

Editorial



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Increased Risk with Older Donor Age and More Frequent Pre-transplant ECMO: the Second Official KOTRY Report

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► See the article “The Korean Organ Transplant Registry (KOTRY): Second Official Adult Heart
Transplant Report” in volume 49 on page 724.

The second Korean Organ Transplant Registry (KOTRY) report for heart transplantation (HTx) was released 2 years after the first monumental KOTRY report.^{1,2)} In this second KOTRY report, a total of 400 adult HTxs were enrolled from March 2014 to December 2017. Subsequently added 217 more patients and 2 more follow-up years for the previously enrolled patients (183 patients were enrolled in the first KOTRY report: April 2014 to December 2015). In this report, the authors performed a thorough analysis of 4 years of registry data according to transplant year and patient age which helped to enhance our understanding of the current HTx status in Korea. The 1-year survival rate was maintained in 90% patients (previously 91.6%) which is superior than the rate seen in the International Society for Heart and Lung Transplantation (ISHLT) registry report (according to the 2018 ISHLT report: 1-year survival best in non-ischemic cardiomyopathy [84.1%], and worst in re-transplantation [68.9%]).^{3,4)} Similarly, as seen in a previous KOTRY report and other HTx registries, most of the deaths occurred within 1 year and the main cause was infection.^{1,3-5)} Tacrolimus, mycophenolate mofetil, and steroids were the 3 major immunosuppressants used and basiliximab was most frequently used for induction therapy in Korea. Over the years, tacrolimus has increased to become the most frequently used calcineurin inhibitor over cyclosporine, while the number of patients using steroids both at discharge and 1-year follow-up has declined.

After the first HTx in 1992, the annual number of cases in Korea has been increasing. The number has increased to more than 50 cases between 2000 and 2007 and reached to 176 cases in 2018.⁶⁾ However, recent annual HTx surgery statistics reflect different views in terms of the regional distribution within the nation (**Figure 1**). Heart transplant hospitals in Seoul-Gyeonggi area including the 4 representative KOTRY hospitals, still run the biggest HTx programs in Korea, but the proportion is gradually declining. On the other hand, HTxs in other regions are continuously increasing (**Figure 1**). According to the previous and present reports, the proportion of cases treated in the 4 representative hospitals among the total HTxs in Korea declined from 78% to 70% in the 2014–2015 period to the 2014–2017 period, respectively. To become a national HTx registry that is fully utilized as a resource not only

Conflict of Interest

The authors have no financial conflicts of interest.

Author Contributions

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for clinical and academical achievements but also to ensure that the fundamentals of the policy are in place, it is necessary for us to make effort to build more regionally representative Korean HTx registry.

The feature of this second KOTRY report is that the analysis was focused on the differences in patient age. Even though the sample size is small, there is a tendency of increase in older recipients during the period. There was also a significant increase in donor age during the 4-year period. Due to the development of various therapeutic modalities, more patients survive after their index critical cardiovascular event.^{7,8)} This could be the cause of increase in patient severity, including age and comorbid conditions. The utilization of left ventricular assist devices (LVADs) as both bridge to transplantation and destination therapy after the reimbursement since October 2018, is expected to alter HTx trends in Korea. Interestingly, the conditional mortality was distinctively different according to the age of recipient and donor. The effect of recipient age is more pronounced before 1 year and the effect of donor is more pronounced after 1 year. Older recipients might have decreased self-defense and tolerability for end-stage heart failure and it affects their short term-survival.⁶⁾ In comparison, older donor hearts might have an increased risk of coronary arterial disease, including endothelial dysfunction which could have influence on the longer term-survival.⁶⁾

One of the unique features of Korean HTx is that substantial number of patients get HTx surgery under extracorporeal membrane oxygenation (ECMO) support.²⁾ The proportion has

