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Case Report

Patent ductus arteriosus with pulmonary endarteritis leading to pulmonary infarction in a 9-year-old boy: a case report

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Abstract

Background: Pulmonary endarteritis secondary to Patent ductus arteriosus (PDA) can present even in silent PDAs. Pulmonary endarteritis is treated with prolonged duration of antibiotics followed by PDA closure. It can also cause septic pulmonary emboli requiring critical care if multi-organ dysfunction ensues. Case presentation: A 9-year-old boy had high grade fever for one week and few nonspecific complaints. Echocardiogram showed PDA with infective endarteritis. Child was admitted with IV antibiotics. CECT chest done for resurgence of fever and need for increased oxygen demand showed multiple septic pulmonary emboli with pulmonary infarction. Surgical closure of PDA prevented further clinical deterioration. Conclusion: This case highlights the poor medical scenario of rural communities of Nepal. Such life- threatening complication can be prevented by timely recognition of the condition which is only possible by implementation of standard, accessible and affordable health care system across the country.

Keywords: patent ductus arteriosus; pulmonary endarteritis; septic emboli; pulmonary infarction

Introduction

Ductus Arteriosus (DA) is an essential vascular communication between aorta and pulmonary artery in fetal life. DA shunts blood from pulmonary artery to descending aorta to bypass oxygenated blood from lungs to distal organs in fetus [1].

It is known as PDA if persists beyond the age of three months. PDA can be either silent or hemodynamically significant. Transcatheter device closure of PDA is an effective, economical and less invasive alternative to surgical closure in patients other than neonates. Anatomically unfavorable PDAs are dealt with either ligation or clipping [2].

Here we present a case of pulmonary endarteritis with PDA with septic pulmonary emboli leading to pulmonary infarction in a 9-year-old boy.

Case report

A 9-year-old boy presented with history of on and off high-grade fever for 1 week, associated with loss of appetite, joint pain and myalgia. He was tachypneic (RR:32 per min), tachycardic (HR: 143 beats per minute) with oxygen saturation of 93% in room air. Child was underweight (BMI:13 kg/m^2) with mild pallor. Auscultation revealed decreased air entry in left lung fields with few crepitations in addition to continuous murmur of grade 3/6 in left second intercostal space. There was no hepatosplenomegaly. No other obvious abnormal external features were noted in skin and other appendages. Proper consent was taken from the father prior to history taking and examination.

His lab reports showed anemia (Hb: 8.8 mg/dl) and raised C-Reactive Protein (96 mg/dl). Chest x-ray revealed wedge shaped homogeneous opacification in left middle zone and multiple small to medium opacities on both lung fields along with borderline cardiomegaly (Fig. 1a). ECHO revealed hemodynamically significant PDA (pulmonary end 3.0 mm) with multiple vegetations in main pulmonary artery, largest measuring approximately 9 mm × 6 mm (Fig. 2). Pulmonary artery pressure was normal. Intravenous antibiotics (Inj Ceftriaxone and Inj Amikacin) were started after sending three blood culture samples. Child became febrile after five days of IV antibiotics and had increased supplemental oxygen requirement. CECT chest revealed multiple septic emboli with pulmonary infarction (Fig. 3). All three blood culture reports were sterile, likely due to use of prior antibiotics. To prevent further deterioration surgical closure of PDA was done. Child was discharged from hospital after 3 weeks of IV antibiotics. Child continued another 3 weeks of IV Ceftriaxone in a health post near his house. He was clinically better and the lab parameters along with ECHO and Chest x-ray radically improved. He was doing well in his first follow up after a month of discharge.

