Chronic Renal Failure- a review article

Sarita Gaikwad and Rajendra Huparikar

Tilak Ayurved College, Pune

Abstract

Chronic Renal Failure is a worldwide threat to public health. It is reported to be a silent epidemic. Incidence of Chronic Renal Failure has been doubled in the last 15 years. It is a global threat to health in general and for developing countries in particular, because therapy is very expensive and life-long. Prevalence of diabetes, hypertension and associated risk factors such as obesity, hypercholesterolemia and the metabolic syndrome is increasing alarmingly. Though Renal Replacement Therapy (RRT) is cheapest in India but irony is that 90% subjects cannot afford the cost of treatment. Those who start Haemodialysis, 60% of them are lost to follow-up within 3 months due to financial reason. Modern Medicine has very limited options to treat ESRD but Ayurveda has the potential to treat CRF to restore kidney function and that too at a much lesser cost. There are few studies giving
encouraging results with the hope that with the Ayurvedic line of treatment, it may be proved that ESRD is reversible, bringing new hope of life to the millions suffering from C.R.F./ESRD. Ayurveda has a promising role in the management of Renal diseases and it is the need of hour that the Modern science acknowledges it as early as possible.

**Introduction**

Chronic Renal Failure is a syndrome characterized by progressive and irreversible deterioration of renal function due to slow destruction of renal parenchyma eventually terminating in death when sufficient numbers of nephrons have been damaged.

It is a patho-physiological process with multiple etiologies, resulting in to inexorable attrition of the nephrons number and function, frequently leading to End Stage Renal Disease (ESRD). In turn, ESRD represents a clinical state or condition in which there has been an irreversible loss of endogenous renal function, of a degree sufficient to render the patient permanently dependent upon Renal Replacement Therapy -RRT (dialysis or transplantation) in order to avoid life threatening uremia¹.

**Review:**
Chronic Renal Failure is caused mainly by Diabetes and Hypertension, followed by Glomerulonephritis, recurring Pyelonephritis (kidney infection), Polycystic Kidney Disease (multiple cysts in the kidneys), autoimmune disorders such as Systemic Lupus Erythematosus, urinary tract blockages and reflux, due to frequent infections, stones, excessive use of drugs/antibiotics that are metabolized through the kidneys etc.

Chronic Renal Failure is a worldwide threat to public health. It is estimated under Global burden of diseases that diseases of the kidney and urinary tract contribute to 8, 30 000 deaths annually and 1, 88, 67 000 disability-adjusted life years (DALY), and that is the 12th highest cause of death (1.4% of all deaths) and the 17th cause of disability (1% of all DALY). Chronic renal failure is reported to be a silent epidemic. Incidence of Chronic Renal Failure has been doubled in the last 15 years. It is a global threat to health in general and for developing countries in particular, because therapy is very expensive and life-long. Over 2.6 million people worldwide were surviving on dialysis as per data available in 2010. It is a matter of concern for all of us that prevalence of diabetes, hypertension and associated risk factors such as obesity, hypercholesterolemia and the metabolic syndrome increasing which along with increased life span of persons facilitate sustained and explosive growth of this epidemic. As per the data published by Diabetes Atlas 2011, we are in the midst of a global epidemic of type 2 diabetes.
Currently, there are more than 371 million people with diabetes in the world and it is estimated to grow to 552 million by the year 2030, of which 101 million will be in India unless urgent preventive measures are not taken. Approximately 30-40% of patients with Diabetes mellitus develop into diabetic nephropathy and with the growing number of DM patients and increasing life span of population, as prevalence of CKD is higher in older people; there is likelihood of commensurate increase in the incidence of CKD.

Stengel B et al reported that despite vast improvement occurred in the diagnostic tools and treatment facilities to detect and treat Diabetes and Hypertension at an early stage, there was increasing trend of ESRD observed at the rate 4.8% per annum in Europe in the years 1990-1999.

Suresh M et al mentioned that Kidney diseases is ranked 3rd amongst life threatening diseases in India, after Cancer and Heart disease. About 200,000 persons go into terminal kidney failure every year.

