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Organ donation and transplantation in South Africa – an update

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South Africa has one of the highest incidences of renal failure in Africa. It is estimated that we now have over 5 000 patients with end-stage renal failure, and more than 2 500 of these patients are awaiting transplantation. Transplantation is more cost-effective and provides a much better quality of life for these patients than dialysis. But transplantation in South Africa is far more than just kidney transplantation. Liver transplantation has become more common over the last 10 years, with Donald Gordon Hospital expanding their programme and now also offering living-related liver transplantation. In the Western Cape the liver transplant programme is based at Groote Schuur Hospital and Red Cross Children's Hospital. A smaller kidney-pancreas programme is running at Donald Gordon Hospital – especially useful to type 1 diabetic patients with renal failure. Heart transplantation takes place in Johannesburg and Cape Town and lung transplantation forms a small, but important, part of the country's solid organ transplantation programmes.

How do we decide who gets on to the deceased donor waiting list for organ transplantation?

In most regions there is now a shared waiting list between state and private sector units for all solid organs. When a patient approaches end-stage renal failure and glomerular filtration rates are less than 10 ml/kg/h, the patient is eligible for a kidney transplant. However, the potential candidate must be fit for such a procedure from a general and cardiac point of view as well. Only patients who can tolerate surgery and postoperative immunosuppression should be listed. Waiting time for a kidney will vary according to the patient's blood group. As O blood group is the most prevalent among potential recipients, their waiting time is the longest. O blood group livers and hearts are often used for patients with other compatible blood groups, but because of lengthy kidney transplant waiting lists only O-positive recipients are cross-matched against O-positive deceased donors.

Patients are presented at a panel meeting, which consist of physicians, surgeons, transplant co-ordinators and other nursing staff as well as social workers and psychologists. In the state sector, where dialysis is limited, patients will only be accepted for dialysis if they are also good transplant candidates. In the private sector there are patients on chronic dialysis programmes who are not eligible for transplantation.

For kidney transplantation we have now accepted a points system in most regions. Patients are allocated points according to the following criteria:

- time on the waiting list
- age
- previous transplants
- sensitisation
- other medical issues, e.g. a lack of vascular access on dialysis.

When a donor becomes available all suitable recipients of that blood group will be cross-matched against the donor and the organ will be allocated according to the position on the waiting list after cross-matching.

For liver and heart transplantation the waiting list is much shorter, and physicians are able to allocate according to the patient's current clinical condition and urgency.

Shortage of organs and ways to expand organ utilisation

Declining numbers of deceased donors is a big problem in transplantation in South Africa. Despite an increasing waiting list for solid organs, the number of transplants annually remains stable in South Africa. In many centres living donation has become the mainstay of kidney transplantation. Although this is an acceptable alternative, putting a living donor at risk is not an ideal way of increasing organ availability. With the extent of renal disease present in our population, transplants will only increase if deceased donation continues to grow. It is the ethical responsibility of every medical doctor to refer potential deceased-organ donors to transplant co-ordinators.

At Groote Schuur Hospital, the number of referrals made for deceased donation has declined over the last 10 years. This is a result of more aggressive treatment of head injury and other neurosurgical patients with a good prognosis and an earlier withdrawal of treatment in similar patients with a poor prognosis. Most suitable deceased donors have a history of trauma to the head or medical conditions affecting the brain, such as subarachnoid haemorhage or isolated brain conditions.

South Africa currently has the potential to almost double or triple our current number of 300 deceased donors per year. A small unpublished study comparing head injury deaths with donor referrals was done by the author at Groote Schuur Hospital in 2007. Results showed that a significant number of potential donors were not referred to transplant co-ordinators for discussion with the family (Fig. 1).

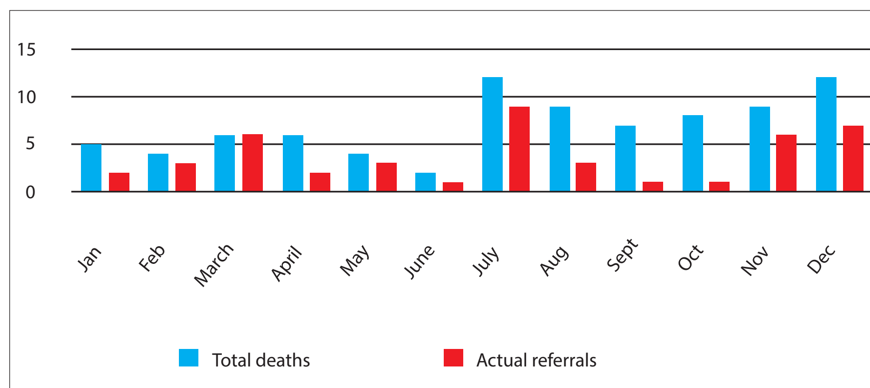

Fig. 1. Total deaths versus actual referrals, Groote Schuur Hospital (2007).

Table 1 reflects a further breakdown of referrals of potential organ donors from the different units to the transplant coordinators. At Groote Schuur Hospital these referral rates vary tremendously, with the trauma surgeons referring most of the potential donors. The option of having a hospital policy of required referral is currently being explored. This option would improve referral numbers, as it will force doctors to refer every potential donor to transplant co-ordinators. At Tygerberg Hospital fewer than 5 brain-death donors are certified and referred per year. The potential to expand organ donation and referral of brain-death donors in the Western Cape is huge.