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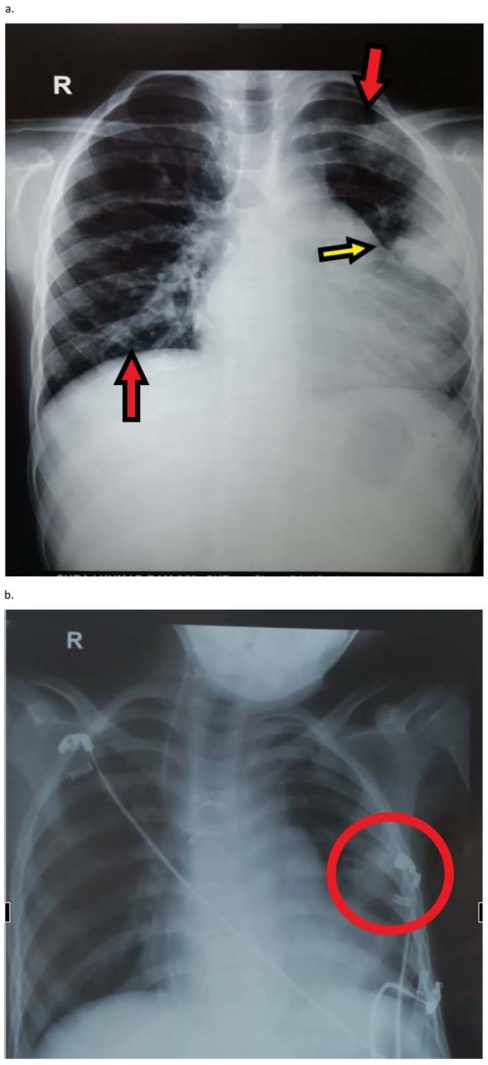

Figure 1. Chest x-ray of the child at the time of presentation (a) showing various bilateral nodular densities (red arrows), along with subpleural wedge shaped opacity on left lung (yellow arrow). They were significantly reduced at the time of discharge (circle) (b).

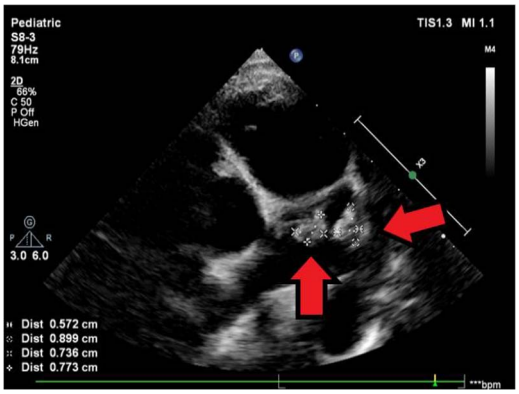

Figure 2. Parasternal short axis view in Transthoracic echocardiogram showing multiple large vegetations in Main Pulmonary artery.

Discussion

PDA with infective endarteritis is common. There is risk of Infective endarteritis even in the silent PDA which prompts prophylactic closure of silent PDA [3]. Vegetations usually develop at the

