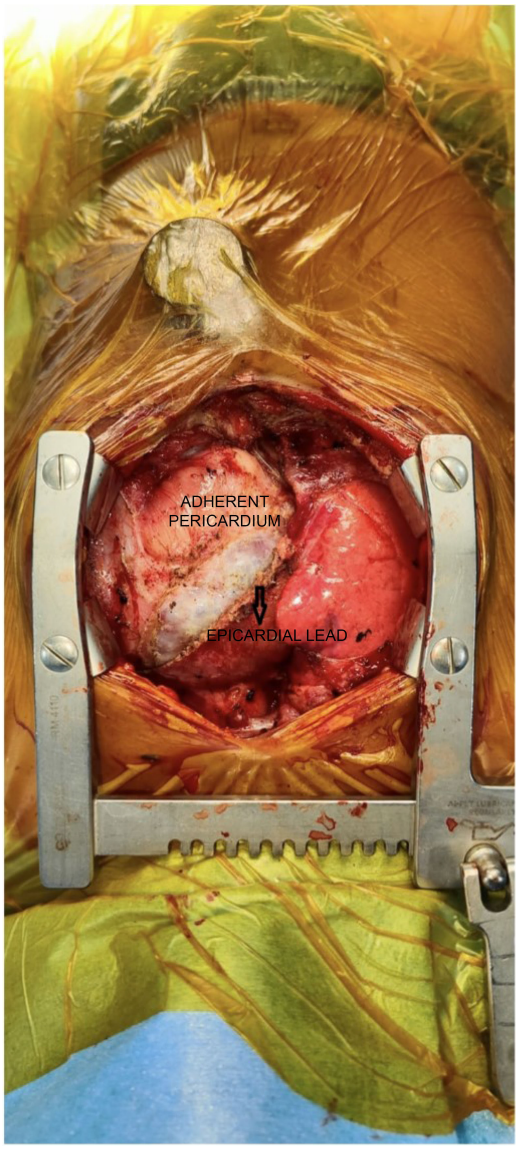


Figure 2. Intraoperative picture showing adherent pericardium.

Conclusion

Constrictive pericarditis is relatively rare in paediatrics and is usually secondary to acute pericarditis or tuberculous pericarditis. However, it can also occur years after pericardiotomy and cardiac surgery. Suspicion and evaluation should be part of the diagnostic workup of patients with right ventricular failure following single chamber epicardial pacing, as only changing the pacing to AV sequential may not completely relieve the symptoms.

Acknowledgements. None.

Author contribution. Informed consent was taken from the patient's guardian for this publication.

Financial support. This research received no specific grant from any funding agency, commercial, or not-for-profit sectors.

Competing interests. The authors declare none.

References

1. Gaudino M, Anselmi A, Pavone N, Massetti M. Constrictive pericarditis after cardiac surgery. Ann Thorac Surg 2013; 95: 731–736.
2. Deepti S, Gupta SK, Ramakrishnan S, Talwar S, Kothari SS. Constrictive pericarditis following open-heart surgery in a child. Ann Pediatr Cardiol 2016; 9: 68–71.
3. Okamoto N, Shiraishi H, Konishi H, Momoi MY. Effusive constrictive epicarditis that developed more than 5 years after ventricular septal defect closure: two cases relieved by epicardiectomy. Pediatr Cardiol 2005; 26: 872–876.
4. Saiki H, Masutani S, Tamura M, Senzaki H. Constrictive pericarditis developed after childhood repair of ventricular septal defect. Pediatr Int 2013; 55: 512–516.
5. Kim BJ, Ma JS. Constrictive pericarditis after surgical closure of atrial septal defect in a child. J. Korean Med Sci 1998; 13: 658–661.
6. Khan AH. The postcardiac injury syndromes. Clin Cardiol 1992; 15: 67–72.
7. Zeltser I, Rhodes LA, Tanel RE, et al. Post pericardiotomy syndrome after permanent pacemaker implantation in children and young adults. Ann Thorac Surg 2004; 78: 1684–1687.

https://doi.org/10.1017/S1047951124036217 Published online by Cambridge University Press