SPECIAL SECTION: RENAL DISEASE

Deceased Donor Kidney Transplantation in India

Ilangovan Veerappan, MD,DM
Department of Nephrology
Pondichery Institute of Medical Sciences (PIMS),
Pondicherry, India

Introduction

The incidence of end stage kidney disease (ESRD) in India is 151-232 per million per year. The renal transplantation rates are a paltry 3.25 per million per year.\(^1\) In India less than 10% ever get access to renal replacement therapy like dialysis and transplantation, while less than 3% continue the therapy life long.\(^2\) Renal Transplantation has better survival\(^3\), quality of life\(^4\) and is cost effective.\(^5\) The major barrier to transplantation is money and availability of live related donor in India. Even in the better performing regions of the country the deceased or cadaver renal transplantation rate is only 0.08 per million per year, i.e., 2% of the total transplantation.\(^6\) Deceased donor transplantation has the potential to significantly reduce the mismatch between need and availability of the organs for transplantation and minimize the burden on living donors for organ donation. The barriers, misconceptions and mistrust that currently impede the development of sufficient deceased donor transplantation are discussed here.

Deceased donor transplantation in India

Contrary to general perception the long term cost of renal transplantation in lower compared to hemodialysis or peritoneal dialysis.\(^6\) The quality of life\(^4\) and survival\(^3\) are better amongst renal transplant recipients. Yet the renal transplantation rate in India is a paltry 3.25 per million per year.\(^1\) The renal transplantation centers are concentrated in major cities and industrial areas and wide disparity exists in different regions of the country. Compared to cities, the awareness and affordability is lower in most regions of the country. Apart from money, availability of live related donor is a major cause for the ever increasing gap between the patients awaiting a renal transplant and the patients who get a renal transplant.\(^7,8\) In Spain and Portugal the deceased donor rate is more than 30 donors per million population. In India, the deceased or cadaver renal transplantation...
rate in one of the better performing region in India is only 0.08 per million per year, i.e., 2% of the total transplantation.

In India, 1,33,938 people have died of road traffic accidents in 2010 and of that 70% are brain dead. Deceased donor transplantation has a great potential in bridging the ever widening gap between availability and demand of organs for transplantation. Cadaver renal transplantation involves declaring brain-death, seeking permission from the relatives, retrieval of the organs, storage of organs, transport to the recipient’s hospital and ultimately transplantation. The first two stages are the more difficult ones.

**Spanish model of deceased donor transplantation**

More than 95% of deceased donors come from intensive care units (ICU) and ICUs therefore is the place where the efforts to increase donation are targeted. The main cause of loss of donors in Spain is the lack of identification and referral of possible or potential deceased organ donors. The ICU clinician is identified as the person most capable of influencing the donation process as he is able to establish appropriate relationship with those working in the unit and promote the idea of organ donation as a part of end of life care. The success of Spanish model is frequently attributed to Spain’s legal framework of presumed consent. The opting out of deceased donor donation was introduced in 1979 and had no impact on donation rates. With the establishment of National Transplant Organization and trained Transplant Donor Coordinators in Spain, the donation rates have increased furthermore.

**Tamil Nadu model of deceased donor transplantation**

The role of transplant coordinator was realized and a transplant coordinator is appointed and is available round the clock to coordinate all aspects of transplantation in the hospitals. The hospitals are required to upload the details of the transplantation on the hospital web site and the government web site (www.tnos.org). Each hospital maintains a waiting list of patients awaiting transplantation that is frequently updated. In the absence of an organ sharing network, The Tamil Nadu model involves allocation of one kidney, liver, and heart automatically to the hospital where the deceased donor organs are harvested. The second kidney, the liver, and the heart (if the hospital where harvesting has taken place only does renal transplantation) will be allocated to patients in other hospitals by the convener. The postmortem of the brain dead cadaver donor is performed in the premises of the organ retrieval hospital to save time and worry for the donor family. A full recipient report is sent to the central convener of the transplant.
program within 48 hours of discharge of the recipient and uploaded to the website http://dmrhs.org. In addition a monthly statement of the transplants performed is sent. The long term clinical results of the transplantation surgeries are also periodically monitored. A transplant advisory committee involving members of the health ministry, NGOs, private, and government medical college hospitals in the state monitor the functioning of the programme. The combined effort has resulted in the harvesting of 223 deceased donors in the state of Tamil Nadu during the period October 2008 to December 2012.¹¹

**The barriers to deceased donor transplantation**

There are several barriers to successful implementation of deceased donor programme. The issues pertaining to India are discussed here.

