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CONGENITAL HEART DISEASE

CASE REPORT: CLINICAL CASE

Infective Endarteritis in a Patient With Patent Ductus Arteriosus and Rheumatic Heart Disease

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ABSTRACT

We present a 10-year old patient from Ethiopia with 3 pathologic findings: infective endarteritis with known patent ductus arteriosus and rheumatic heart disease. The patient was managed with antibiotics and ligation of the patent ductus arteriosus. She was followed up with monthly benzathine penicillin and recovered well. (JACC Case Rep. 2024;29:102631)

HISTORY OF PRESENTATION

A 10-year old girl presented with worsening of shortness of breath and fever of 1-week duration. She had also shortness of breath, easy fatigability, and anasarca for 2 weeks. The patient had previously been diagnosed with patent ductus arteriosus (PDA) and rheumatic heart disease (RHD) and was on routine diuretics and monthly benzathine penicillin.

On physical examination, she was in respiratory distress without clubbing or cyanosis. Her vital signs were a heart rate of 140 beats/min and respiratory rate of 38 breaths/min, elevated axillary temperature of 38.8° C, normal blood pressure (100/60 mm Hg), and an oxygen saturation of 95% with intranasal (prong) oxygen of 3 L/min. There were basal rales on chest examination.

On cardiovascular examination, she had distended jugular veins, grade III holosystolic murmur at the apex radiating to the axilla, and machinery murmur at the pulmonic area radiating to the back. Abdominal examination showed a palpable liver 4 cm below the right costal margin with a total liver span of 14 cm (hepatomegaly) and a sharp border with mild tenderness. The spleen was palpable at the left sternal border 1 cm below the costal margin across the growth line (splenomegaly). She had no peripheral stigmata for infective endocarditis.

TAKE-HOME MESSAGES

- Once patent ductus arteriosus is diagnosed, children should be closely monitored and managed accordingly to prevent infective complications.
- In geographies with endemic rheumatic heart disease, patients with congenital heart disease even under close clinical follow-up should be carefully studied with echocardiography to detect early changes of rheumatic heart disease.

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ABBREVIATIONS AND ACRONYMS

CHD = congenital heart disease

PDA = patent ductus arteriosus

RHD = rheumatic heart disease

MEDICAL HISTORY

The patient was diagnosed with PDA at age 1 year with a heart murmur, which was confirmed with echocardiography at a tertiary hospital. She was not brought for follow-up until 8 years old because of travel costs that were unaffordable for the family.

At age 8 years, she presented with shortness of breath, cough, and fever. She was then diagnosed with RHD (mild mitral and aortic valve regurgitation) and was given diuretics and monthly benzathine penicillin 1.2 million IU with regular follow-up.

INVESTIGATIONS

Blood tests showed normal cell count and hemoglobin, hematocrit, liver enzyme, electrolyte, urea, and creatinine levels. The erythrocyte sedimentation rate was high at 85 mm/h. Following established protocols,[1] a blood culture grew *Klebsiella pneumoniae* that was reported as resistant to amikacin, meropenem, ciprofloxacin, and ceftriaxone.

Two-dimensional echocardiography revealed a dilated left atrium and ventricle with moderate mitral valve regurgitation (**Figure 1**, Video 1). Both mitral valve leaflets were thickened (5 mm during diastole in the parasternal long-axis view). The movement of the mitral leaflets was normal with clean commissures (Video 1). There was no mitral stenosis based on Doppler and planimetry measurements and no calcification or thickening of the subvalvular apparatus (**Figure 2**, Video 2). A small PDA (continuous left to right shunt and peak pressure gradient of 50 mm Hg) was confirmed. At the pulmonic end, an oscillating mass (2 × 5 mm) next to ductal orifice was seen (**Figure 3**, Video 3). The pulmonary valve was normal, with no sign of aneurysmal ductus arteriosus. Additionally, mild central aortic regurgitation and mild tricuspid regurgitation with a systolic peak pressure gradient of 45 mm Hg were seen. The left ventricular ejection fraction was 64%.

