

Dealing with renal disease

Cross-blood renal transplantation can go a long way in the treatment of end-stage renal disease, but even more important is the control of diabetes and hypertension.

ASHA KRISHNAKUMAR

THE number of people suffering from end-stage renal disease (ESRD), that is, a condition in which the kidneys function at less than 10 per cent of their capacity, is rapidly rising the world over and threatening to become a major public health problem.

In India, several lakh people suffer from ESRD, which requires long-term dialysis or renal transplantation. In the United States there are over 300,000 ESRD patients and in Europe more than 250,000.

The kidneys maintain the internal body environment for the optimum functioning of various organs by getting rid of various metabolic byproducts such as urea and uric acid and by maintaining the pH and electrolyte level of various body fluids. They filter 180 litres of blood every day. The kidneys also perform hormonal functions such as the activation of vitamin D and the production of erythropoietin, which is responsible for the functioning of bone-marrow.

There are two types of kidney failures. One is acute failure, when there is a reduction in the blood supply to the kidneys or when a nephrotoxin is administered. It is potentially reversible. The other failure is chronic, which is caused by urinary infection, allergic reactions, diabetes and hypertension. It is irreversible. When a chronic failure patient cannot survive without dialysis or transplant, the patient is said to be suffering from ESRD.

Dialysis purifies blood. There are two types of dialysis. One is haemodialysis. It is done by a sophisticated machine in hospitals. A patient is usually required to undergo haemodialysis two or three times a week, which would

cost about Rs.10,000 a month. The second is continuous ambulatory peritoneal dialysis (CAPD), which can be administered by a patient on himself/herself by implanting a catheter in the peritoneal (abdominal) cavity. It costs Rs.20,000 to Rs.25,000 a month and provides better-quality life.

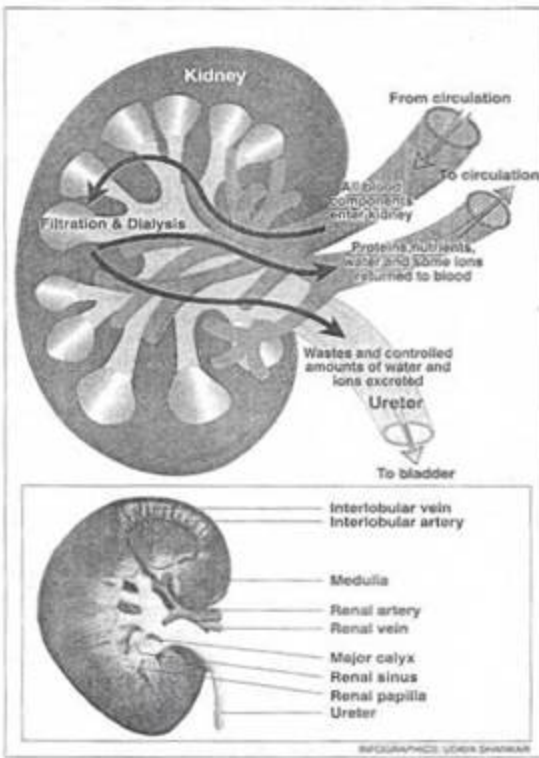
Haemodialysis was first done over 50 years ago. Only in 1960, with the development of the indwelling arteriovenous teflon shunt, called the Quinton-Scribner shunt, was maintenance haemodialysis introduced for patients with ESRD. At about the same time, advances in immuno-suppression, such as the development of 6-mercaptopurine (Purinethol) and its derivative azathioprine sodium (Immunan), led to the procedure of kidney transplantation. Widespread use of peritoneal

dialysis began in the mid-1970s and is used by over 100,000 patients the world over.

Neither haemodialysis nor peritoneal dialysis offers a cure. Transplantation is a more stable form of therapy and leads to complete rehabilitation, particularly among younger ESRD patients. Transplantation, done from a live donor or from a cadaver, costs over Rs.2 lakhs and the annual cost of maintaining the patient with immuno-suppressants is about Rs.1 lakh.