There was one study conducted by Singh Ajay Kumar et al across 12 cities in India and reported that 17 out of every 100 people living in cities were suffering from some form of kidney disease. The prevalence of CKD was found to be 17.2% by MDRD equation and by CKD-EPI equation it was 16.4%. Of this, 4.3% had stage III CKD, 0.8% stage IV CKD and 0.8% stage V CKD (i.e. 5.9% from stage III CKD to stage V) which required urgent medical attention and, in some cases, patient had to
put on life saving expensive treatment like dialysis or renal transplant. The most surprising finding of the study was that a majority of individuals diagnosed with different stages of Chronic Kidney Disease (CKD) had not undergone any kidney function test earlier. We may not generalize the findings of this study, for the entire country, however this study has drawn attention of everyone that there has been a rapid rise of kidney diseases in urban community.

The exact prevalence of CKD is not known in India in the absence of national registry\textsuperscript{13} and our knowledge regarding the same is based on isolated studies in few parts of our country. The studies in Delhi, and other areas indicated that prevalence of Chronic Renal Failure was around 0.8% in India.\textsuperscript{14,15} Though this appears to be less, in absolute numbers, it is comparable to individual cases of Tuberculosis, Malaria and HIV-AIDS.

A large proportion of subjects present late when they have reached stage of advanced kidney failure i.e. ESRD and multiple complications, then nothing much is left to treat.\textsuperscript{15} Management is hampered by the lack of health care services, especially in the rural areas to treat C.R.F. One data from India also suggests that in a developing country, the prevalence rate of CKD could vary almost 5-fold between the rural and city population\textsuperscript{16}. These observations highlight that CKD would affect not only many people in the developing world, but particularly the poor within these countries who usually have no information about disease and risk
factors, and may not have access to healthcare. It is documented that low socioeconomic status is associated with CKD noticed commonly in developing nations, as shown in United States by the NHANES survey, which reported that people from lower income group being disproportionately affected by higher burden of CKD. Poverty-related factors such as low birth weight, malnutrition, infectious diseases secondary to poor sanitation, inadequate supply of safe water, environmental pollutants and high concentrations of disease-transmitting vectors continue to play an important role in the development of CKD in low-income countries.\textsuperscript{16,17}

In India, diagnosis of CRF is made very late and failure to institute measures to slow the progression of renal failure have resulted in a predominantly young ESRD population, with a median age of 44 years.\textsuperscript{18} These people are the bread earners of the family and when they suffer from CRF, there are devastating effects on the entire family.

Though RRT is cheapest in India but irony is that 90% subjects cannot afford the cost of treatment.\textsuperscript{5}. Those who start Haemodialysis, 60% of them are lost to follow-up within 3 months.\textsuperscript{2,19} These study subjects drop out of therapy, because they realize that dialysis is not a cure and has to be performed over the long-term, ultimately causing impoverishment of their families\textsuperscript{6}. They prefer to die rather than putting their families in financial crisis.
C.R.F. and Chronic Kidney Disease (C.K.D.), are used as interchangeable terms by many, but C.K.D. is a preferred term than C.R.F. as C.R.F. denotes that both kidneys have failed and stopped functioning. In most cases of CKD that is not so. There are five stages of CKD. Only small proportion of CKD subjects progress to End Stage Renal Disease. As per Harrison’s textbook of Internal Medicine, CRF corresponds to stage 3-5 stages of CKD in which GFR is < 60 ml/min/1.73 m^2. CRF leads to chronic loss of kidney function which causes generalized wasting (shrinking in size) and progressive scarring within all parts of the kidneys. The kidneys become small and shrunken. Such reduction of renal mass causes structural and functional hypertrophy of surviving nephrons. Eventually, these short term adaptations prove maladaptive, that they predispose to sclerosis of the remaining viable nephrons. In passage of time, overall scarring obscures the site of the initial damage. Yet, it is not until over 70% of the normal combined function of both kidneys is lost then only, most subjects begin to experience symptoms of kidney failure. When G.F.R. falls to less than 10%, ESRD ensues, and then survival becomes impossible without RRT. (Berne Levy Physiology)