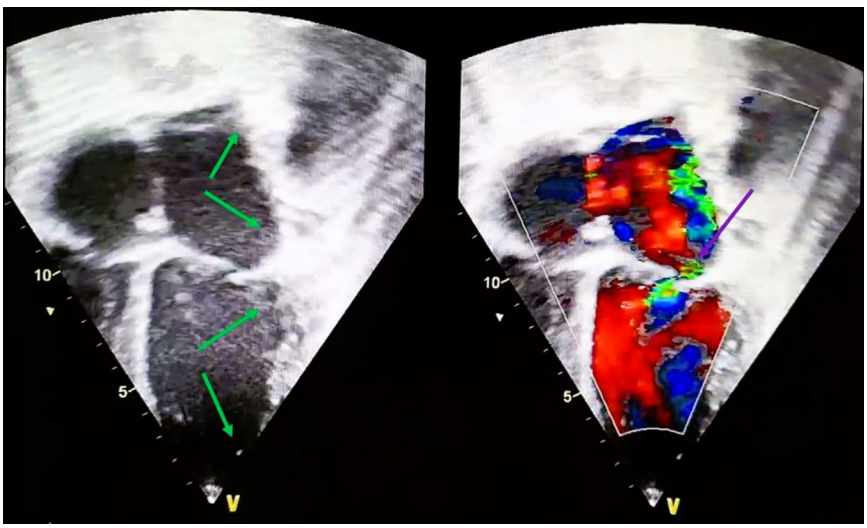
MANAGEMENT

The patient was hospitalized and treated with diuretics and antibiotics (vancomycin 360 mg 4 times a day for 6 weeks and gentamicin 40 mg 3 times a day for 2 weeks). After 2 months, blood cultures were negative, and no more vegetation was seen (**Figure 4**). She was discharged and scheduled for PDA ligation, which was done after 5 months on the waiting list.

OUTCOME AND FOLLOW-UP

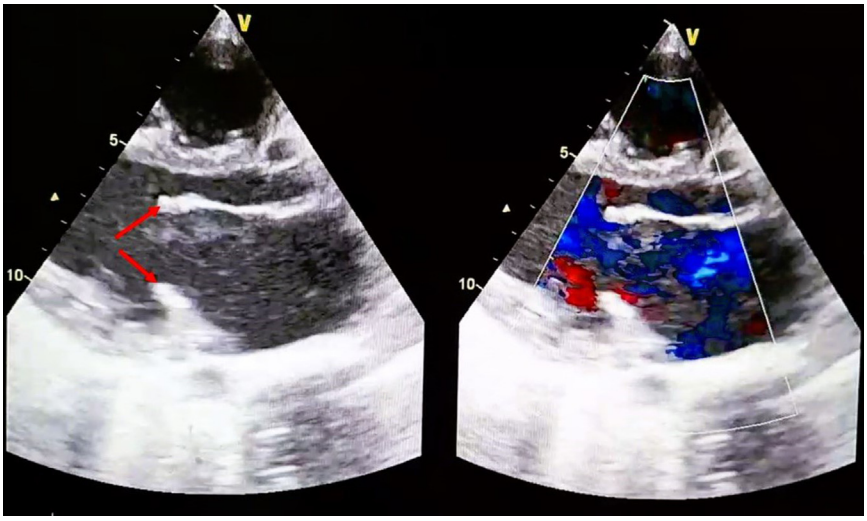
The patient was evaluated 2 months after the ligation and remained in good condition. She continued with standard RHD treatment, which was benzathine penicillin.

FIGURE 1 Evidence of Mitral Regurgitation and Dilated Left Chambers



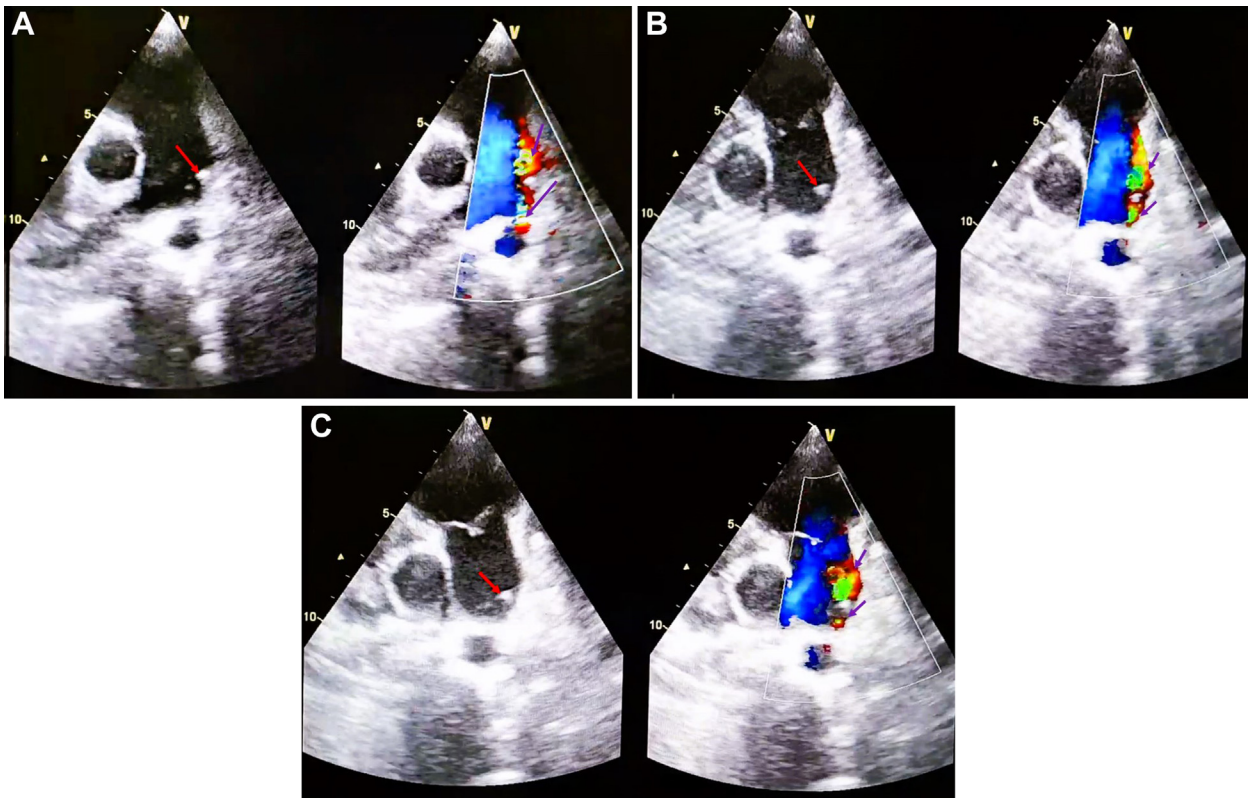
An apical 4-chamber view showing the turbulent flow across the mitral valve during systole (purple arrow) and dilated left heart chambers (green arrow).