According to the nephrologist Dr. R. Ravichandran, Director, Madras Institute of Nephrology, Chennai, most kidney problems remain undetected until they become ESRD. Even among those detected, most patients cannot afford the cost of dialysis or transplantation and treatment with immuno-suppressants. Added to this are the myths and half-truths associated with renal diseases. Says Ravichandran: "Most times the patient and his family are left fatigued, confused and depressed." Realising the complexity of the problem faced by ESRD patients, Ravichandran and Dr. P.B. Sivaraman, Professor in the Department of Urology at the Government General Hospital in Chennai and consultant urologist, Malar Hospitals, who have been treating ESRD patients for over two decades, set up the Balaji Medical and Educational Trust five years ago, to subsidise treatment costs, create awareness about the disease, and screen the population for diabetes and high blood pressure – the main causes of ESRD. Some organisations such as the Tanker Foundation subsidise dialysis. But that is not enough, they say.

The rising incidence of ESRD the world over has led to social problems primarily because the number of patients wanting kidneys for transplantation has increased manifold while the availability of donor and cadaver





In a haemodialysis centre at the Tamil Nadu Kidney Research Foundation in Chennai.

organs has not. A cadaver organ is hard to come by and live related donation is not happening at the desired level, leading to a thriving trade in kidneys; the organs are sold mostly by the poor and the vulnerable.

According to Ravichandran, it is important to increase the live related donor pool, apart from strengthening the infrastructure to harvest cadaver organs. One way of increasing the live related donor pool is by accepting cross-blood donation. A new technique that was explained by Japanese nephrologists Dr. Kazunari Tanabe and Dr. Hiroshi Toma (see interview) recently in Chennai. According to Ravichandran, though relatives of ESRD patients often want to donate a kidney, they are unable to do so because of blood group mismatch. The new technique removes antibodies from the patient's blood before the transplant. It can increase the donor pool by over 20 per cent.

The technique was tried in India in 1984, in Mumbai. But because of problems with filtration techniques to remove the antibodies from the patient's blood, it was not successful. "But now," says Ravichandran, "with new developments in filtration technology, we should be able to do it without any problem."

With the introduction of cross-blood group transplantation, there is a very good case for scrapping Clause 9(3) of the Transplantation of Human Organs Act (1994), which allows for live unrelated donations on emotional grounds leading to trade in kidneys. Often, the reason cit-

ed for sourcing a kidney from an unrelated donor on "emotional grounds" is: "The blood group of the patient does not match with any eligible close relative." Now that excuse will not hold water with the introduction of cross-blood transplantation.

On the flip side, the cross-blood match will open up a number of social issues. For instance, there is the possibility of a rise in kidney sales once the constraint of "same blood group" match too is gone. But Ravichandran is confident that this will lead to at least a 20 per cent rise in live related donation.

But medically, this kind of transplantation is significant and may be useful especially as the number of ESRD patients is rising sharply. For instance, in the last decade, the prevalence of ESRD has almost doubled in most countries and on an average the rate is more than one in every 1,000 persons. The figure is much higher in developing countries. The incidence of ESRD is similar to that of AIDS (Acquired Immune Deficiency Syndrome) and 10 times greater than that of Hodgkin's lymphoma. On an average, the incidence of ESRD is increasing at 5 per cent a year.

The rising incidence of diabetes (fuelling an increase in diabetic nephropathy) and hypertension is said to be the major reason for the sharp rise in ESRD cases. Diabetes is the cause for over 40 per cent of ESRD cases. Among ESRD patients, those with Type II diabetes outnumber patients with Type I diabetes by almost three to one. Over 25 per cent of ESRD cases are related to hypertension.

Glomerulonephritis accounts for over 10 per cent of new ESRD cases, and cystic, hereditary and congenital diseases together constitute another 4 per cent of cases.

With significant developments in pharmacology, the mortality rate has declined in dialysis patients in recent years and is much lower in patients who have undergone kidney transplants, particularly those having received the organ from a live related donor. Increased clearance of nitrogenous solutes through improved dialysis membrane technology has resulted in enhanced nutrition and fewer infection-related complications. Improvements in general medical care may also be contributing to the decrease in mortality. Patient survival rates after a renal transplantation has also improved dramatically in the last two decades. The five-year survival rate is more than 90 per cent. Recipients of cadaver kidneys have a one-year survival rate slightly lower than recipients of live donor kidneys.

According to Ravichandran, the best method is live related donation and it is in that context that cross-blood group transplantation would go a long way.

According to Dr. M.K. Mani of Apollo Hospitals, Chennai, the primary goal should be the prevention of ESRD. Aggressive treatment for hypertension is likely to reduce the incidence of ESRD. Screening for diabetes and hypertension may be important in reducing ESRD rates. Mani's project in Sunkuvarchatham, a suburb of Chennai, is a success story. Regular screening for hypertension and diabetes has more than halved the risk of ESRD among its population. ■