Because of a shortage of organ donors in South Africa constant efforts are made to improve public education around organ donation and brain death. However, education among medical professionals is still lacking.[1,2] The introduction of a lecture on organ donation and transplantation in both the fifth and sixth year of study from 2009 at the University of Cape Town should help address this problem.

Consent rates for organ donation are influenced by religion, socio-economic status and race. Consent rates in the private sector, where the higher socio-economic groups are situated, are much better than in the state sector. In a recent comparison consent rates in the private sector were between 80% and 100% (Table 2). In the state sector consent rates are as low as 30% (Table 3).

The Organ Donor Foundation of South Africa is constantly trying to improve consent rates among the public through their educational outreach programmes. But it remains the responsibility of transplant professionals to think of new ideas to get more donors and to make sure all referred donors are utilised.

Increasing organ donation and transplantation by using marginal donors

Many new programmes have been introduced to improve organ donor numbers. The use of marginal donors is being explored worldwide and, as a result, the threshold for using patients with pre-existing medical conditions as organ donors is getting lower.

South Africa has a huge HIV-positive population and for this reason an HIV-positive-to-positive transplant programme was started at Groote Schuur Hospital in 2008 for HIV-positive patients with end-stage renal failure.[3,4] To date 22 patients have received transplants, with good outcomes.

Donation after cardiac death – the way forward in South Africa?

One way of increasing organ donation dramatically is to use patients after

Table 1. Donor referrals at Groote Schuur Hospital

	1991	1996	2001	2006	2011	Total
Trauma unit	26	42	40	32	50	190
Emergency unit	7	1	3	1	7	19
Neurosurgical ICU	20	10	1	3	0	34
Other ICU	5	3	7	5	3	23
Other	3					3
Total	61	56	51	41	60	

Table 2. Private sector consent rates

	Black		Coloured		White	
Private sector Cape Town	Number of families asked	Consent given *N* (%)	Number of families asked	Consent given *N* (%)	Number of families asked	Consent given *N* (%)
2001	0	- -	3	1 (33.3)	8	7 (87.5)
2006	1	1 (100)	4	3 (75)	12	12 (100)
2011	2	0 (0)	3	3 (100)	9	8 (88.8)

Table 3. State sector consent rates

	Black		Coloured		White	
GSH	Number of families asked	Consent given *N* (%)	Number of families asked	Consent given *N* (%)	Number of families asked	Consent given *N* (%)
1991	7	2 (28.5)	31	18 (58.0)	7	5 (71.4)
1996	13	7 (53.8)	21	17 (80.9)	10	8 (80.0)
2001	17	6 (35.2)	19	10 (52.6)	6	5 (83.3)
2006	7	0 (0)	19	6 (31.5)	2	2 (100)
2011	28	9 (32.1)	12	4 (33.3)	0	- -

circulatory death in a donation after cardiac death (DCD) programme. Patients who are not brain dead and possibly will not become brain dead can still give consent for organ donation after cardiac death if they die of a suitable cause. In most European countries this type of organ donation has expanded dramatically over the last 10 years. In Spain and the USA, DCD donor rates now equal the traditional brain-dead donor rates.

In the case of a dismal prognosis and a decision to withdraw treatment from a patient, the treating physician is asked to consider referring the patient to the transplant team as a DCD donor. This is then followed up with a conversation with the family and consent is obtained for organ donation after cardiac or circulatory death. The family does not need to understand the concept of brain death – they are only asked for permission to use the patient as an organ donor once the patient's heart has stopped and circulation has ceased.

After death certification the patient is taken to theatre, where the kidneys are removed and flushed with cold Euro Collins or Brett Schneider solution. A warm ischaemic time between 10 and 30 minutes is acceptable. Cold ischaemic times should be kept to a minimum. Machine preservation has improved the outcome of these kidneys elsewhere, but this is not yet available in South Africa.

After the family has given consent, a theatre is opened and prepared for organ retrieval. Inotropes, fluids and ventilation are stopped in the ward or unit. At Groote Schuur Hospital the family are reassured that this is not done because the patient will be an organ donor, but that this is our normal policy in the case of head injury, namely that, because of resource limitations, we do not treat patients with a dismal prognosis with ventilation or aggressive treatment. However, this should be possible in the private sector as well, because the withdrawal of treatment will be discussed with the family as part of the consent process.

The retrieving surgeon awaits the death of the patient in theatre, ready and scrubbed in order to shorten the warm ischaemic time. The operating theatre needs to be ready and prepared so that the body is transported to theatre immediately after death. It is generally acceptable to allow the family 5 minutes with the deceased before the body is moved to theatre. For practical purposes this waiting period has a 2-hour cut-off time at Groote Schuur Hospital. If the potential donor does not arrest in this 2-hour period, organ retrieval after death is abandoned.

Although it is logistically a challenge, this option is an excellent way of increasing organ donation. At Groote Schuur Hospital we have done 15 transplants from DCD donors to date.

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