Managing Cardiovascular Risk in the Post Solid Organ Transplant Recipient

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KEYWORDS

• Solid organ transplant • Cardiovascular disease • Risk factors
• Immunosuppression • Survival

KEY POINTS

- Overall mortality among solid organ transplant recipients has improved owing to advances in surgical techniques and immunosuppressive therapy.
- Although short-term survival rates have improved significantly, long-term survival rates are suffering secondary to enhanced cardiovascular mortality.
- Identifying comorbidities that contribute to enhanced cardiovascular risk and modifying these risks while awaiting transplantation and after transplantation are imperative to improve long-term graft and patient survivals.

INTRODUCTION

Solid organ transplantation has become the standard of care for patients with end-stage liver, kidney, lung, and heart diseases and has significantly improved the survival and quality of life for successful recipients. A mean of 4.3 life years per solid organ transplant recipient (SOTR) are saved based on retrospective analysis of data from the United Network for Organ Sharing for solid organ transplants over a 25-year period by Rana and colleagues.[1] Despite improvements in overall graft and patient survival rates that have followed the major advances in the management of transplant recipients and improvements in cardiovascular health that follow successful transplantation, cardiovascular disease (CVD) remains the leading cause of posttransplant mortality.[2–5] The prevalence of CVD is high among kidney and liver transplant recipients compared with the general population, which has been attributed to metabolic and systemic derangements that are associated with end-stage organ disease processes and exacerbations of these processes with immunosuppression, as well as

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Med Clin N Am 100 (2016) 519–533
http://dx.doi.org/10.1016/j.mcna.2016.01.004 **medical.theclinics.com**
0025-7125/16/$ – see front matter

the added risks of infection and rejection with transplantation. CVD in SOTR can be categorized primarily into atherosclerotic heart disease/ischemic heart disease, which manifests secondary to abnormality in cardiac perfusion, disorders of cardiac function (left ventricular hypertrophy, left ventricular systolic and diastolic dysfunction), which typically present as congestive heart failure and cardiac arrhythmias. Despite the high prevalence and mortality associated with CVD in SOTRs, there is limited evidence available for management of risk factors and prevention. CVD is the most frequent cause of death with functioning graft in kidney transplant recipients (KTRs) and thus the leading cause of graft loss. This review summarizes the risk factors contributing to cardiovascular mortality and therapeutic strategies to address these risk factors in SOTRs. In this review, we discuss CVD risk factors in KTRs that can then be extrapolated to other SOTRs.

EPIDEMIOLOGY OF CARDIOVASCULAR DISEASE IN SOLID ORGAN TRANSPLANT RECIPIENTS

SOTRs are at increased risk for premature CVD and cardiovascular mortality. Although the risk of CVD improves after kidney transplantation when compared with patients with end-stage kidney disease awaiting transplantation, CVD risk remains significantly greater in KTRs when weighed against the age- and sex-matched general population.[6,7] Several variables contribute to the CVD risk in SOTRs including recipient's pretransplant disease process, traditional and nontraditional risk factors and transplant related risk factors such as exposure to immunosuppression.[8] **Fig. 1** depicts the various risk factors contributing to CVD risk in SOTRs. There are also organ-related risk factors, such as pretransplant uremic cardiomyopathy and dialysis vintage in KTRs, and pulmonary hypertension (HTN) and cirrhotic cardiomyopathy[9] in liver transplant recipients. Detailed discussion of organ-specific and donor-specific cardiovascular risk factors is beyond the scope of this article.

The United States Renal Data System 2014 annual data report system revealed that mortality from CVD among KTRs is approximately twice as frequent when compared

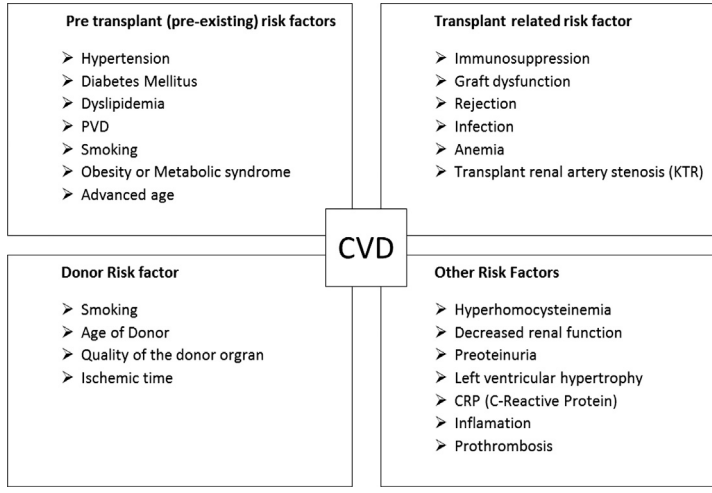

Fig. 1. Risk factors contributing to cardiovascular mortality in solid organ transplant recipients. CVD, cardiovascular disease; KTR, kidney transplant recipient; PVD, peripheral vascular disease.