

Surgical Management of Infective Endocarditis: A Case Series

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ABSTRACT

Introduction: Infective endocarditis (IE) is defined as an infection of the endocardial surface of the heart, which may include one or more native or prosthetic heart valves, the mural endocardium leading to tissue destruction and formation of vegetations. It is associated with a high rate of mortality and morbidity. Early surgical intervention in selected cases is the key for better outcome. In this series we present three different scenarios leading to infective endocarditis and their surgical management.

Cases report: First case is a 28 year lady with tricuspid valve endocarditis following septic abortion with congestive failure. Second is an eighteen year girl with congenital acyanotic heart disease (VSD) with tricuspid valve endocarditis and left empyema thoracis. Third one is a case of critical mitral valve stenosis with fungal infective endocarditis. All of them were managed surgically successfully.

Conclusion: Early diagnosis and timely referral to higher centre for appropriate management plays an important role in the outcome. Abortions by quacks should be condemned. Congenital heart defects and rheumatic valve disease patients should be operated early. Appropriate management with good ICU care is needed for better outcome.

Keywords: Infective Endocarditis, Vegetations

INTRODUCTION

Infective endocarditis (IE) is defined as an infection of the endocardial surface of the heart, which may include one or more native or prosthetic heart valves, the mural endocardium¹, leading to tissue destruction and formation of vegetations. It can be caused by bacterial or fungal microorganisms. The prototype lesion of IE, the vegetation is a mass of platelets, fibrin, colonies of microorganisms, and inflammatory cells.² It is associated with a high rate of mortality and morbidity. Congestive heart failure, metastatic infection, pulmonary embolism, stroke and mycotic aneurysm are the life threatening complications of IE.³ Staphylococcus aureus is the most common organism responsible for endocarditis. In cases of fungal endocarditis candida and aspergillus species are commonly responsible.^{4,5} The mortality rate has decreased now a days because of early surgical intervention in selected cases. Indications of surgery are intractable heart failure, uncontrolled infection, large mobile vegetations, fungal infective endocarditis etc. In this series we present three different scenario leading to infective endocarditis and their surgical management.

Case 1

28 year lady presented with fever for last two and half months, high grade, continuous, with breathlessness and cough since 2 months. There is history of induced abortion 2 and half

months back without any involvement of registered medical practitioner. 4 days after the abortion patient developed fever. She consulted locally to quacks in her village. When she was not relieved she consulted various hospitals before being referred to our hospital. She was admitted in cardiology with features of septic shock and Congestive Heart Failure. Her haemoglobin was 5gm/dl. X ray chest PA view revealed multiple infarcted areas of lung parenchyma. 2D echo showed vegetations involving the tricuspid valve leaflets and inter atrial septum with moderate Pulmonary Arterial Hypertension and severe Tricuspid Regurgitation without any left sided pathology. Blood culture revealed staphylococcus aureus infection sensitive to vancomycin and linezolid. USG abdomen and pelvis showed there is no retained product of placenta. Antibiotics were started but the patient did not improve. Patient was then referred to our department.

Intra operatively large vegetations over the septal and anterior leaflets of the tricuspid valve and inter atrial septum surrounding the coronary sinus were found (Fig 1). The vegetations over the tricuspid leaflets caused about 50% destruction of the leaflets. The vegetations were debrided and area was thoroughly washed with saline. After debridement there was presence of moderate to severe tricuspid regurgitation intraoperatively. Pericardial patch annuloplasty was performed. Tricuspid valve replacement was deferred in view of septic condition of the patient.

Post operatively fever subsided and patient recovered uneventfully. Antibiotics coverage was same as preoperative. Hepatomegaly was there post operatively which gradually decreased after decongestion with diuretics. Post-operative 2D echo showed no residual vegetations, moderate to severe TR, moderate PAH. Right Ventricular function was good. Patient was maintaining saturation in room air. Mild cough was there which was managed with some expectorants and bronchodilators. Patient was discharged on post-operative day 14 with improved condition with advice to continue

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antibiotics for 2 weeks more. On her follow up after 1 month she is afebrile and symptomatically improved. Now the patient is on diuretics coverage for the tricuspid regurgitation.

