

Combined Heart-Kidney Transplants: Simultaneous vs Sequential

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Abstract:

The indications for combined heart-kidney transplant (HKTx) lack standardization. Gallo M, et al. (2020) attempt to establish an eGFR threshold to identify patients that would reap a survival benefit from HKTx versus sequential kidney transplant after heart transplantation (SKTx). Utilizing UNOS data in a retrospective fashion, they demonstrate a significant survival benefit in patients undergoing HKTx with preoperative eGFR < 30 mL/min or on dialysis.

Keywords: Heart-kidney transplant; Dialysis; Calcineurin inhibitor nephrotoxicity; Sequential kidney transplant

Commentary

National guidelines for transplant candidates with combined heart and kidney failure lack standardization and currently remains an area of controversy within the field of transplant [1]. Heart failure and kidney disease are commonly related pathologies. Poor cardiac output results in chronic renal hypoperfusion which in turn leads to decreased kidney function, which may be reversible or permanent. Additionally, patients who have undergone heart transplant (HTx) may develop progressive kidney disease due to calcineurin inhibitor nephrotoxicity in addition to other medical comorbidities such as pre-existing or post-transplant diabetes [2]. Combined heart-kidney transplant (HKTx) has become increasingly common in recent years, with a 400% increase between 2011 and 2021 [3]. HKTx recipients have lower rates of cardiac graft rejection and better graft longevity [2,4]. The most recent ISHLT consensus guidelines (2016) recommend an estimated glomerular filtration rate (eGFR) < 30 mL/min as a relative contraindication for heart transplantation. This threshold has since been utilized as an unofficial indication for HKTx [5].

In their manuscript 'Combined Heart-Kidney Transplant Versus Sequential Kidney Transplant in Heart Transplant Recipients', Gallo M, et al. (2020) investigate the predictive value of preoperative eGFR for outcomes in HKTx compared to sequential kidney transplant (SKTx) in heart transplant recipients [6]. The United Network for Organ Sharing (UNOS) database was reviewed retrospectively from January 2000 to June 2015 to identify all adult patients who underwent HKTx or SKTx.

Patients were divided into those on hemodialysis (HD) and/or eGFR <30 mL/min pretransplant and those with eGFR between 30 and 44 mL/min at the time of transplant. For both the HD/low GFR and higher eGFR groups, primary indication for SKTx was calcineurin inhibitor nephrotoxicity (followed by diabetes). Analysis demonstrated a significant survival benefit in the HD/low eGFR group who underwent HKTx versus SKTx (80% and 59% at 5 years respectively; P = 0.04). Those in the higher eGFR group had no such survival benefit with HKTx versus SKTx.

This study outlines standardizing preoperative planning for patients with concomitant heart and renal failure where previously none has existed. This study had excellent statistical power, with over 800 patients analyzed utilizing a national database. Both the HD/low eGFR and higher eGFR groups had similar demographic make-ups, further increasing the applicability of their results. An obvious limitation of this work is the retrospective nature of the study. A noteworthy detail that may affect the translation of this research into practice is the use of a calculated eGFR as a measure of renal function. Gallo M, et al. (2020) [6] acknowledge this limitation, noting that eGFR may not accurately reflect permanent renal damage from calcineurin inhibitor-induced tubule-interstitial fibrosis versus reversible cardiorenal syndrome.

Other studies have examined this topic over the last two decades. Older UNOS data shows similarly improved survival in HKTx compared to HTx in patients with eGFR <30 mL/min [7]. More recently, Malas J, et al. (2023) published their study using

UNOS data comparing heart re-transplant alone versus heart re-transplant with kidney transplant and found an advantage to the dual-organ group [8]. Finally, a single-center study demonstrates excellent post-transplant outcomes in a series of 31 patients who underwent simultaneous HKTx [9].

Hemodialysis results in significantly decreased survival in the general population, and this risk is increased even further after HTx due to increased infection risk while on immunosuppression. Thus, renal failure requiring hemodialysis should be avoided at all costs for patients after heart transplant; however, if unanticipated permanent dialysis occurs, sequential kidney transplant should be pursued. Working within the confines of a retrospective study, Gallo M, et al. (2020) provide a scaffolding for future concrete recommendations regarding combined heart-kidney transplant indications [6]. While it is unlikely that this question will ever be answered by a clinical trial, all patients with irreversible eGFR <30 after appropriate inotropic or mechanical support should be considered for dual organ transplant at the time of heart transplant candidacy.

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