**Lack of awareness of brain-death concept**

Brain death equals to death of the patient. Contrary to general perception cessation of cardiac activity is not required to declare a patient dead. There is reluctance from the doctors in declaring brain death. Declaration of brain death should be made compulsory at least in the government hospitals to begin with, in India. In the state of Tamil Nadu, declaration of brain death has been made compulsory in the three main government hospitals in Chennai. The other hospitals, both public and private are also encouraged to certify brain death on voluntary basis as of now. The Director of Medical Education and the Director of Medical and Rural Health Services are directed to periodically organize awareness workshops on the provisions of the above order.¹² The cadaver organs should be considered as national resource and should not be wasted.

**Lack of organ donation awareness**

Lack of organ donation awareness in India is another major barrier for deceased donation. After a much publicized organ donation by the doctor couple of their brain dead son, the organ donation rates in Tamil Nadu had increased exponentially. Without awareness it is going to be difficult to convince the relatives of the deceased patients to donate the organs for transplantation. Contrary to logical understanding, educational status, socio-economic status, language barrier, cultural and religious factors do not affect the decision for or against donation.¹³

**Perception of increased cost and mortality on renal transplantation**

Between dialysis and transplantation, renal transplantation is more economical and offers a much better quality of life. Outside major cities, the prevalence of patients on
hemodialysis is much higher compared to renal transplantation. Most of these patients stop dialysis after few months. Though it could be argued that there lack of availability of centers doing renal transplantation, there is also increased reluctance among the patients due to fear of excess morbidity, mortality and increased cost.

**Low number of cadaver renal transplant centers**

Approximately 200 centers undertake renal transplantation in our country. Of these only 35 centers undertake cadaver renal transplantation on a regular basis. Deceased donor transplantation is predominantly done in the four states of Tamil Nadu, Andhra Pradesh, Gujarat and Maharashtra. Unlike a live related renal transplantation programme, deceased donor transplantation requires a coordinated effort at different levels with hospital and government backing and adequate infrastructure and personnel. Also it requires the team to be prepared at all times of the day. The organs should be transported in cold storage to the recipient's hospital and the recipient has to be prepared for an emergency surgery all within a limited time frame to avoid prolongation of cold ischemia time. The longer the cold ischemia time higher is the delay in the functioning of the organ. All these make deceased donor transplant possible only in centers with adequate infrastructure.

**Role of transplant coordinator**

The transplant coordinator/grief counselor is central to successful function of the deceased donor programme. Counseling the families at a time when they are in extreme grief from the death of their loved ones can only be done by a trained person. With the public-private partnership, transplant coordinators are trained in Tamil Nadu and other southern states of India on a regular basis. This has helped to achieve one of the highest deceased donor transplantation rates in the region. The government of Tamil Nadu had realized the importance of the transplant coordinators and it had amended the Transplantation of Human Organs Act 1994. The Transplantation of Human Organs (Amendment) Act 2011 makes the appointment of grief counselor/ transplant coordinator mandatory.\(^{12}\)

**Increasing Governmental support**

Maintenance of the brain-dead donor in critical care units requires infrastructure and personnel. When the government hospitals in most centers in the country are inadequately staffed and when the health care spending by the government is only 0.9% percent of GDP, funding the cadaver programme had till recently taken a back seat. The Eleventh Five Year Plan is targeted
for increasing the public spending on health to at least 2 percent of GDP by the end of the Plan.\textsuperscript{14} In some of the southern states, the government actively oversees the running of the transplant programme, lays the policies for organ allocation and sharing of organs between government and private hospitals. The government offers the transplant medicines free of cost lifelong. This has reduced the commercial renal transplantation considerably.

