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Case Report

Fungal Infective Endocarditis Post Device Occlusion in Perimembranous Ventricular Septal Defect

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ABSTRACT

Recent increase in deployment of trans-catheter devices such as septal or ductal occluding coils and devices has been a possible risk factor for infective endocarditis, predominantly in the initial post deployment period before endothelialization has ensued. Though a long-term study of trans-catheter Atrial Septal Defect (ASD) closure revealed no cases of Infective Endocarditis, some case reports of endocarditis in trans-catheter device closure of ASD, VSD and Patent ductus arteriosus (PDA) advocate that residual defect after device occlusion may be a factor in the risk for Infective Endocarditis. We herein describe the case of a 9-month-old female patient who underwent device closure for peri-membranous ventricular septal defect (VSD) and developed fungal infective endocarditis in early post occlusion period which was confirmed on blood culture. Despite treatment with appropriate antifungal as per sensitivity, clinical condition of the patient deteriorated and it was decided to manage her with surgical explantation of device and closure of defect.

Keywords: Device occlusion, Infective endocarditis, Trans-catheter, Ventricular septal defect.

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INTRODUCTION

Ventricular septal defect (VSD) is one of the most common congenital heart defects.[1,2] The traditional treatment was surgical closure which has a very low risk of morbidity and mortality.[3] One of the most dreaded complications of this surgery is a complete atrioventricular block that is described in 0.7-3.1% of cases.[3,4] Ever since the first attempt was made to close a VSD percutaneously in 1988 by Lock *et al.*

Transcatheter closure of peri membranous ventricular septal defects has been established as a procedure of choice in suitable candidates.[5] A study done to compare surgical closure versus transcatheter closure of VSD has revealed transcatheter closure to be less invasive, having a shorter recovery time and requiring lesser hospital stay hence less morbidity. The incidence of complications in both were comparable.[6]

Main complications in VSD device closure are risk of dysrhythmias, hematoma of groin, residual shunt hemolysis requiring device removal, device embolization and infective endocarditis with infective endocarditis being a rare entity.[7]

CASE REPORT

Present case of a 9-month-old female patient who underwent device closure for perimembranous VSD measuring 5mm with 10mm lepu device, under fluoroscopic and echo guidance via antegrade approach. She was administered 50mg/kg of Cefotaxime before the procedure which was repeated 12 hours after the procedure. The procedure was successful and post procedure echo showed well profiled device with no residual leak. She was discharged on oral Cefixime for 72 hours and Loprin for 6 months.

She developed fever, and reported back to OPD after 72 hours. Her antibiotics were extended for 3 weeks, but the fever didn't subside. She was febrile with a temperature of 39 degrees Celsius, heart rate was 150/min, respiratory rate was 30/min. A new onset systolic murmur grade 3/6 was heard at left lower sternal border. No visceromegaly, splinter hemorrhages and Roth spots were observed. She was admitted for additional investigations. Laboratory investigations revealed raised total leukocyte count, CRP and ESR. Blood cultures revealed Candida Tropi-calis sensitive to Fluconazole. She was thus started on oral fluconazole at 6 mg/kg/day. Echocardiography revealed 13 x 14 mm vegetations attached to tricuspid valve septal leaflet (Figure-1).

She was placed on IV fluconazole at 10 mg/kg /day. Her CRP increased further to 99 mg/dl and TLC to 22,000/mm^3. HRCT chest showed multiple bilateral infective foci and the vegetation size increased markedly with severe Tricuspid regurgitation (Figure-2).

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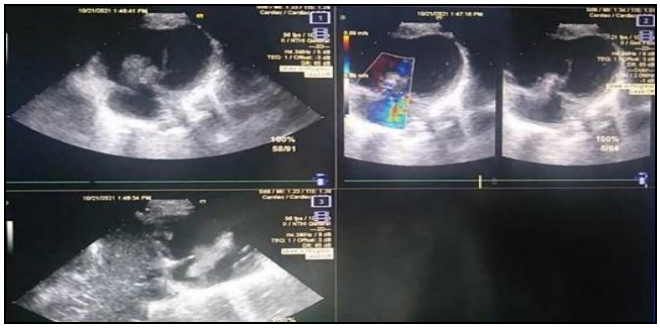

Figure-1: Tricuspid Valve, Septal Leaflet Vegetations

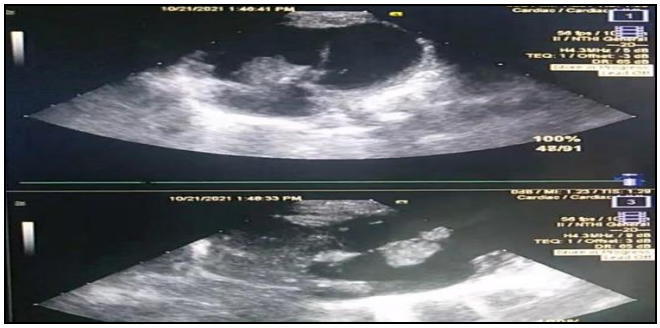

Figure-2: Tricuspid Valve Regurgitation

She was discussed in MDT meeting involving pediatric cardiologist, pediatric cardiac surgeon and anesthetist. It was decided to manage her with surgical explantation of device and closure of defect. Upon opening the right atrium a destroyed tricuspid valve with vegetations and necrotic debris around the device was seen (Figure-3).

