

## Left Side Native Mitral Valve Infective Endocarditis Caused by Staphylococcus Aureus in a Patient on Chronic Hemodialysis

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**A forty-six-year-old male who is a known case of autism, hypertension, dyslipidemia, end-stage renal disease (on hemodialysis), bilateral renal cell carcinoma, but did not receive chemotherapy nor surgical excision. He was diagnosed with left-side native mitral valve infective endocarditis caused by Staphylococcus aureus in November 2018.**

**The patient had several risk factors including end-stage renal disease on hemodialysis, infective endocarditis caused by Staphylococcus aureus and neoplasia. The patient had an uncomplicated course of infective endocarditis followed by successful mitral valve repair. A multi-disciplinary approach and early surgical intervention is the key for successful outcome.**

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Infective endocarditis is an ever-growing clinical diagnosis in industrialized countries. It is more common in patients with prosthetic valves, cyanotic congenital heart diseases and it is less frequently seen in rheumatic heart disease. Hemodialysis is considered a major risk factor for infective endocarditis due to high circulating calcium levels in the blood that eventually leads to valvular calcification and the dialysis catheters that are a source for microbial growth. Other risk factors include age, human deficiency virus infection and intravenous drug use<sup>1,2,3</sup>.

There are several case reports in the literature describing infective endocarditis in hemodialysis patients and in patients with neoplasia; however, few cases are discussing the co-existence of both in the same patient such as in this case report<sup>1,2,3</sup>.

In addition, our patient was diagnosed as autistic since childhood, which raised a challenge regarding patient autonomy and obtaining consent.

The aim of this report is to evaluate the treatment guidelines for infective endocarditis, discuss the risk factors and the course of treatment.

### THE CASE

A forty-six-year-old male autistic, hypertensive, dyslipidemic, end-stage renal disease on hemodialysis, bilateral renal cell carcinoma who had not undergone treatment (neither chemotherapy nor surgical excision), was transferred due to failure of antibiotics therapy to treat native mitral valve infective endocarditis caused by Staphylococcus aureus.

Blood culture was positive and sensitive Staphylococcus aureus. The patient was started on Vancomycin with monitoring of trough levels. An echocardiography revealed an oscillating mass on the atrial aspect of the anterior mitral leaflet measuring 0.93x0.8 cm, trace MR, LVEF 65%.

Follow-up echocardiography showed increased vegetation size to 1.7x1 cm with mass passing slightly into LV during the opening of the mitral valve.

The patient was started on Cefazolin 1 gram IV OD on for 8 weeks. Rifampicin 600 mg PO OD was later added.

CT abdomen and pelvis with contrast revealed that the spleen was average-sized and had multiple hypochoic focal lesions ranging between 1 and 4 cm splenic infarcts, less likely to be a metastasis.

Both kidneys showed multiple bilateral soft tissue cortical masses between 0.6 and 7.3 cm, suggestive of bilateral multifocal RCC. Small para-aortic lymph nodes between 1 and 1.5 cm each.

Table 1 shows serial blood culture results, which were done throughout the antibiotics treatment period.

**Table 1: Blood Cultures Results Done Throughout the Antibiotics Treatment**

Blood culture date	Result
5 <sup>th</sup> Nov 18	Positive
6 <sup>th</sup> Nov 18	Positive
11 <sup>th</sup> Nov 18	Negative
13 <sup>th</sup> Nov 18	Negative
18 <sup>th</sup> Nov 18	Negative
31 <sup>st</sup> Dec 18	Positive
1 <sup>st</sup> Jan 19	Positive
2 <sup>nd</sup> Jan 19	Positive
3 <sup>rd</sup> Jan 19	Positive
10 <sup>th</sup> Jan 19	Positive

\* Resident

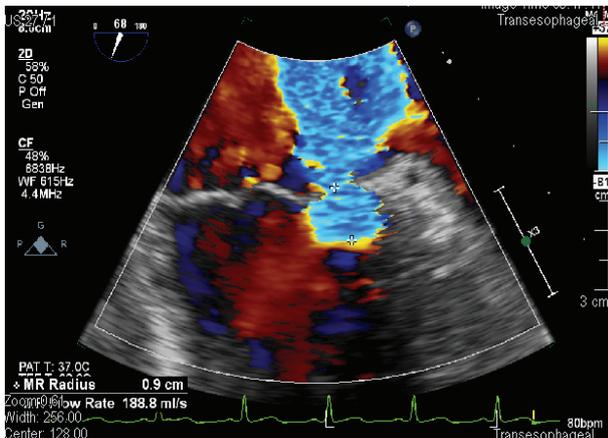
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Table 2 is a serial echocardiography studies done in MKCC to assess the size of vegetation during the antibiotics treatment course.