The Union Health Ministry is in the process of setting up the autonomous National Organ Procurement and Distribution Organization (NOPDO) at the Centre and State Organ Procurement and Distribution Organization (SOPDO) for the National Organ Transplant Programme (NOTP). The organization will strive to increase the availability of organs from cadaver donors, improve the infrastructure for organ retrieval and offer post-transplant services to recipients. They also intend to bring the public and private hospitals under the programme as the majority of the transplantation services are available with the private sector.\textsuperscript{15} Cadaver transplantation reduces the people of the waiting list for renal transplantation and reduces commercial transplantation which is illegal in our country. The long term survival is unknown in commercial transplantation and is reported to be low. The donors are left cheated and they suffer from health-related and economical problems.\textsuperscript{16}

**Organ sharing network**

In the United States, the United Network for Organ Sharing/ Organ Procurement Network (UNOS/OPTN) has convincingly demonstrated that one-year and long-term graft survival is higher with nationally shared six antigen matched deceased donor kidneys.\textsuperscript{17} The total benefits of prolonging the function of first graft for significant number of patients are substantial both in economic and life year terms.

In India and in most countries of the world due to lack of consensus within the transplant community regarding the policies of organ allocation, a kidney from a young patient is often placed in an older patient, resulting in a situation where the allograft recipient dies with a functioning graft, thereby wasting many years of allograft survival, due to disparity in age between donor and recipient age. A functional network for organ sharing exists only in a couple of state in India, at present. When the NOTP comes to existence in India there will be a nationwide organ sharing network, and utilization of donor organs optimally.\textsuperscript{15}

**Non-government organizations (NGO) and deceased donor transplantation**
The NGOs have been doing a great job not just in promoting awareness of organ donation but have been instrumental in initiating policy change by the government and in aiding the government in organizing a regional network. NGOs in partnership with the governments have been successfully promoting and helping to implement the deceased donor programme. The FORTE (Foundation for Organ Transplantation and Education)-Bangalore, MOHAN (Multi Organ Harvesting Aid Network)- Chennai and Hyderabad, Narmada Kidney Foundation, ZTCC (Zonal Transplant Co-coordinating Committee)-Mumbai, (ORBO) Organ Retrieval Banking Organization-New Delhi, DONATE (Delhi Organ Procurement Network and Transplant Education) – Delhi are some of the active groups.

Extended criteria deceased donor transplantation

Some of the deceased donor kidneys have till recently been wasted as some the kidneys have some minor structural or functional flaws. The expanded criteria donor (ECD) kidney are kidney which have a relative risk of graft loss $>1.7$ (70% greater likelihood of graft loss) when compared with kidneys transplanted from standard criteria donors. ECD was defined as all donors older than 60 years and donors older than 50 years with any 2 of the following criteria: (1) hypertension, (2) cerebrovascular cause of brain death, or (3) pre-retrieval serum creatinine level $>1.5$ mg/dL. Even though the life expectancy of the ECD kidneys are shorter than the conventional criteria kidneys, it is unrealistic to strive to allocate pristine kidneys to all, especially, when the survival of the elderly recipients is low compared to the younger recipients. ECD is a significant source of organs and should not be wasted.

Donation after circulatory death

Donation after circulatory death (DCD) can be considered in a patient who does not fulfill brain death criteria and has no chance of recovery and in the best interest of the patient life-sustaining treatment is being withdrawn. The main difference between the conventional brain death deceased donation and DCD is the duration of warm ischemia time (WIT). The WIT is the time taken after clamping of the donor renal artery to initiation of cold perfusion of the organ. This time is usually few minutes in conventional deceased donor retrieval and is less than 2 hours in DCD. The patient and graft survivals are similar with DCD as compared to conventional deceased donor transplantation.

Conclusion
Cadaver transplantation reduces the waiting list for renal transplantation and reduces commercial transplantation which is illegal in our country. The government should make transplantation more affordable by strengthening the public sector hospitals and by making the transplant medication more affordable. With the National Organ Transplant Programme in the process of being established in India, the transplant community should strive to increase the organ donation awareness, improve the infrastructure for organ retrieval, storage and allocation in an equitable way.

References


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