

Overview of kidney transplantation in Malaysia

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Introduction

In Malaysia, more than 44,000 people live with end-stage kidney disease (ESKD) ⁽¹⁾. The development of chronic kidney disease (CKD) and its progression to this terminal disease remains a significant source of reduced quality of life and significant premature mortality. Chronic kidney disease (CKD) is a debilitating disease, and standards of medical care involve monitoring and managing risk factors of disease progression. Early referral to nephrologists for planning of kidney replacement therapy is important. Options of kidney replacement therapy include kidney transplantation, haemodialysis and peritoneal dialysis. In some patients a conservative approach may be considered if dialysis is not suitable or in patients with limited life expectancy due to other co-morbidities.

Burden of CKD & status of kidney transplantation

The prevalence of CKD in Malaysia had increased from 9.1% in 2011 to 15.5% in 2018⁽²⁾. Similarly, the number of treated ESKD had increased from 26,442 in 2011 to 44,136 in 2018⁽¹⁾. Bujang and his co-worker predicted that the prevalence of ESKD will continue to rise from 46 thousands patients in 2018 to 100 thousand patients by 2040 ⁽³⁾. The rise in the prevalence of ESKD has a significant impact the economy of Malaysia. Based on Hirman et al, The ESKD expenditure in public sectors had increased by 94% from USD 405 million in 2010 to USD 785 million in 2016 ⁽⁴⁾. Unfortunately, the number of kidney transplantation performed in Malaysia is extremely low. In 2020, Malaysia observe incidence rate of living kidney transplant rate of 3.46 pmp and deceased kidney transplant rate of 1.27 pmp with a total kidney transplant rate of 4.83 pmp ⁽⁵⁾.

Benefit of kidney transplantation

Kidney transplantation provides better long term survival provides better quality of life and cheaper in comparison to continuing on dialysis,

Types of kidney transplantation

There are two sources of kidney donors, deceased donors and living donors. In Malaysia, we are practising and opt-in system where the consent of the family member is obtained prior to organ donation.

Deceased Donors

There have been several efforts to improve donation rate. Awareness on importance of organ donation among the general public, medical professionals, policy makers and fund providers. There is a need of continuous awareness program. The National

Transplant Resource Centre (NTRC) had actively played this role in the past. However, this has slowed down due to COVID 19 pandemic and other reasons

Many other initiatives had been planned and introduced at the Ministry of Health (MOH) level to strengthen the transplant program with the aim to increase deceased donor organ donation rate but due to lack of follow up actions , those initiatives failed to achieve the objectives . The MOH introduced “Unit Perolehan Organ Hospital (UPOH)” team in 2019 to focus on Intensive Care Units in large public hospitals to identify potential brain-dead donors, engaging and training intensivist and anaesthetists to perform brain stem function tests and to refer potential donors to the Transplant Organ Procurement (TOP) teams.

Deceased donor kidneys allocation criteria

Given the small number of kidneys from deceased donor, the eligibility criteria to be on the waiting list is strict. Previous allocation system known as Malaysian Organ Sharing System (MOSS) was introduced in 1998 ^(6,7). MOSS allocation system was based on a point system adopted by other countries and summarized in table 1. Due to logistics, human resource & financial reasons, it is impossible to have HLA & panel reactive antibody (PRA) tested for all patients in the waiting list especially when the transplant rate is extremely low. It is also difficult to test for HLA of the deceased donor prior to transplant. Therefore, HLA matching and PRA score has not been used for kidney allocation in Malaysia. For these reasons , the only criteria feasible in Malaysia then in determining kidney allocation is based solely on duration of dialysis. Kidney allocation systems that emphasized on waiting time place minimal attention to optimizing the use of extremely limited organs.

Table 1: MOSS Criteria and Scoring System

Criteria	Scoring System
HLA matching	12 points 2 points for every HLA match
PRA	10 points 1 point for every 10%
Waiting time	20 points 1 st get 20 points, last have 0 points
Logistic scores	6 points - when applicable (prolonged cold ischaemic time)
Age of patient	Organs from DD < 18 years allocated to recipient < 18 years

DD, deceased donor; HLA, human leucocyte antigen; MOSS; Malaysian Organ Sharing System; PRA, panel reactive antigen

In 2019, a new allocation system was introduced, named as Malaysian Kidney Allocation System (MyKAS)⁽⁸⁾. MyKAS utilizes a mathematical scoring system which estimated the chances of survival after kidney transplantation, Estimated Post

Transplant Survival (EPTS). EPTS is utilized by the United Organ Sharing System (UNOS) in the United States. During 2020 to 2021 period, EPTS scoring of 0-20% were considered eligible. Data suggested the optimal cut-off EPTS scoring was 38%. However, this is recently revised and EPTS scoring of 0-40% is now considered eligible and this will be adopted in 2022 allocation system.

Living Donors

Majority of kidney transplantation performed in Malaysia are from living donors. Based on the Unrelated Living Organ Donation Policy and Procedures 2011, first and secondary relatives are allowed to donate, whereas third degree relatives need to be evaluated and obtain approval from The Unrelated Transplant Approval Committee(UTAC), MOH⁽⁹⁾. There is a need to expand potential living donors to include friend as well as altruistic donors

Degree of Consanguinity	Example	
First degree relative	Mother Daughter Full sister (including heterozygous twin/multiple twins)	Father Son Full brother (including heterozygous twin/multiple twins)
Second degree relative	Grandmother Granddaughter Aunt Niece Half sister	Grandfather Grandson Uncle Nephew Half brother
Third degree relative	Great grandmother Great granddaughter Great aunt First female cousin Grand niece	Great grandfather Great grandson Great uncle First male cousin Grand nephew

High immunological risk transplant

In Malaysia, we have embarked on high immunological risk transplants. These include ABO-incompatible(ABOi) transplant as well as HLA incompatible transplant (transplant in the presence of Donor Specific Antibody (DSA)). Both types of transplant requires desensitization procedure to remove antibodies that can cause early antibody mediated rejection (AMR); anti-hemagglutinins antibody (ABOi) and DSA in HLA incompatible transplant. Desensitization procedures achieved by plasmapheresis and B cell therapies and accompanied by higher state of immunosuppression. This added to cost and increased risk of infection immediate post transplantation

ABO incompatible transplant

Malaysia had performed the first ABOi transplant since 2021. ABOi transplant carries increased risk of early rejection. There is a concern of increased risk of infection such as BK virus as well as urinary tract infection. However, the long term allograft outcome is comparable to ABO compatible transplant

High immunological risk transplant

High immunological risk transplant (due to the presence of DSA is associated with increased risk of allograft rejection as well as increased risk of long term allograft failure. However, HLA-incompatible transplant is associated with better survival than continuing on dialysis.

Paired Kidney Exchange Program (PKE)

PKE aims to increase the number of living donor kidney transplants in Malaysia by exchanging organs between incompatible donor/recipient pairs. Once enrolled in this program, a recipient and their willing, but incompatible live donor agree to exchange kidneys with another incompatible pair so that both recipients receive compatible organs from strangers. As such, donors must be willing to donate their kidney to someone they do not know, while their intended recipient receives a kidney from an unknown donor who is also part of an incompatible donor/recipient pair. For some patients, PKE may provide their only opportunity of kidney transplantation.

PKE occurs when a live donor (Donor A) is willing to donate to a spouse or relative (Recipient A), but cannot do so because they have an incompatible blood type or tissue type. PKE, through its database of registered pairs, helps to find another pair in the same situation (Donor and Recipient B) who might be a match with Donor and Recipient A. By exchanging donors, two compatible matches are created.

References

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