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## Long-term complications of heart transplantation in Korea

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The first human heart transplantation (HTx) was performed by Christian Barnard in 1967. While the technical aspect had been worked out, allograft rejection was a major limitation in the early days of heart transplant. The discovery of cyclosporine revolutionized the field and led to the modern era of transplant. Recently, the median survival is reported as long as 12.4 years and that when recipients survive to 1 year, they have a greater than 50% chance of survival at 14 years. However, there are still limitations including the impact of limited availability of graft, graft dysfunction, and rejection, and long-term non-cardiac complications.

Etiology of recipient HF is correlated to survival, with re-transplantation recipients showing the lowest survival rates. Donor characteristics and indications for heart transplantation recipients can be major determinants for the early survival, with predominance of non-ischemic (50.5%) and ischemic (33.1%) cardiomyopathies in most recent era. The post-transplantation morbidities affecting recipients are severe renal dysfunction, diabetes mellitus, chronic obstructive pulmonary disease, end-stage renal disease, increased age, male sex, preoperative ECMO bridge. And some of those comorbidities may be developed because of long term complications of the immunosuppressive agents. And malignancy is also a concern due to immunosuppression.

The most common malignancy for HTx recipients is skin cancer, with a rate upto 18.5% in 10-year survivors. Renal failure is a concern in the HTx patient population due to the nephrotoxic effects of CNI therapy. Although freedom from severe renal dysfunction has improved in recent years, 22.3% of recipients suffer from the disease by 10 years after transplantation. Need for chronic dialysis 6% after 10 years.

The field of immunosuppression is continuously evolving and new drug regimens are being searched for in order to reduce the side-effect profile of such medications. Currently, heart transplantation remains the best treatment for patients with end-stage heart failure. Other avenues being investigated at this time include xenotransplantation and bioengineered organs, though there still remain many hurdles, including maintaining graft function long term, genetic modifications of organ source, and higher-than-standard immunosuppression regimens.