FIGURE 2 **Evidence of Thickened Mitral Valve Leaflets, Typically Occurring With RHD**



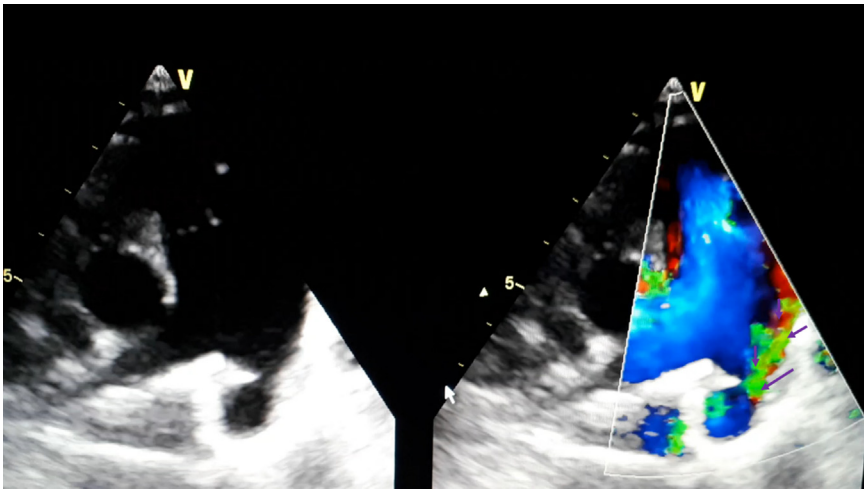
A parasternal long-axis view demonstrating thickened mitral valve leaflets (red arrows).

FIGURE 3 **Evidence of a PDA and a Vegetation Consistent With Endarteritis**



A high parasternal short-axis view demonstrating the turbulent flow across the patent ductus arteriosus (purple arrow) and the vegetation at the pulmonic side (red arrow). (A) Midsystolic phase, (B) early systolic phase, (C) early diastolic phase.

FIGURE 4 Visualization of the PDA and No Evidence of Endarteritis After Treatment



A high parasternal short-axis view showing the turbulent flow across the patent ductus arteriosus (purple arrows), without vegetation, after the treatment with antibiotics for 6 weeks.

DISCUSSION

Congenital heart disease (CHD) and RHD affect millions of children worldwide. RHD is a major challenge in developing nations like Ethiopia, where the prevalence ranges from 1 to 14 per 1,000 children.[2] A study from Cameroon showed that patients screened by echocardiography for murmur had either RHD or CHD but not mixed.[3] RHD and CHD can be complicated with endarteritis and endocarditis, with high mortality and morbidity in Africa.[4]

PDA is one of the most common CHDs, accounting for 5% to 10% and with significant morbidity and mortality.[5] One of its major complications is infective endarteritis, an inflammation of the endothelial surface. Infectious vegetations might also present originating from the valvular lesions or the turbulent flow across the PDA.[6]

Detailed echocardiographic evaluation for vegetation is crucial in patients with fever and medical history of either CHD or RHD. The focus is mostly on the valves (as in endocarditis), yet vegetations can also be identified at the level of the PDA, mostly at the pulmonic side as previously reported[7,8] and also presented in our case. In the past, because of a lack of antibiotics, the morbidity and mortality of endarteritis was significant, reaching up to 45%, comparable with the current situation in low- and middle-income countries.[9]

Based on the bacterial culture, *K pneumonia* was reported in our case, but gram-negative bacteria including *Klebsiella* species are generally uncommon causes of infective endarteritis or endocarditis.[10] The culture positivity and cure rate with antibiotics for infective endarteritis caused by *K pneumoniae* was reported to be high,[11] which is in line with our case where the patient showed excellent response to the therapy.

CONCLUSIONS

We present a case of a pediatric patient who had RHD and untreated PDA complicated with culture-positive endarteritis at the pulmonic end of the PDA. The endarteritis was medically treated, and the PDA was surgically ligated. Children with CHD can acquire RHD and are at risk for endocarditis or endarteritis unless properly treated and followed. Timely access to adequate care is pivotal.

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KEY WORDS **congenital heart disease, infective endarteritis, patent ductus arteriosus, rheumatic heart disease**

APPENDIX **For supplemental videos, please see the online version of this article.**