In the RRT, there are two options Dialysis and Kidney transplantation. Dialysis is not a cure. It may prolong life but does not cure kidney failure. It is like washing the cloths in washing machine, that cleans the cloths but these cloths do not last
long; becoming fragile to get torned. Dialysis is a stop gap arrangement till kidney transplantation is possible, it may extend life for some period but it is established fact that treatment of end-stage renal disease with haemodialysis has a high mortality rate (20-50%) \(^ {24, 25}\) as annual mortality among HD patients is 23% \(^ {26}\) and low quality of life \(^ {27}\). Dialysis patients are at high risk of acquiring Hepatitis Viral infections and infection is the major cause of mortality and morbidity in patients on haemodialysis. \(^ {28}\)

Kidney transplantation is a better option but one has to wait long to get suitable match of kidney donor. As per one conservative estimate approximately 1,75,000 kidneys are needed for transplantation in India every year. At present, just about 4,000 transplants are conducted annually (2.28% of the need). Cadaveric transplantation has not been picked up yet, and it accounts for less than 2% of all transplants. Further, there is always a possibility that the recipient's body may reject it treating it as a foreign body. This is an expensive major surgery and not within the financial reach of a common man. Even after surgery the recipient has to be put on very costly immunosuppressant drugs for lifelong period, which may cause many complications because the body's immune defenses are compromised. These drugs put further financial strain on the poor subjects. Many of the recipients undergone renal transplant are forced to discontinue expensive drugs like Cyclosporine after variable periods that is the reason of high rates of graft loss. \(^ {19}\)
Ramchandran and Jha\textsuperscript{29} have recently demonstrated that even kidney transplantation, the most cost effective form of renal replacement therapy, in a public sector hospital can have catastrophic financial consequences pushing majority of families in to severe financial crisis.

There is a huge unmet need to take care of most of the subjects suffering from ESRD. There are only 950 nephrologists and 700 dialysis centers in the country\textsuperscript{30} and they are located in big cities only.

In short, Modern Medicine has very limited options to treat ESRD but Ayurveda has the potential to treat CRF to restore kidney function and that too at a much lesser cost.

**Ayurvedic Pathology of Renal Diseases:-**

According to Ayurved, Heart, Brain and Vrikka are the three Sadhya: Pranhar Marmas and are Agneya in nature. Death can occur if there is Aaghat (Physical trauma/ pathological disease) to any of these 3 Marmas. The diseases caused to them are Kashta sadhya in nature.

CRF is an entity of varied aetiology; it is also termed as a syndrome and is considered as Sannipatik vyadhi. CRF may be termed as a ‘Vyadhi sanskar’ consisting of various conditions e.g. Prameha, Shoth, Udavart, Vatavyadhi, Mutraghat, Mutra jathar, Mutrakshay, Mutrakricchha etc.

\textit{Rogah Sarveapi Mandegno I Ashtang Sangrah Nidan 12/3}
The pathology behind renal diseases is also disturbed Agni (metabolic Fire), due to which the food is not digested properly and thus formation of the vital components is disturbed. Increase in the use of antibiotic, analgesics/ anti-inflammatory drugs, Steroids leads to Dosha and Dhatu Dushti. The changing lifestyle of people, sedentary work, eating fast food/junk food, tinned food, incompatible food, Virudhha Anna, constant stress and strain, over indulgence of alcoholic drinks (Madyapan), smoking, tobacco chewing contributes substantively to Agnimandya, which is the root cause of many diseases. Therefore as per Ayurvedic point of view Annavaha, Rasvaha, Udakvaha,-Raktavaha, Medovaha, Mutravaha and Swedvaha strotas dushti contributes to kidney failure. Taking in to account the doshdushti, sthanas and lakshanas (symptoms), the Anukta Vyadhi methodology is applied to find out the factors leading to CRF.

\[\text{Sarva vikaranam api cha Nigrahe hetu I}\]

\[\text{Vyadhiviparitam aushadham ichhanti kushalah tadartha kariva II}\]

\[\text{Cha. Vi. 2/13}\]