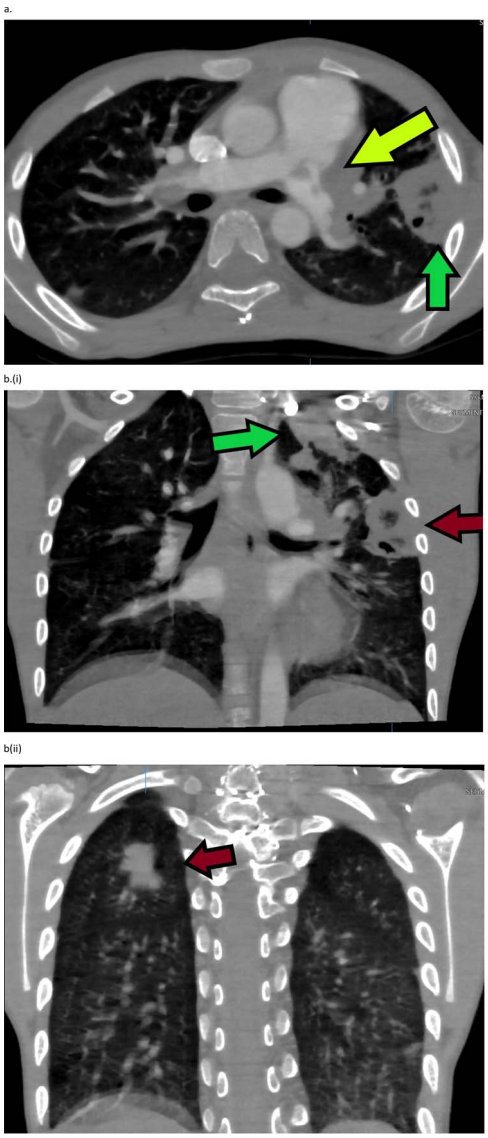

Figure 3. (a) Axial section showing multiple vegetations in main pulmonary artery and distal LPA (yellow arrow). Pulmonary infarction with cavitation in the left lung (green arrow). (b) (i) A coronal section of CECT showing septic nodule in left upper lobe with feeding vessel sign (green arrow). A peripheral wedge-shaped opacity adjoining the adjacent pleura in the left lung with cavitation (red arrow). (ii) Septic pulmonary nodule in right upper lobe.

pulmonary end of PDA due to venturi effect, microscopic tears in the endothelium makes them susceptible for infections and can subsequently lead to thrombus formation. Thereafter, fibrin deposition and aggregation lead to vegetation growth [4].

Most patients benefit from long course of IV antibiotics. Candidates for surgical interventions of right sided IE include failure to respond to antimicrobial therapy, large vegetations (>20 mm for right sided IE) or those with evidence of septic emboli [5].

One of the complications of Pulmonary endarteritis is the continuous showering of septic particles into lungs or Septic pulmonary embolism (SPE). The diagnosis is usually made by CT although the findings are not pathognomonic. Typical CT findings of SPE are nodules of different sizes conforming to the different time of their formation, cavitations or feeding vessel sign [6]. Pulmonary vasculitis, Infections like Tuberculosis or fungal infection are common differentials of SPE. Lesions developing in

short duration of symptoms (<12 weeks) are usually of infectious origin while chronic or indolent (>12 weeks) are likely to be due to malignancy or vasculitis [7].

Pneumonia, indwelling Catheter related infections, liver abscesses, Tricuspid Valve vegetations are usually the common precursors of SPE. Commonest organisms are usually *Staphylococcus aureus*, *Pseudomonas Aeruginosa*, *Escherichia coli*, Klebsiella pneumonia etc. Low oxygen levels and altered mental status are poor prognosticators of SPE [8].

Recent guideline for management of Infective endocarditis has upgraded its recommendation in high-risk groups which include certain patients with congenital heart disease, history of previous Infective endocarditis, prosthetic implants or ventricular assist devices. Antibiotic prophylaxis is recommended for this group of population in dental extractions, oral surgery procedures, and procedures requiring manipulation of the gingival or periapical region of the teeth (I C); and systemic antibiotic if undergoing invasive procedures related to respiratory, gastrointestinal, genitourinary, skin, or musculoskeletal systems (II B) [9].

Death from Cardiovascular disease in children below 15 years of age in Nepal is 1.5 per 100 000 which is 3% of total deaths. Endocarditis accounts for 0.04% of total deaths (CI 95%) and 0.03% of total DALYs (CI 95%) in all age groups. Health facilities and trained manpower are mainly focused in cities, treatment and preventive strategies are usually out of reach of rural communities. This could be contributing to the increasing trends of cardiovascular disease in Nepal [10].

Conclusion

While PDA with endarteritis is only of historical importance in developed nations, children in developing counterparts still suffer its consequences. It is thus important to find measures to provide health facilities to incorporate children from all tiers of society. Proper and early detection and management of patients is essential to prevent complications of PDA.

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Conflict of interest

We declare no conflict of interest.

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Ethical approval

Ethical approval was taken from Institution Review Board (IRB) of our institution.

Consent

Informed and written consent was taken from the guardian of the child.

Guarantor

Dr. Urmila Shakya, Head of Department, Department of Pediatric Cardiology.

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