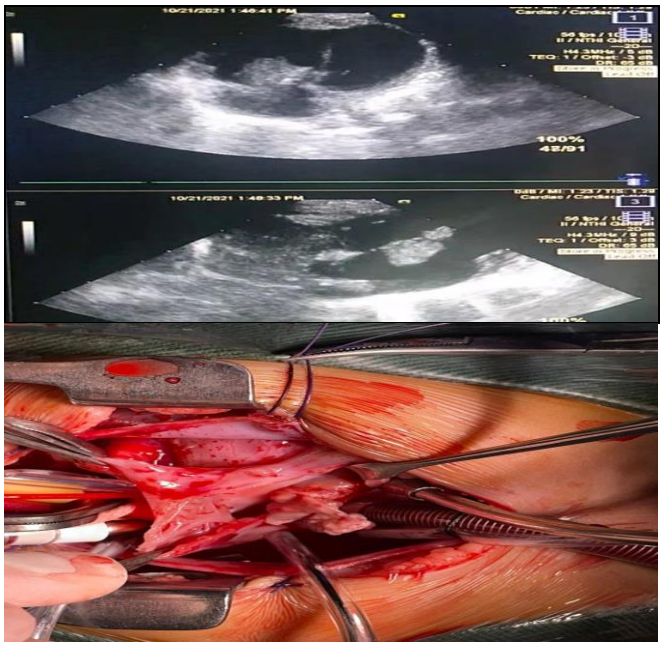

Figure-3: Tricuspid Vegetations

The device was removed using snare, and the defect was closed by an autologous pericardial patch using prolene suture.

Cardiac bypass time was 90 mins and cross clamp time was 68 mins. Tricuspid valve was salvaged. Patient was extubated within 24 hrs of surgery and had smooth post operative course. Trivial Tricuspid regurgitation documented post operatively with satisfactory patch closure of VSD.

DISCUSSION

Device closure is an effective way of managing VSDs, with a success rate approaching 94.8%, when different devices are used.[1,8] Main complications encountered being conduction disturbances, residual shunts, aortic regurgitation, embolization of device and hemolysis.[5] Endocarditis is a very rare complication.[9] Device associated endocarditis is not routinely reported in children after atrial and ventricular septal defect closure.[10,11]

The device might get infected by carrying microorganisms either during the procedure or after the procedure.[7] It takes around 6 months for endothelialization to complete after device closure. Even temporary bacteremia during this time is capable of seeding the device with microbes.[7] Nosocomial infection of the device may occur while doing the procedure. This highlights the importance of observing strict asepsis during the procedure itself and perhaps also proposes the use of infective endocarditis prophylaxis in these patients, after device implantation.

There is an increased risk of infective endocarditis in early childhood as reported by studies in children with congenital heart diseases and also in children from the general population that is probably caused by multiple factors. Many patients who have undergone surgery for their CHD lesions earlier in life, which seems to decrease the overall risk of IE, consequently having lower relative risk in older age groups. Indeed, data shows that IE risk is highest in children of ages 0 to 3 years. In this age group, the incidence of surgical procedures is not yet equal to those in general pediatric cardiology practice. Moreover, the use of intravascular catheters and devices at very young age might increase the risk of IE in these children.[12]

Medical treatment of fungal IE is usually not successful except in the neonates with mural endocarditis.[11] For majority of patients diagnosed with fungal IE, surgery along with antifungal medicines is needed. Consulting cardiology, infectious disease, and cardiac

surgery departments early on is suggested in these cases. Amphotericin B is the drug of choice for medical therapy, although its penetration in vegetations is suboptimal. Although the Imidazoles (e.g., Fluconazole) are not proven to be effective in human fungal IE, long -term therapy with these agents is recommended for patients who are unable to undergo surgery and are having infections caused by these microorganisms.[11,13]

Cardiac surgery is required urgently at times and is imperative in patients with IE, but decision to perform surgical intervention is taken considering patient's clinical condition and taking into account several other parameters. There are no special guidelines for surgical management of pediatric IE, they are mostly an extrapolation of recommendations for managing IE in adults. The most common indications for surgical intervention in IE are progressive valve dysfunction, congestive cardiac failure and embolic phenomena. It is very difficult to predict a patient's risk for embolization, available data has no specific value of vegetation size on echocardiography which can be termed high risk. However, left-sided lesions involving anterior leaflet of the mitral valve if associated with *S. aureus*, seems associated with a very high risk for embolization. There are no pediatric recommendations for prophylactic surgery to avoid an embolic event keeping in view immediate and long-term risks of valve replacement in childhood. Other important problems for which early surgery is indicated include fungal endocarditis, perivalvular spread of infection, persistent bacteremia in spite of appropriate antibiotic therapy, ruptured sinus of Valsalva, or ventricular septal and mycotic aneurysms.[7,10]

In our patient decision to proceed with surgical intervention was made due to suboptimal response to appropriate culture and sensitivity based antifungal treatment, clinical deterioration of patient along with increasing size of vegetations and worsening tricuspid regurgitation on echocardiography.

CONCLUSION

Endocarditis is although a very rare but possibly fatal complication of device closure of VSD. Strict aseptic measures along with appropriate prophylactic doses of antibiotic perioperatively are very important. Fever within 1-2 weeks time period following a transcatheter procedure should be treated as endocarditis until proven elsewise. The caretakers of patients should be advised to instantly report to medical facility if fever does not settle within 2 days. Early and timely session with cardiology, infectious disease, and cardiac surgery services leads to proper management and better clinical outcome in terms of morbidity and mortality.

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Author's Contribution:

Following authors have made substantial contributions to the manuscript as under:

NS: Manuscript writing, concept and editing

IUH Intellectual contribution, concept and final approval

SR: Concept, manuscript writing and critical review

MU: Review of article, formatting and critical review

KA: Proof reading, Intellectual contribution, final approval

HA: Proof reading, interpretation and article finalization

AA: Final approval, proof reading and critical review

SI: Intellectual contribution, concept and final approval

MAF: Review of article, formatting and critical review

TA: Final approval, proof reading and critical review

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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