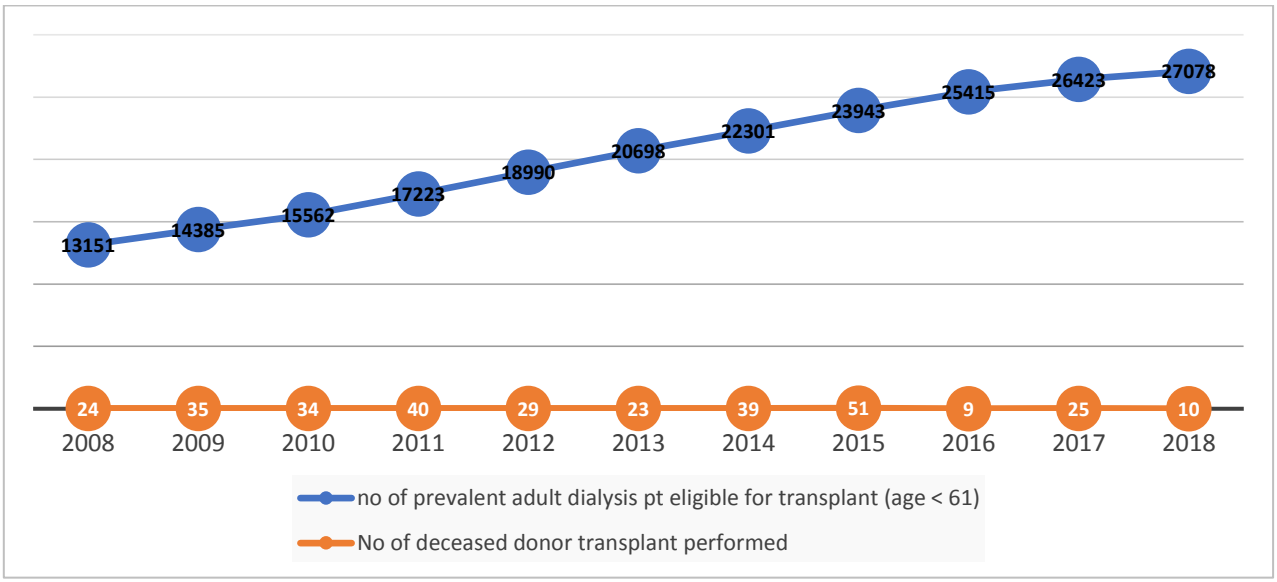
Improving Kidney Allocation System in Malaysia
From MOSS to MyKAS

Introduction

The prevalence of end stage renal disease (ESRD) patient continue to increase over the years with 43,804 on dialysis at 31st Dec 2018. Out of these, 27,078 patients are eligible and waiting for a kidney transplant . However, the number of deceased donor kidney transplant performed each year in Malaysia has been very small which created a huge gap in demand and supply.



The current deceased donor kidney allocation system or The Malaysian Organ Sharing System (MOSS) has been in existence since 1998. This was based on a point system(adopted from USA, Australia, UK). The MOSS criteria consists of:

Criteria	Scoring System	**Comments**
HLA matching	12 points 2 points for every HLA match	Due to logistics, human resource & financial reasons, it is impossible to have HLA & 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
PRA	10 points 1 point for every 10%	
Waiting time	20 points 1st 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	

For the various reasons stated above, the only criteria feasible in determining kidney allocation is based solely on duration of dialysis. Kidney allocation systems that emphasized on waiting time place minimal attention in optimizing the use of extremely limited organs.

The current selection process is solely based on the ethical principle of **justice** (being fair), but not on **utility** (quality of being fair). Allocation of scarce resources like DD kidneys should not only be fair but should also

be based on good **medical** judgement and **equity** (social justice). This approach seeks to achieve the best use of donated organs, avoid futile transplant, promote patient access and promote efficient management of deceased donor kidney transplantation

Patients who have been on hemodialysis for a significant period of time have more complications such as cardiovascular disease, vascular calcification, severe CKD-MBD which leads to significant mortality and morbidity. These patients are more likely to have a more difficult and prolonged transplant surgery, higher post-operative complications and cardiovascular events as well as poorer post-transplant graft and patient survival.

