

Indigenous machine for acute kidney failure patients

A MAJORITY of patients with acute kidney failure in India, especially in the rural areas, have at present very slim chances of survival.

Even in cities, not all hospitals are equipped to treat such cases.

This despite the fact that nearly 75 per cent of those with kidney problems admitted in ICUs suffer from acute kidney failure.

Conventional dialysis methods such as peritoneal or haemo-dialysis cannot be used on acute kidney failure patients.

Conventional dialysis requires drawal of 200 to 300 ml of blood per minute making it fatal when used on these patients.

What they need instead is a continuous renal replacement therapy (CRRT). Success of a low cost CRRT prototype designed and developed by a team headed by Dr. R. Ravichandran, nephrologists at the Vijaya Health Centre, Chennai, may indeed prove to be a boon for such patients.

But patients with acute kidney failure are critically ill and have low blood pressure.

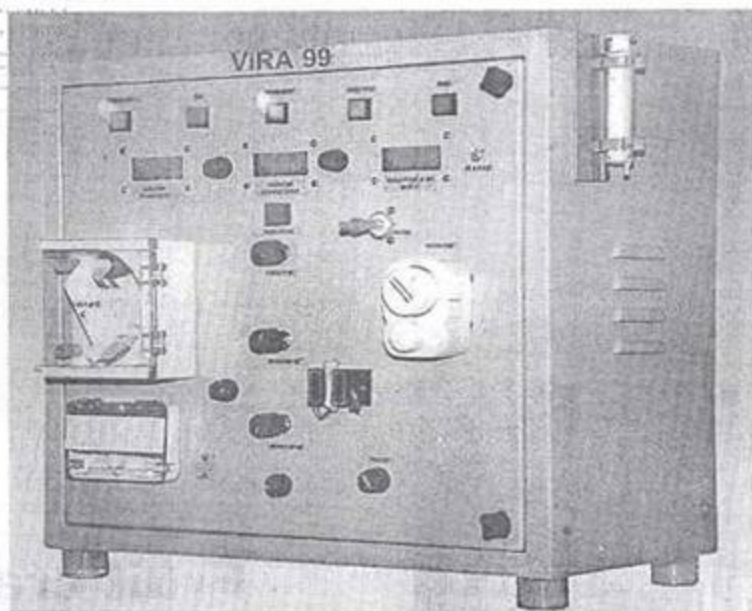
This necessitates a CRRT dialysis where the blood is drawn from the body at a slow rate of 50 ml per minute. Acute kidney failure (AKF) happens when the blood supply to the kidney is suddenly affected for various reasons such as malaria, leptospirosis, dehydration, diarrhoea, or due to drugs. At times these patients may have multi-organ failure making it all the more important to draw blood at a slow rate for dialysis.

Patients suffering from acute kidney failure have normal kidneys and need continuous dialysis for a maximum period of six weeks.

On the other hand, the chronic kidney failure patients require dialysis two to three times a week till such time kidney transplantation is done.

The most important aspect of acute kidney failure is that the process is potentially reversible unlike in the case of chronic failure.

CRRT is a routine procedure abroad while it is yet to become popular in India. The main reasons for this according to Dr. Ravichandran, are three fold. The non-availability of CRRT machines due to the prohibitory cost of imported machines, lack of



Vira 99, an indigenous CRRT machine

between chronic and acute kidney failure among the public.

The availability of a cheap CRRT machine, feels Dr. Ravichandran, would solve the problem to a major extent.

The Vira 99 CRRT machine designed by him costs between Rs. 1 and 5 lakhs compared to Rs. 4 and 25 lakh for an imported machine. It would become even cheaper when large-scale commercial production starts.

A less expensive alternative that obviates the need for a nephrologist to handle it would serve the needs of even rural patients thus solving the problem to a major extent, feels Dr. Ravichandran. It is now being used at Vijaya Health Centre and at Apollo Hospital, Chennai, for the last couple of months.

Prevention pays

Even chronic kidney failure can be easily prevented if all adults suffering from high blood pressure and diabetics are regularly screened for albumin content in the blood. Any increase in unit albumin content in the blood is a first indication of a kidney failure. Since the kidneys are not damaged at this stage it is possible to prevent and even reverse

treated as these kidneys are growing. Urine infection is normally the first indication of a kidney abnormality.

Indian answer to imported machines

The Vira 99 designed by the team headed by Dr. Ravichandran uses a simple continuous venovenous haemo filter (CVVH). This draws blood at a slow rate for several days at a stretch. The haemofilter purifies the blood and an anti-coagulant pump with heparin prevents blood clotting. The purified blood is taken back to the body. The machine controls the metabolism of the patients and maintains the vital functions for a couple of weeks. The machine does not require water or fluids thus eliminating contamination, a major problem encountered with haemodialysis. The machine has been designed to take into account Indian conditions such as voltage fluctuations and need for sturdiness.

The prototype Vira 99 has used IDEAS, a software package developed by Chennai based Structural Dynamics Research Centre and adopted by IIT, Chennai. Apart from acute kidney patients, other beneficiaries include those who cannot tolerate conventional dialysis