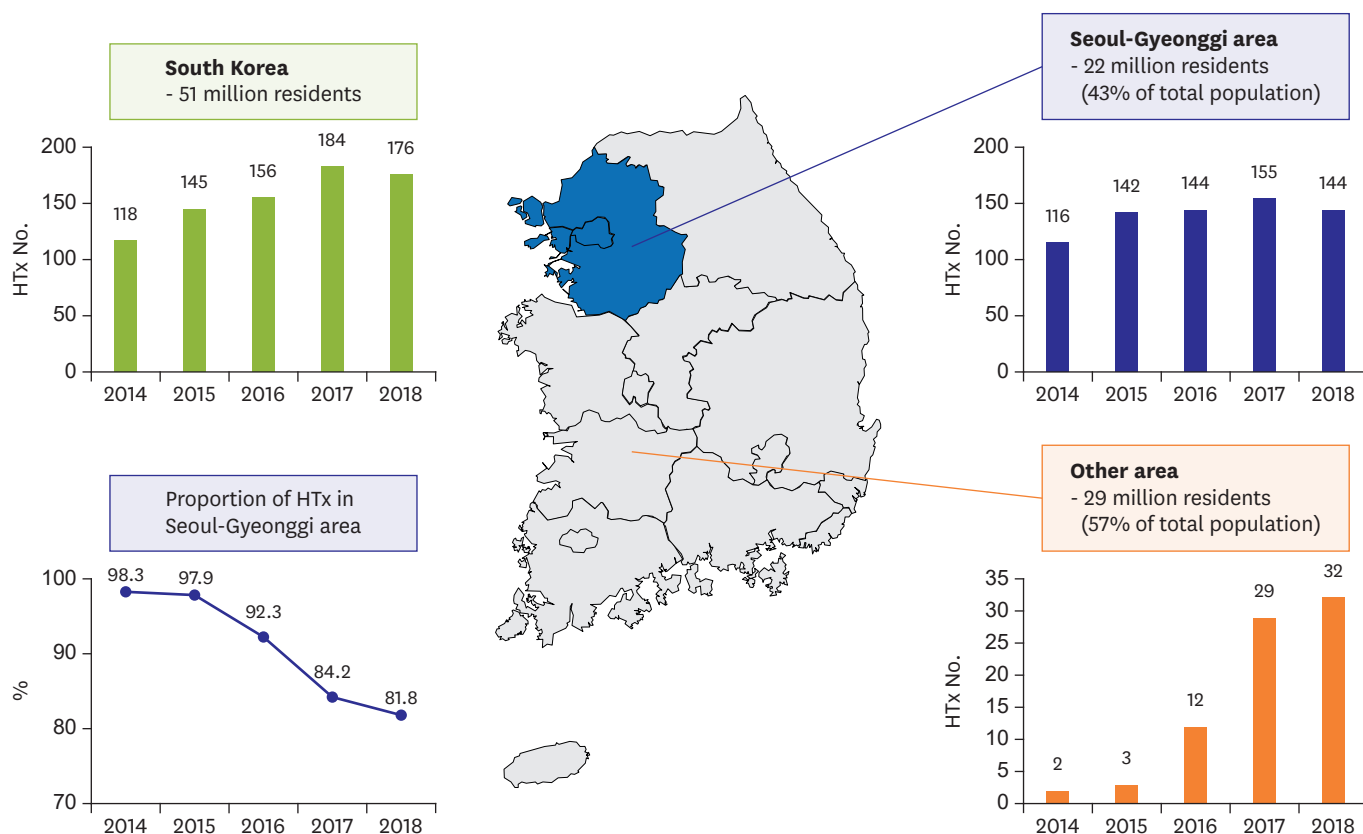


Figure 1. Annual HTx surgery statistics showing different trends according to the regional distribution in South Korea. The number of HTx in Seoul-Gyeonggi area is stationary since 2015, but HTx cases in other area are continuously increasing. The dependence of HTx surgery in Seoul-Gyeonggi hospitals are gradually decreasing from 98.3% in 2014 to 81.8% in 2018. HTx = heart transplantation.

been increased from 16% in 2014–2015 period to 33% in 2016–2017 period.⁴⁾ Patients with ECMO would definitively have high-risk features which would result in poor post-operative survival.²⁾⁶⁾ One-year survival was significantly lower in patients with pre-transplant ECMO (79%) compared with patients without pre-transplantation mechanical circulatory support (93%). Notably, ECMO without mechanical ventilatory support showed better survival than ECMO with mechanical ventilatory support. Among those with ECMO support, relatively stable patients might be able to tolerate without mechanical ventilatory support and they are more likely to have less ventilator associated infection with better chance to recover after the HTx surgery.

The entire process of HTx is the art of engaging all available contemporary medical resources. It starts with effective donor organ utilization. Considering the number of HTxs in Korea (annually less than 200 cases in Korea among approximately 500 brain dead donors), many potentially available organs are still not fully utilized. An expanding donor pool with an effective organ utilization system should be operated by utilizing at ‘well-organized donor organ care strategy.’ In addition, peri- and post-operative treatment including selection of immunosuppressive regimen and appropriate risk management need to be standardized according to the evidences provided through Korean's own experiences. Sharing knowledge and practical cases in Korean HTx society members would expand opportunity to improve the quality of management and survival. Timely application of LVAD can be another breakthrough in the era of high-risk HTxs—older donor and recipient, HTx during ECMO support—as shown in the report. In conclusion, the second KOTRY report provided further insight into understanding the current status of Korean HTx and unveiled our future directions. More regionally representative Korean HTx Registry can broaden our perspectives.

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