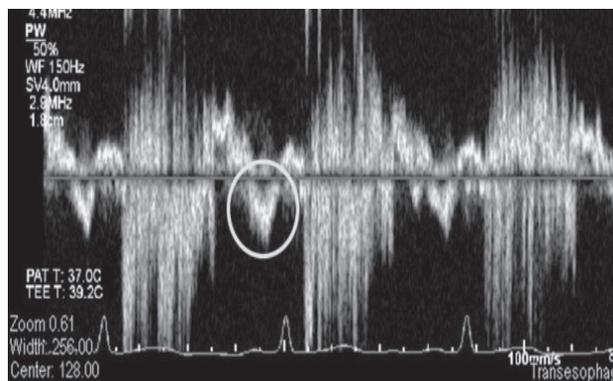
**Table 2: Serial Echocardiography Studies**

Echo date	Vegetation size	EF	Degree of MR	Period of treatment
6/11/18 Transthoracic echo	1.6 X 1.1 cm	70%	Mild	1 <sup>st</sup> day of antibiotics
7/11/18 Trans-esophageal echo	1.5 X 0.6 cm	60%	MVA by PHT= 4.4 cm <sup>2</sup> with mean gradient of 4 mmHg	2 <sup>nd</sup> day of antibiotics
31/12/18 Transthoracic echo	1.7 x 0.5cm	65%	severe eccentric mitral regurgitation	56 day of antibiotics
14/1/19 Trans-esophageal echo	1.4 X 0.4 cm	60%	severe mitral regurgitation, perforation and underlying destruction of the A1 scallop and possible A2	68 day of antibiotics

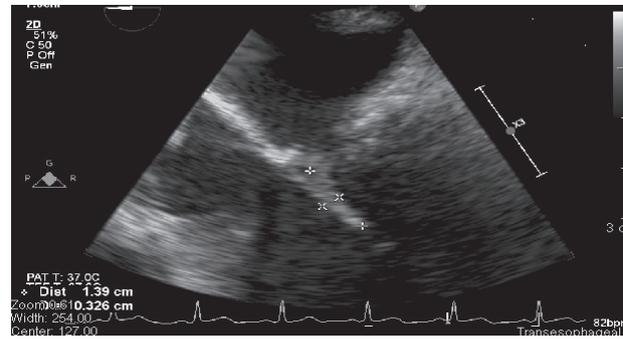
Trans-esophageal echocardiography revealed a perforation and underlying destruction of the A1 scallop and possible A2, resulting in severe mitral regurgitation and spontaneous PISA, which is posteriorly directed with swirling jet in the left atrium, see figures 1-3. There is evidence of systolic pulmonary vein reversal.



**Figure 1: Severe Mitral Regurgitation: Perforation and Underlying Destruction of the A1 Scallop and Possible A2, Resulting in Severe Mitral Regurgitation and Spontaneous PISA, Which is Posteriorly Directed with Swirling Jet in the Left Atrium**



**Figure 2: Severe Mitral Regurgitation with Pulmonary Vein Reversal**



**Figure 3: Mitral Valve Vegetation: Mobile Density Attached to the Anterior Mitral Valve Leaflet Measuring 0.4x1.4 cm Consisting of a Vegetation**

The patient underwent a mitral valve repair with an uneventful postoperative period.

**DISCUSSION**

Infective endocarditis incidence is increasing in the US<sup>4</sup>. Its incidence, however, is difficult to ascertain due to variable infective endocarditis definitions between authors and clinical centers. Infective endocarditis incidence in hemodialysis patients is 50-60 times higher than in the general population with an even higher mortality rate in those who require cardiac surgery<sup>5</sup>.

Staphylococcus aureus is the leading cause of left-sided infective endocarditis and is associated with high morbidity and mortality. Embolism and infarction of various organs are frequently seen on presentation<sup>5</sup>.

Streptococci and staphylococci account for most cases of infective endocarditis. The extent to which it affects individuals depends on age, the type of valve, native or prosthetic and the individual’s co-morbid conditions<sup>4</sup>.

Patients receiving dialysis are at increased risk for infective endocarditis (IE) from the combination of transient bacteremia resulting from repeated vascular access, accelerated valvular calcification, and immune dysfunction. IE has a poor prognosis for end-stage renal disease (ESRD) patients. One-year survival rates for patients with both ESRD and IE are estimated to be 50%, whereas the expected survival rate at 5 years with ESRD alone is 50%<sup>5</sup>. Infectious diseases consultation should be sought to achieve the optimal empirical treatment regimen at the time of initiation of antimicrobial therapy (Class I; Level B Evidence)<sup>6</sup>.

Many patients with end-stage renal disease are considered high risk for surgical intervention based on the presence of co-morbid conditions and the severity of their illness. On the other hand, patients with no co-morbidities or not having severe illness could undergo surgical treatment earlier than formerly mentioned group<sup>5</sup>.

In a study among dialysis patients with left-sided IE, the predictors of early surgery were assessed and it concluded that In-hospital mortality occurred in 22% of patients and was similar in patients who underwent early surgery compared with those who did not<sup>5</sup>. It concluded that despite overall high risk,

patients with ESRD were likely to benefit from appropriate surgical intervention<sup>5</sup>.

A study concluded that surgery for IE should be considered for patients on hemodialysis<sup>4</sup>. A study found that previous cancer accelerates IE through associated thrombotic phenomena in cardiac valves that favor bacterial colonization or as a consequence of medical management (e.g., catheter-associated disease)<sup>8</sup>.

## CONCLUSION

**The patient was diagnosed with left-side native mitral valve infective endocarditis caused by Staphylococcus aureus. The patient had an uncomplicated course of infective endocarditis followed by successful mitral valve repair despite end stage renal disease on hemodialysis.**

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**Competing Interest:** None.

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