From MOSS (Malaysian Organ Sharing System) to MyKAS (Malaysian Kidney Allocation System)

Rationale

Given the scarcity of this precious national resource (donor kidneys), there is a strong need to include the ethical principle of **utility and equity** into allocation policies while retaining the principle of **justice** in the kidney allocation process with the hope to produce the greatest "good".

In Malaysia, the number of patients with ESRD continue to grow and the number of deceased donor organ is extremely low. It is impossible to manage more than 20,000 patients on the waiting list for an average of 30 to 40 kidneys per year. Stricter criteria to be in the waiting list are required. However, we are unable to develop a model to predict post-transplant survival for Malaysian population as the database of deceased donor kidney transplant is extremely small.

Proposal

The MyKAS committee proposed to adopt some of the principle in the OPTN/UNOS Kidney Allocation System and utilize the EPTS Scoring System to predict patients who will survive the longest after transplantation.

OPTN/UNOS Kidney Allocation System
Organ Procurement Transplant Network (OPTN) in the USA introduced the new Kidney Allocation System in Dec 2014 with the following principles: to maintain balance between **justice** (fair consideration of candidates' circumstances and medical needs) and **Medical utility** (trying to increase the number of transplant and the length of time patients and organs survive).

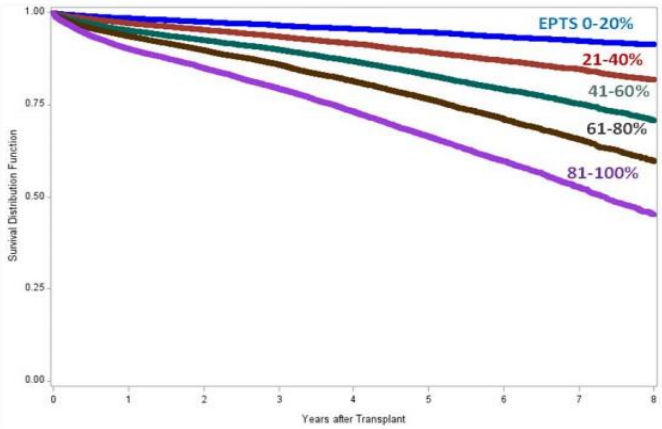
What is EPTS Score?
Estimated Post Transplant Survival (EPTS) score is a numerical measure used to predict patient survival after kidney transplantation. Every adult patient on the kidney waitlist receives an EPTS score.

Factors included in the EPTS formula are:

1. The potential recipients age (in years)
2. Duration of dialysis (in years)
3. Current diagnosis of diabetes
4. History of prior solid organ transplant**).**

EPTS scores range from 0% to 100%, where patients with EPTS score of 0-20% have been shown to survive the longest after transplant

Figure 1: Kaplan-Meier Patient Survival Curves by EPTS Score
Deceased Donor, Adult, Solitary Kidney Transplants from 2003-2010
Based on OPTN data as of Feb 7, 2014



An EPTS score of 20%, the recipients would likely survive longer than 80% of other recipients nationally.

MyKAS Eligibility Criteria

Adult

1. All patients (>=18 and < 60 years old) that are registered with the National Renal Registry

2. EPTS scores will be calculated:
   - EPTS ≤ 20: “Eligible for Assessment”
   - EPTS > 20: “ Ineligible for Assessment”

3. Patients with EPTS score of ≤ 20% will be divided into their own blood group .These patients will be prioritised in their individual blood group using the following criteria
   - Duration of dialysis (i.e. patients with longer duration of dialysis will be higher in the list)

4. The following patients will be prioritized if they are deemed fit to undergo kidney transplantation
   a) Living kidney donors who developed ESRD
   b) Living kidney transplant recipient with primary non-function (due to technical reason)
   c) Family members (first degree) of deceased donors
   d) Organ pledgers (who have registered as pledger minimum of 3 years prior to diagnosis of CKD)

Paediatric

1. All patients age < 18 and weight >= 17 kg

2. These patients will be prioritised in their individual blood group using the following criteria
   a) Living kidney transplant recipient with primary non-function (due to technical reason)
   b) Family members (first degree) of deceased donors
   c) Duration of dialysis (i.e. patients with longer duration of dialysis will be higher in the list)