Clinical Queries: Nephrology 4 (2015) 15–18

Contents lists available at ScienceDirect

Clinical Queries: Nephrology

journal homepage: www.elsevier.com/locate/cqn

Review article

Renal replacement therapy in India: Promising future with kidney paired donation transplantation

M.K. Shah [a], V.B. Kute [b,*], H.V. Patel [a], P.R. Shah [a], A.V. Vanikar [c], P.R. Modi [d], V.R. Shah [e], P.S. Shah [a], H.L. Trivedi [a]

[a] Department of Nephrology and Clinical Transplantation, Institute of Kidney Diseases and Research Center, Dr. HL Trivedi Institute of Transplantation Sciences (IKDRC-ITS), Ahmedabad, India
[b] Associate Professor, Department of Nephrology and Clinical Transplantation, IKDRC-ITS, Civil Hospital Campus, Ahmedabad, India
[c] Department of Pathology, Laboratory Medicine, Transfusion Services and Immunohematology, IKDRC-ITS, Ahmedabad, India
[d] Department of Urology and transplantation, IKDRC-ITS, Ahmedabad, India
[e] Department of Anaesthesia and Critical Care, IKDRC-ITS, Ahmedabad, India

ARTICLE INFO

Article history:
Received 11 November 2015
Accepted 18 November 2015

Keywords:
Renal replacement therapy
Kidney paired donation
Kidney transplantation
Living donor

ABSTRACT

The prevalence of CKD is increasing worldwide. There is tremendous imbalance in organ supply and demand worldwide. India is having mainly living donor (up to 90%) kidney transplantation program. Majority (up to 45%) of the living donors, although healthy and willing, are rejected due to ABO incompatibility. Deceased donation contributes to <10% of KT in India. Kidney paired donation, ABO incompatible KT, desensitization protocols, and marginal living donors are the ways to expand the living donor pool. The age at time of CKD reporting is less as compared to western stand and economic constraints are the most important hurdle in access to renal replacement therapy. The best long-term patient and graft survival is seen in KPD, which is cost effective and can be performed in all transplant centers. KPD has potential to expand the KT rate by 25%. The state and national KPD program will increase the donor pool and it increases the transplant rate in KPD. The harmony and co-ordination in different transplant centers, uniform guidelines to accept donor and patients for transplantation and computer software are required for the national KPD program.

With changing times, life practices and health dynamics have also changed in recent years. Indian healthcare has found hard to control diseases such as polio but now faces the new challenge of non-communicable diseases such as diabetes, hypertension, obesity, cardiovascular diseases, and chronic kidney disease (CKD). Globally the estimated prevalence of CKD is approximately 8–16% over the age of 30 years. Similarly in China, Australia, USA, and Europe, >10% of people over the age of 30 years suffer from CKD.[1,2] In India, the prevalence is alarming at 13.2–15.04% in urban adult population.[3] Total population of India stands at 125 crores, and almost 60 crores of population are above aged over 30 years; 10% of 60 crores population, i.e. at least 6 crore Indians might be presently suffering from CKD. Moreover it is estimated that in India, about 1,00,000 persons are suffering from end stage renal disease (ESRD) each year; of which, only about 20,000 people get treated.[4] Majority are still untraced or about to suffer from CKD. This is an extremely severe and grave scenario.

As per CKD registry of India, about 48% of cases were in stage 5 CKD at presentation, with the remaining in decreasing order of frequency in lower stages.[5] On the contrary to developed world, the mean age group of patients requiring RRT in India is younger, comprising individuals in the most productive years of their lives, often the only livelihood earners of families with multiple dependents.[6] Multiple factors seem to be responsible, including poor availability of healthcare, ignorance (both by layman and local physician), and social stigma, which holds up diagnosis and leads to a loss of opportunities to institute timely preventive measures. The role of environmental and genetic factors has not been explored. So, kidney disease is usually in advanced stage at the time of presentation, and patients often arrive in a terminal morbid condition with complications involving multiple organ systems and in need of immediate lifesaving dialysis. Many times end stage renal disease ESRD patients present primarily for confirmation of diagnosis, and receive hemodialysis (HD) only for a

* Corresponding author. Tel.: +91 9099927543; fax: +91 79 2268 5454.
E-mail address: drvivekkute@rediffmail.com (V.B. Kute).

http://dx.doi.org/10.1016/j.cqn.2015.11.006
2211-9477/

brief period. Most of them discontinue dialysis or are forced to discontinue dialysis due to social barrier and loss of family/economic support and subsequently die.[7]

Available renal replacement therapy (RRT) options for ESRD patients include hemodialysis, chronic ambulatory peritoneal dialysis (CAPD), and kidney transplantation (KT). However, according to Indian CKD registry report, 61% of stage 5 CKD cases were not offered on any form of renal replacement therapy (RRT), 32% were on hemodialysis, 5% on peritoneal dialysis, and only 2% received a KT.[5] The majority of dialysis units (>90%) are in the private hospitals and they are small minimal care facilities, owned and supervised by non-nephrologists or even technicians in which the dialysis prescription often remains unsatisfactory, with a majority getting not more than two 4-h sessions every week.[8] The cost of maintenance of dialysis is variable depending on many factors, but the charges per year in US dollars are between $9000 to $14,000 for hemodialysis and $10,000 to 14,000 for CAPD depending on whether it is done in government or private hospitals.[9] Due to lack of economic support, most patients are forced to stop dialysis therapy or they opt for once-weekly dialysis and thus fail to achieve acceptable outcome. To cut costs, dialyzers are reused multiple times, usually after manual cleaning.

