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REVIEW ARTICLE

THE CATHETER RELATED TRICUSPID VALVE ENDOCARDITIS IN HEART TRANSPLANTED PATIENT. A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

Endocarditis in heart transplanted: While heart transplant recipients are immunosuppressed, the development of endocarditis is a relatively rare event compared to other infections.
Infective endocarditis (IE): In patients without Transplantation is a rare and serious complication with high morbidity and mortality. More than 15 percent of patients with chronic kidney disease who receive central venous access catheters have complications such as infection, arterial puncture, thrombosis and pneumothorax (McGee and Gould, 2013).
Right-sided infective endocarditis: (RSIE) is less common than left-sided infective endocarditis (IE), encompassing only 5–10% of cases of IE and is classically related to intravenous drug use (Habib *et al.,* 2009). We review a case reports of 60 years old woman with cardiac transplantation for 10 years ago which developed chronic renal failure with hemodialysis 3d/weekly. She developed symptoms as endocarditis. We discuss even the etiologic agents, clinical findings, treatment, and outcome of infective endocarditis in solid organ transplant recipients.

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INTRODUCTION

Orthotopic heart transplantation (OHT) remains the gold standard therapy for advanced heart failure refractory to medical management. Currently, the number of OHTs performed annually worldwide has remained static at approximately 4,000, limited mainly by donor organ availability. The median survival of 11 years following OHT has remained consistent throughout time with the major limitation being allograft vasculopathy (Murray *et al.,* 2017). RSIE and TVIE are strongly associated with intravenous drug use (IVDU), although pacemaker leads, defibrillator leads and vascular access for dialysis are also major risk factors. Staphylococcus aureus is the predominant causative organism in TVIE (Syed *et al.,* 2017).

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(RSIE) is uncommon due to low hemodynamic pressure, but patients using central venous catheters have an increased risk. Ninety percent of RSIE involves the tricuspid valve (TV)(Kale and Raghavan, 2013). Patients with end-stage chronic kidney disease without mature arteriovenous fistula frequently require central venous access for dialytic therapy. IE is significantly more common in hemodialysis patients than in the general population (Abbott and Agodoa, 2002). The use of a central venous catheter (either permanent or temporary) increases that risk (Kamalakannan *et al.,* 2007). In patients on chronic HD, IE affects mainly native valves and only a small percentage of cases (20%) are seen in prosthetic valves (Kamalakannan *et al.,* 2007). IE usually involves the left side of the heart, but patients using central venous catheters have increased risk of developing right-sided IE due to mechanical injuries during guidewire insertion and forceful injection through the catheter (Kale and Raghavan, 2013). IE affecting the interatrial septum is even less common and has only been described in association to prosthetic devices, such as valves and patches (Osawa *et al.,* 2004).

Risk factors

Intravenous drug users

Infection resulting from IVDU constitutes approximately 30–40% of all TVIE cases (Habib *et al.,* 2009; Baraki *et al.,* 2013 and Shrestha *et al.,* 2015). The IE presentation is with TV lesions in 50–65% of IVDU, and the prevalence of IE in IVDUs is about 2–5% per year (Osawa *et al.,* 2004; Baraki *et al.,* 2013 and Miró *et al.,* 2003).

Cardiac implantable electronic device (CIED)

Infection CIED lead infection is an increasingly important cause of TVIE (Habib *et al.,* 2009; Baraki *et al.,* 2013 and Gaca *et al.,* 2013).

Indwelling lines (hemodialysis, parenteral nutrition and chemotherapy)

Chronic IV access infections account for approximately 10% of all IE, 8% of which occur in hemodialysis patients (Murdoch *et al.,* 2009). Dialysis patients often have a greater burden of comorbidities, including diabetes, hypertension and atrial fibrillation, besides their end-stage renal disease (Yamane *et al.,* 2012).

Microbiology

S. aureus is the predominant causative microorganism for TVIE, occurring in 60–90% of cases in some studies, irrespective of associated risk factors (Baraki *et al.,* 2013; Miró *et al.,* 2003 and Murdoch *et al.,* 2009). *Pseudomonas aeruginosa*, other gram-negative microorganisms, *fungi, enterococci, streptococci* and *polymicrobial infections* occur less frequently (Habib *et al.,* 2009). The most common microbes are S. aureus and Enterococcus.S. aureus is associated with a larger number of comorbid factors, including hemodialysis, IVDU and advanced age (Habib *et al.,* 2009 and Cabell *et al.,* 2005).

Diagnosis

The usual manifestations of TVIE are persistent fever and bacteremia. Multiple septic pulmonary emboli cause chest pain, cough and occasionally hemoptysis. Systemic emboli are rare manifestations of TVIE and, when noted, should be considered evidence of either leftsided involvement or paradoxical embolism (Habib *et al.,* 2009). Right heart failure is rare and caused by increased pulmonary pressure combined with severe TR or TV obstruction from huge vegetations. Pulmonary septic emboli cause pulmonary infarcts and pulmonary abscesses and may be complicated by pneumothorax and empyema.