Case 2

Eighteen year known case of Ventricular Septal Defect presented with fever for 2½ months, worsening of breathlessness, cough for 2 months, yellowish discoloration, swelling in bilateral lower limbs and face for 1½ months. Fever was of high grade, continuous associated with chills and rigor. On medication in different hospitals fever did not subside. Then patient developed cough without any expectoration and haemoptysis. Her family members consulted different hospitals but symptoms gradually worsened. Meanwhile patient developed swelling in bilateral lower limbs, face and yellowish discoloration of eyes and skin. Then she presented to us. Features of congestive heart failure were present. Systolic murmur was present over left para sternal area. On examination of chest left intrascapular area and infra scapular area were dull on percussion and decreased breath sound. Haemoglobin was 4.7gm%. Total bilirubin was 4.5 mg/dl and direct bilirubin 3 mg/dl. AST and ALT were marginally raised. X ray chest showed left sided hydropneumothorax with collapse lung. Blood culture sent and antibiotics (vancomycin and gentamicin) were started. CHF was managed. Left sided Inter Coastal Drain was placed, 400 ml of pus drained. There was no broncho pleural fistula and pus was sent for culture which came out sterile. 2D Echo showed perimembranous VSD of 4.6 mm with left to right shunt with tricuspid valve endocarditis. Mobile Vegetation of size 9.8mm x 7.8mm was present. Blood transfusion given. Blood culture was sterile. Patient symptomatically became better with this conservative management but after 2 to 3 days fever reappeared again so patient was planned for surgery.

Intraoperatively large vegetations were found over septal and anterior leaflets of tricuspid valve as well as over margins of sub aortic VSD, 10 mm in size. Debridement of vegetation from tricuspid valve with Dacron patch closure of VSD done. Mild to moderate TR left. Bacterial and fungal cultures of the vegetation were sterile.

Post operatively fever subsided and patient symptomatically better. Mediastinal drain removed and the intercoastal drain left. Once the pus drainage was minimal and the mediastinum became fixed, under water seal drainage was replaced by tube thoracostoma. Vancomycin was continued for 6 weeks. Tube thoracostoma was taken out on POD 31 once the empyema cavity became sterile. At the time of discharge patient was completely asymptomatic. Post op ECHO showed complete clearance of vegetation, no residual flow across the patch, mild to moderate residual TR. On her follow up after 6 months she was asymptomatic.

Case 3

36 year gentleman with known case of Rheumatic Heart Disease with severe mitral stenosis presented with fever for last 7 days with worsened breathlessness. Fever was of high grade, continuous associated with cough, breathlessness.

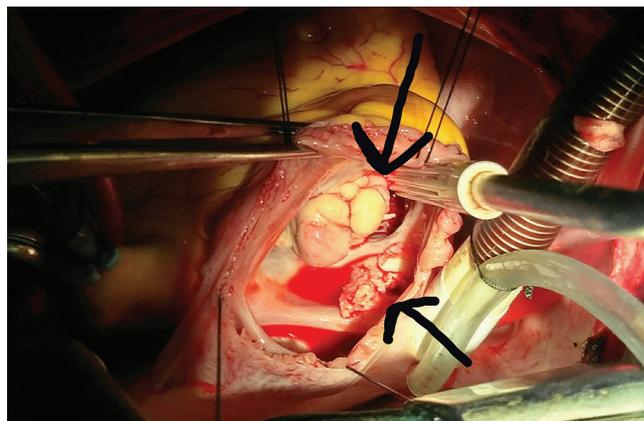


Figure-1: Large vegetations over Tricuspid valve and around coronary sinus over inter atrial septum.



Figure-2: Excised mitral valve showing small vegetation due to Candida, this was missed in pre operative echo.

No history of haemoptysis. Decreased appetite also was associated. On examination S1S2 normal. Mid diastolic murmur present. Bilateral basal crepitation present. Liver was enlarged 5 cm below costal margin in the mid clavicular line.

Patient was managed conservatively for CHF. Blood culture was sent. X ray chest revealed no abnormality. 2D ECHO showed severe mitral stenosis without any clot or vegetation. Antibiotics were started but fever persisted. Blood culture was negative. Once the patient stabilized he was taken up for surgery for the critical mitral stenosis.

Intra operatively vegetations found over the mitral leaflet and the leaflet was thickened (Fig 2). Commissure fused. Subvalvular apparatus fused. The vegetations debrided and sent for both bacterial and fungal culture. The anterior and posterior mitral leaflet excised and metallic valve was implanted.

Fungal culture of vegetation came out to be positive with growth of candida and sensitive to fluconazole and amphotericin B. Amphotericin B was given to the patient for 5 weeks. Post operative echo revealed non stenotic mitral prosthesis in position and there is no residual vegetation. Moderate residual TR was present. For which patient was kept in diuretics. He was discharged with oral fluconazole.

DISCUSSION

The incidence of IE is 1.7–7.2 cases per 100000 person-

years.⁵ Most of the infective endocarditis are bacterial and about 1-3% are fungal.⁶ In our country most common risk factor for infective endocarditis are congenital heart diseases (Ventricular Septal Defect, Patent Ductus Arteriosus, Tetralogy Of Fallot) and rheumatic heart diseases. But in western countries degenerative valve diseases, prosthetic heart valves, implanted pacemakers and defibrillators are the risk factors.⁷ Intravenous drug abusers, prosthetic-valve recipients, and patients with long-term central venous catheters are at highest risk of fungal IE.

