A kidney exchange programme for South Africa – the time is right

Kidney transplantation remains the optimal treatment for eligible patients with chronic kidney disease requiring kidney replacement therapy, offering superior survival and quality of life compared with dialysis.[1] Unfortunately, in South Africa (SA), most dialysis patients wait between 5 and 10 years, or even longer in provinces with low deceased donor transplant rates, for an organ on a deceased donor waiting list. For those with living donors, transplantation may still not be possible owing to incompatibility with their donors. This could be because of a blood group incompatibility, i.e. ABO incompatibility (ABOi) or human leucocyte antigen (HLA) incompatibility. Together, these can affect between 30 and 40% of donor-recipient pairs (DRPs).[2]

Historically, as well as in many current transplant programmes, potential living donors who are found to be incompatible with their intended recipient are advised that donation is not possible. One option to overcome this challenge is to embark on the complex, expensive and risky process of desensitising the recipient's immune system to allow them to receive the kidney from their incompatible donor. However, this approach carries significant risks, requires extensive resources and is generally performed only in highly specialised and experienced transplant centres, of which there are very few in SA. Even if successful, they carry a higher risk of rejection[3] and infection.[4]

A more effective and safer alternative is to enrol these incompatible DRPs in a kidney paired donation (KPD) programme, also known as a kidney exchange programme (KEP). First suggested by Felix Rapaport in 1986,[5] and implemented as a national programme in South Korea in 1991,[6] regional and national KEPs are now well established in many developed countries, and have also been successfully adopted in several lower-middle income countries including India, Iran, Nepal and Pakistan.[7]

The concept is simple yet elegant. Multiple incompatible DRPs provide consent and are enrolled into a KEP where their data, in particular their blood group and HLA data, are captured. This database of donors and recipients is then analysed by a matching software program using complex algorithms that look for new compatible pairs in such a way that for every recipient where a new compatible donor is found, their original incompatible donor is paired with a new compatible recipient (Fig. 1). This usually involves a two- or three-way exchange. Even more exchanges are possible, but this becomes logistically challenging.

In this way, ≥2 compatible transplants can be performed, usually simultaneously, to ensure that all donors proceed as planned, hence preventing the possibility of a donor withdrawing after their original incompatible recipient has received a transplant. KEPs have allowed thousands of kidney transplants to proceed safely all over the world, and in some countries, such as the USA, accounted for almost one in five of all kidney transplants performed in 2021.[8]

Between 26 and 49% of patients enrolled onto a KEP find a compatible donor on national KEPs.[9] This matching concept was so groundbreaking that the Nobel Prize for economic sciences was awarded to Alvin Roth and Lloyd Shapley in 2012 for the 'theory of stable allocations and practice of market design'. Their theory allowed for the matching of students to schools, doctors to hospital positions and donors to recipients.

KEPs can also utilise non-directed altruistic donors (NDADs). An NDAD, sometimes called a 'Good Samaritan' donor, is a person who wishes to donate a kidney to a person with advanced kidney disease who (s)he does not know. They may have originally wanted to donate to a family member or friend, but were unable to do so for one of various reasons, including: (*i*) another more suitable donor was available; (*ii*) their intended recipient was unable to receive a transplant for medical reasons; (*iii*) their intended recipient died before the transplant could be performed, and no KEP was available at the time; or (*iv*) their intended recipient was tissue or blood group incompatible. The ideal way to utilise an NDAD in a KEP is in a domino or chain of transplants (Fig. 2).

A single NDAD has the potential to initiate a chain of transplants that continues until a donor in the sequence is no longer available, becomes medically unsuitable, or chooses to withdraw. At that point, the chain can be restarted by introducing another NDAD. In theory, a single NDAD could trigger a sequence resulting in hundreds of transplants over time.

NDADs make up as many as 6% of donors in some countries, such as the UK.[10] When a potential NDAD approaches a transplant programme, careful and comprehensive screening is essential, with particular attention paid to psychological assessment. In our limited experience, it is not uncommon for such donors to present with unresolved psychological issues that require sensitive evaluation before proceeding.

In May 2025, Groote Schuur Hospital (GSH) approved the launch of a pilot KEP. The following month, the first KPD transplant under this initiative was successfully performed, with simultaneous surgeries

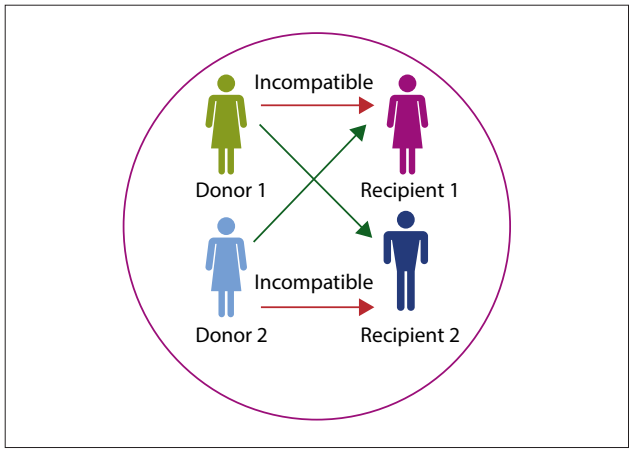

Fig. 1. Kidney paired donation. (Red = incompatible; green = compatible).

