India's 1st Case of Re-Do Heart Transplantation for Cardiac Allograft Vasculopathy: A Case Report and Review of Literature

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Abstract

Cardiac Allograft Vasculopathy (CAV) is the 'Achilles heel' of long term outcome following heart transplant. Even though the overall outcomes for heart transplant has improved over the last 4 decades, with survival after heart transplant reported 90%, 80% and 60% at 1, 3 and 10 years respectively, the long term survival is determined mainly by presence or absence of CAV. In this report we discuss the first case of re-do heart transplant done in India for CAV, 8 years following the initial transplant done in 2009 and we discuss the underlying pathology, treatment options and possible preventions of CAV in the current era.

Keywords: Heart transplantation; Cardiac allograft vasculopathy

Introduction

Since the first successful heart transplant done by Christian Bernard in 1967, survival after heart transplant has improved over the last 5 decades to more than 90%, 80% and 60% at 1, 3 and 10 years respectively [1,2]. Still the median survival after heart transplant is 11.7 years for non-ischemic dilated cardiomyopathy and 9.5 years for ischemic cardiomyopathy. The 'Achilles heel ' of long term survival following heart transplant is cardiac allograft Vasculopathy [3,4]. CAV with reduced allograft function carries a very poor prognosis and retransplantation is the only definitive therapy available. Even though the outcome after retransplantation following primary graft dysfunction is very poor, it is reasonable following CAV [5]. This case illustrates the significance of mechanical circulatory support in stabilizing a patient in cardiogenic shock due to severe form of CAV with graft dysfunction as a bridge to early successful retransplantation.

Case Presentation

36 year female athlete was diagnosed with post viral myocarditis and dilated cardiomyopathy with stage IV heart failure, for which she underwent successful orthotopic heart transplant in 2009, following this she was continued on standard immunosuppressant therapy and has been under regular follow up leading a near normal life and has represented India in Transplant Olympics in 2017 in 100 meters, while managing to do other athletic activities including under sea walking,
Cardiac allograft vasculopathy (CAV) is common with prevalence of >50% at ten years after Heart Transplant (HT). CAV is the leading cause of death 1 year after HT, responsible for 15% of deaths annually [6,7]. It is characterized by diffuse and concentric intimal proliferation, typically involving the intramural as well as epicardial coronary arteries. Both immune and non-immune mechanisms contribute play a role in the pathogenesis. Its diagnosis is difficult to establish clinically because of denervation of the transplanted heart. Consequently, it presents late with silent myocardial infarction, progressive heart failure or arrhythmic sudden death. Screening is therefore required for its early detection [3]. Although coronary Intravascular Ultrasound (IVUS) is considered the gold-standard technique for detecting the anatomic features of CAV [4], its broad clinical use in this context is limited by cost and lack of widespread expertise and its evaluation is limited to epicardial vessels. Coronary angiography, performed annually or biannually, remains the most common clinical screening method, however because of the diffuse nature of CAV with a lack of normal reference segments and the relatively late occurring luminal narrowing, the sensitivity of angiography is as low as 30% when compared with IVUS. ISHLT nomenclature for CAV is shown in Table 1 and Figure 4 and Figure 5 CAV surveillance/management and prevention [5]. Even though the outcomes after retransplantation for primary graft dysfunction is very poor, retransplantation for CAV is reasonable, and should be decided on a cases by case by the organ sharing scheme, given the shortages of donor organ availability.

Discussion

Cardiac allograft vasculopathy (CAV)

CAV is a leading cause of late death after heart transplantation. Early rapid Intimal thickening predicts the development of
angiographic disease and adverse cardiac outcomes, including reduced survival; hence IVUS to identify early CAV is essential. Current management is focused on prevention strategies directed at modifiable immune and non-immune targets. The mTOR is a significant advance in slowing progression of CAV, but their optimal use needs to be established with further randomized studies. In severe form of CAV (CAV3) with significantly reduced left ventricular function retransplantation is the only viable option. This case also shows the importance of early Mechanical Circulatory Supports (MCS) with ECMO is crucial in stabilizing the hemodynamic as a bridge to successful retransplantation adapted from Chih et al. [5].

### References