- First, the right heart has many echocardiographically anomalous anatomic features that may be difficult to distinguish from vegetations;
- Second, septic emboli are pulmonary, as opposed to systemic, and clinically less obvious until they cause pulmonary infarcts and abscesses;
- Third, early pulmonary radiographic findings may be mistaken for pneumonia (Habib *et al.,* 2009).

Diagnosis

In patients with infective endocarditis (IE), the present illness history is highly variable. Symptoms commonly are vague, emphasizing constitutional complaints, or complaints may focus on primary cardiac effects or secondary embolic phenomena. Fever and chills are the most common symptoms; anorexia, weight loss, malaise, headache, myalgias, night sweats, shortness of breath, cough, or joint pains are common complaints as well.

Treatment

Prognosis of RSIE is relatively good. Non-operative management of TVIE with antibiotics alone clears the bacteremia in 70–85% of cases and is associated with 7–11% in-hospital mortality (Syed *et al.,* 2017). Between 5–16% of RSIE cases eventually require surgical intervention, with reported operative mortality between 0–15% for patients with isolated TVIE (Syed *et al.,* 2017).

Endocarditis in heart transplanted

While heart transplant recipients are immunosuppressed, the development of endocarditis is a relatively rare event compared to other infections. One review of the literature documented 10 cases out of 659 patients transplanted over an 11-year period. Five of these cases involved the tricuspid valve with a 100% mortality following diagnosis(Sherman-Weber *et al.,* 2004).

Case reports

A 60-year-old woman with a history of cardiac transplantation for 10 years ago and chronic renal failure, with haemodialysis 3 days a week was via permcath through IVC. Her medication was standard immunosuppression post cardiac transplantation. She was admitted to hospital because of fever, chills and dyspnoea. The onset of illness was 10 days before admission, with fever, headache, nausea, malaise and anorexia. Four days before admission, her nephrologist prescribed an oral antibiotic to treat presumed acute pneumonia, with no improvement. On physical examination, her temperature was 39.2 °C, her heart rate was 110 bpm and the respiratory rate was 28 breaths per minute. The patient's blood pressure was 145/80 mmHg. A systolic murmur, grade 3 over 6, was heard at the left upper sternal border with no pericardial rub. The lungs were clear bilaterally. Plain chest radiography was reported normal. Transthoracic echocardiography (TTE) showed tricuspid regurgitation and mitral regurgitation without vegetation. A transoesophageal cardiac echocardiography showed mobile, large vegetation of the tricuspid valve. Other valves appeared normal. Laboratory findings included hemoglobin of 110 g/l, a white blood cell count of 10.9 × 10^9/l, an erythrocyte sedimentation rate of 80 mm/hour.

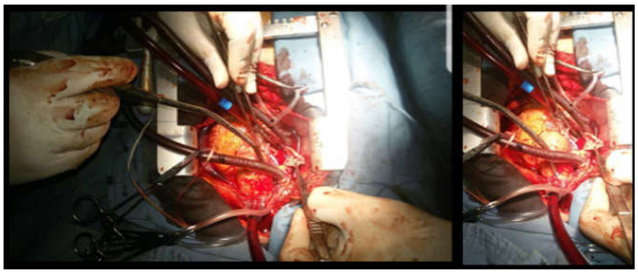

Fig. 1. Under ECC and exploration of RA. (With permission of Dr Sam Zeraatian)

C-reactive protein (CRP) was in the range 20 mg/l. On the fourth day, we received a report that two out of three blood cultures were positive for Gram-positive cocci, which were later identified as methicillin-sensitive *Staphylococcus aureus*

(MSSA).The prescribed antibiotics (ceftriaxone and vancomycin) were changed to cloxacillin. A consultant in cardio-thoracic surgery 20 day after, accepted the patient for cardiac surgery. Under the cardio pulmonary by-pass and exploration of RA, remove of vegetative mass and tricuspid valve repair was done.fig-1. Post-operative the patient was transferred to cardiology ward. She was treated with cloxacillin for a 30 days period, with negative blood culture and normal CRP levels at the end.

Conclusion

Chronic IV access infections account for approximately 10% of all IE, 8% of which occur in hemodialysis patients. The IE presentation is with TV lesions in 50–65% of IVDU, and the prevalence of IE in IVDUs is about 2–5% per year. CIED lead infection is an increasingly important cause of TVIE. *S. aureus* is the predominant causative microorganism for TVIE, occurring in 60–90% of cases in some studies, irrespective of associated risk factors. Endocarditis is substantially more common in heart transplant recipients than in general populations. Frequent central venous catheter access and multiple endomyocardial biopsies appear to predispose to infection.

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