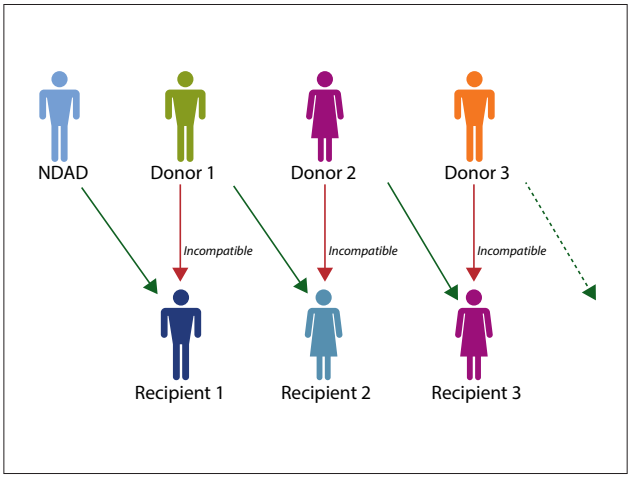

Fig. 2. Using a non-directed altruistic donor (NDAD) to start a chain of transplants. (Red = incompatible; green = compatible).

between two incompatible DRPs at GSH and UCT Private Academic Hospital (UCTPAH). The recipients of both the original pairs had no other donor options. They were blood group incompatible (ABOi), and in addition, the GSH pair was also HLA incompatible. Although both GSH and UCTPAH had the capacity to proceed with the original donor pairs, having both performed ABOi kidney transplants since 2023,[11] these would have been of high immunological risk and considerably more costly. This KPD transplant resulted in two low-risk procedures, with both recipients discharged within 10 days. They continue to maintain excellent kidney function. Importantly, the GSH pilot KEP is open to all patients across SA, and the National Department of Health has committed to supporting the establishment of a national KEP.

While this case illustrates the clear advantages of KPD for incompatible pairs, there are also benefits for compatible DRPs to participate in KEP. This may initially seem unnecessary or counterintuitive, but many compatible DRPs are poorly matched in terms of age and/or HLA compatibility, or may be mismatched for certain viruses, including cytomegalovirus, Epstein-Barr virus and even HIV, making the virus-negative recipient at risk of these infections if their donor is positive. Even when these factors are not present, including additional compatible DRPs in a KEP strengthens the pool and increases the likelihood of identifying suitable matches for incompatible pairs, thereby improving outcomes for all participants.

Anonymity is usually part of most KEPs, and is included in the GSH pilot programme, but while anonymous allocation during KPD is a standard practice in many countries, such as the Netherlands, Sweden and other parts of Europe, this is not the case in countries such as India, South Korea and Romania.[7] Anonymity also means that the original/incompatible DRPs cannot involve social media, especially once the new/compatible DRP is identified. In areas where anonymity is not maintained, such as India, the intended DRPs must meet and share medical information, once a potential exchange is identified. The goal is to increase trust and transparency between the transplant team, the administrative team and the DRPs.[7]

Not all incompatible DRPs choose to participate in a KEP. Some find the concept of donating to or receiving a kidney from a stranger difficult to accept. It can be helpful to explain to the donors that their act of giving will directly enable their loved one to receive a transplant, even if it is not their own kidney.

Because of concerns around organ trafficking, in SA all living donor transplants between unrelated DRPs must be approved by the National Minister of Health, who is assisted and advised by a ministerial advisory committee for organ transplants (MACOT). This means that all the DRPs identified in a KEP need to be approved by the MACOT. In fact, the GSH KEP asks for the original incompatible DRPs, even if related, to be approved by MACOT, in case this committee finds a problem with one of the donors or recipients after the new DRPs are found, thus making the KPD not possible at a late stage.

In the SA public health context, where access to chronic dialysis is rationed and every slot is precious, expanding KPD is more than a clinical innovation; it is a lifeline. Each successful KPD transplant not only restores health and quality of life to ≥2 recipients, but also frees up a dialysis slot for another patient who might otherwise be denied life-sustaining treatment. By embracing KPD nationally, we can maximise the impact of every willing donor, regardless of how compatible they are with their intended recipient, extend the reach and co-operation of our transplant programmes, and offer hope to many more patients living with kidney failure. With all these benefits, the time is right to roll this out in SA.

Z A Barday; F McCurdie; T du Toit; N Wearne
Department of Nephrology and Hypertension, University of Cape Town and Renal Transplant Unit, Groote Schuur Hospital, Cape Town
zunaid.barday@uct.ac.za

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