Right-sided endocarditis mainly affects IV drug users, patients with the use of pacemakers or central venous catheters, cutaneous or gynaecological infections or bacteraemia in patients with congenital heart disease with left-to-right shunt. The incidence of IE in case of abortions approximately one per one million.^{8,9} In our first case infective endocarditis occurred following septic abortion. The infection from septic uterus transmits through the pelvic veins into the right atrium. It leads to the formation of vegetations over the tricuspid leaflets. Usually the presentation of tricuspid valve endocarditis is due to the septic embolization into the pulmonary vasculature. Microorganisms involved in the infective endocarditis are staphylococcus aureus, streptococcus viridans etc. Culprit organism in our case is staphylococcus aureus.

Left- sided IE is more common in adult patients with acquired heart disease and right sided infective endocarditis in children are more common in congenital heart disease patients.¹⁰ Fortune et al described a series of 45 cases of IE (age 8 months to 35 years); the most frequent Congenital Heart Disease was VSD (31%) followed by tetralogy of Fallot (19%) and atrioventricular septal defect (11%).¹¹ Complications of IE are septic emboli, stroke, mycotic aneurysm or abscess.¹² Embolic complications frequently develop during the initial stage of IE.¹³ 50% of the embolic complications occur within 20 days following initial symptoms of IE, while 80% develop within the first month. After initiation of antibiotic therapy, risk of emboli is 6–21%.¹⁴ When right-sided IE is present; pulmonary embolism with or without infarction, acute pneumonia, pleural effusion or empyema are common.¹⁵ In our second case the symptoms like cough, worsening of breathlessness were increased about 15 days of initial symptom which were may be due to septic emboli to pulmonary circulation leading to empyema. Naidoo et al studied 15 non-addict cases of right-sided IE. In which nine patients had tricuspid valve endocarditis. Staphylococcus aureus was the most common causative agent. Right lower lobe consolidation with cavitations was the prominent clinical feature.¹⁶ In a study by Di fillipo et al; among 36 children with endocarditis twenty-six had an isolated VSD and 10 had VSD associated with a minor lesion. The most frequent site for vegetation was the tricuspid valve (10 cases). Multiple embolizations were observed in 60% of right heart endocarditis.¹⁷ The mean course of treatment was 6 weeks (3-12 weeks).¹⁸ In our second and third case the antibiotics were given for 6 weeks. Early surgical intervention should be considered in patients

with right-sided infective endocarditis and subsequent septic pulmonary emboli.¹⁹ In our 2nd case successful surgical procedure was performed.

Among the infective endocarditis fungal infective endocarditis is rare. The patients under risk are immune compromised patients, patients with previous history of cardiac surgery, hyperalimentation, intravenous drug abusers, patients with valvular heart diseases.²⁰ Usually the fungal load in blood is cleared up by body but in case of endocardial injury or in distorted valves as in case of rheumatic or degenerative valvular diseases the fungi colonizes and grows there. So the blood culture in fungal endocarditis patients most often found to be negative. According to Cherubin and neu et al 30% of culture negative infective endocarditis patients have fungal infection.²¹ So the diagnosis is done based on the morphology of the vegetation and most definitive by vegetation culture or infected tissue culture.²² Usually the fungal vegetations are large in size. As the fungal endocarditis are very difficult to diagnose at an earlier stage they usually present with complications like involvement of chordae tendinae and papillary muscles which leads to valvular insufficiency and progressive cardiac failure. So mortality rate in case of fungal infective endocarditis is very high. Candida and aspergillus species are the most common causative agents. Usually amphotericin B with or without flucytosine is the drug of choice for 6 weeks and then oral fluconazole for several months.²³ But usually medical therapy is not much beneficial in cases of candida species due to biofilm formation making them drug resistant.²⁴ In most of the cases so surgical intervention is necessary.²³ According to Mylonakis E et al optimum time for surgery is before development of hemodynamic instability and gross morphological distortion of structures of heart.²⁵ Steinbach et al in 2005 published a meta-analysis in which surgical therapy showed a better option than drug therapy but that was not statistically significant.²⁶ In our third case blood culture was negative but the vegetation culture that is retrieved from the valve surface was positive for fungal growth. The patient had undergone surgery before development of haemodynamic instability.

CONCLUSION

In the above three described cases it is clear that early diagnosis and timely referral to higher centre for appropriate management plays an important role in the outcome. A high degree of suspicion should kept in mind in cases of PUO with a history of recent abortion, congenital heart disease, rheumatic valvular disease. Abortions by quacks should be condemned. Congenital heart defects and rheumatic valve disease patients should be operated timely and IE prophylaxis should be given when indicated. Infective endocarditis patients are very sick so timely appropriate management with good ICU care is needed for better outcome.

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