As hemodialysis is not widely available, peritoneal dialysis is poorly penetrated and deceased donor kidney transplant DDKT is not well developed; therefore, living donor KT soon after the diagnosis is the only viable and cost effective form of long-term RRT for most patients.

Regarding cost for transplantation programme, transplant cost, cytomegalovirus (CMV) prophylaxis, and immunosuppressive drugs for the first year without induction could be only $5600 in a government hospital and $12,000 in a private hospital. The cost of immunosuppression using tacrolimus, steroid, and mycophenolate is $350,400/month. Approximate KT expenditure for KPD and ABO-Incompatible KT are $5000 and 10,000 (in our center). This makes transplant as a cost effective treatment.[10] Still only 2% of the Indian ESRD population received transplant.[5]

As per the Indian transplant registry reports (transplant data from 48 hospitals), total of 21,345 KT were done from 1971 to 2013; majority (96.4%, $n = 20{,}569$) of them were from LD and 3.6% ($n = 776$) were from DD. Most of the LD was contributed by mother and wife, but they were less likely to receive a live kidney than men. Awareness and changes in attitudes of the society including physicians are needed to eliminate this gender inequity.[11]

Reimbursement for healthcare is available only to a minority. The health spending in India is dominated by private, out of pocket spending with high share of about 71% of the total spending. India's present GDP expenditure on health is 1.7% since March 2015, which is one of the lowest figures compared to the international level of health spending that may be much lower than prescribed norm (5% of GDP).[12] Probably, this not only pushes the nonpoor into poverty but also affects final outcomes. In the absence of state or private insurance schemes, most patients have to make out-of-pocket expenses to meet healthcare associated costs. Only the rich can afford treatment in private sectors. The poor typically seek treatment in public sector hospitals, where the government subsidizes treatment. Efforts are required to address these issues.

1. Issues related to living donor kidney transplantation (LDKT)

Major setback in donating kidneys is due to various prevalent myths. People are concerned about post-donation medical problems, compromised ability to earn their livelihood, and possible chances of renal failure in future.[13] It requires thorough professional counseling to overcome their apprehension. Society should be motivated to accept transplantation as the therapy of choice for ESRD, provided the outcome is good and it is available at an affordable and feasible cost to all who need it. Patient and donor well being and the follow-up clinic can provide proof to prospective recipients and donors that one can live a normal life post-transplantation and post-donation. Many of the apprehensions are alleviated, when living donor (LD) themselves propagate donation, and transplanted patients propagate transplantation. The two most significant barriers to greater use of LD are blood type incompatibility and human leukocyte antigen (HLA) antigen sensitization. The most common reason to decline a donor for directed LDKT is ABO incompatibility, which eliminates up to one third of the potential LD pool depending on blood group distributions in different populations. In about another 30% of the transplant candidates, HLA antigen sensitization is present due to exposure to foreign tissue in the form of previous transplants, pregnancies, or blood transfusions.

2. Overcoming barriers related to LD

1. To modify the donor selection criteria with ultimate aim of good long-term outcome. For example, some donor co-morbidities, commonly hypertension, may be a relative contraindication to donation, because of concerns of inferior long-term safety for the donor. But, hypertensive donors can be accepted provided donor age is over 50 years, blood pressure is controlled on a single antihypertensive agent, there is no target organ damage, and post-donation follow-up is guaranteed.[14]
2. To expand diseased donor kidney transplantation program. In our country where commonest cause of young lives loss is road traffic accident, development of effective cadaver transplantation program may increase donor pool tremendously.
3. ABO incompatible transplantation, i.e. transplantation across blood group after desensitization.
4. Kidney paired donation. Of all the advances made in KT in the last 25 years, KPD has the greatest potential to expand LD pool overcoming the barrier faced by LD deemed incompatible with their intended recipients.[15] Reasons for participating in KPD include primarily blood group incompatibility and sensitization of the recipient against the donor, but may additionally include the potential for improvement in transplant quality and tissue compatibility.

In the absence of a well-organized DDKT program, or when transplantation with HLA desensitization protocols and ABO incompatible transplantation is either unaffordable or poses a greater risk due to more intensive immunosuppression, KPD promises hope to a growing number of ESRD patients.[16–18]

However, KPD is still in its primitive stage and requires further development. Ethical, administrative, and logistical barriers initially proved formidable and prevent the implementation of KPD programs. Lack of awareness, counseling, and participation are other important issues. KPD is feasible for any center that performs LDKT. KPD are just like any other conventional transplant, but it requires (1) eligible pair availability, (2) state legislative permission which would take a long time, (3) a large pool of recipients and donors to choose from and most importantly (4) more than one transplant teams.

But in single center KPD program, donor pool is small. To overcome this problem, we require a national KPD program that substantially increases the donor pool, but there are some barriers that need to be address to enable establishing a successful national program. Nevertheless, recent studies are valuable for encouraging the participation of KPD pairs and transplant centers in national KPD program.[16–18]