In patients with Vrikka Rog- Aruchi, Agnimandya and Malavasthamb symptoms are generally observed. Keeping in view of the principles mentioned above, Virechan, Swedan, Mutrapravartak, Raktprasadak, Agnipradeepak and Sarva dhatu poshak line of treatment with observing Pathya/Apathya may be incorporated in the management of CRF. Treatment of CRF with Modern science is organ based while Ayurveda takes in to account Tridoshas, Sapta dhatu and Agni vichar.
There are few Ayurvedic studies conducted to treat CRF. Prashnath G. S. et al.\textsuperscript{31} conducted one clinical comparative study of the management of chronic renal failure with Punarnawadi compound. The study was taken up to evaluate the role of trial formulation tab. Punarnawadi compound in the management of chronic renal failure. However the Comparative clinical trial could not establish superiority of Ayurvedic treatment over Allopathy treatment. Further in this study they had excluded subjects on dialysis; hence the efficacy of the Ayurvedic drugs on CKD stage-5/ESRD could not be established. Apart from that the sample size in each group was less than 30; therefore the results obtained may not stand valid on statistical basis.

Patel et al.\textsuperscript{32} conducted one experimental clinical study on the management of CRF at Nadiad, in Gujarat. The study was titled as "Effects of Ayurvedic treatment on 100 study subjects of chronic renal failure (other than diabetic nephropathy)". Niruha basti of Punarnawadi kvatha daily was given along with oral drugs including Gokshuradi guggulu, Rasayana churna, and Varunadi kvatha for 1 month period. The symptoms and signs, serum creatinine, blood urea, urine albumin level were reduced, which were found to be statistically highly significant on "t" test.

To treat Anemia in CRF itself is a challenge. Gaikwad\textsuperscript{34} (Author) conducted one clinical trial undertaken to evaluate the effect of Raktabasti to treat severe Anaemia in 39 patients with End Stage Renal Disease (ESRD). 60 ml. of blood of a
previously screened donor (close relative) was given to the patient per rectally. The same procedure was repeated after 48 hours. The Hemoglobin rise after two Raktabasti given 48 hours apart was studied after next 48 hours. Raktabasti of total 120 ml blood has showed significant rise in the Hemoglobin level on an average by 1.65 gm/ dl. This study proved that Raktabasti is an alternate, easier, safer and economical method of treating Anaemia in ESRD patients.

These studies are giving encouraging results with the hope that with the Ayurvedic line of treatment, it may be proved that ESRD is reversible, bringing new hope of life to the millions suffering from C.R.F./ESRD, assuring them longevity with quality of life. The main risk of mortality in CRF patients is due to Cardiovascular causes. If we can control Diabetes and Hypertension by Nidan parivarjan and by Ayurvedic chikitsa we may reduce > 60% morbidity and mortality in CRF. Pishoridy Ramdas33 opined that 60% of Renal diseases are preventable33. Ayurved has inherent strength to treat all the vitiated doshas and bring them in Samyavastha. Ayurveda always preaches of Regenerative medicine and Ayurveda can regenerate Nephrons in failing kidneys. Thus Ayurveda has a promising role in the management of Renal diseases and it is the need of hour that the Modern science acknowledges it as early as possible. Modern science may carry out further research on many wonderful Ayurvedic drugs to find active principles in them, which may prove a boon for the mankind.
Gupta and Singh et al\textsuperscript{35} conducted one clinical trial on 150 patients of Diabetic Nephropathy who were treated in IPD (Group A) and OPD (Group B) Nandlalpura Hospital and local regional area of Lokmanyanagar under the guidance of Dr S.K.DasAdhikari. Ayurvedic formulations including *Gokshuradi Guggulu, Bhumyamalaki, Punarnavastak Kwath, Vasa* and *ShilajatvadiVati* were given to all the patients for 3 months. Group A patients were given special planned food. Results were analyzed statistically using ‘t’ test. In group A patients, highly significant reduction was found in the values of serum Creatinine, blood urea and urinary excretion of albumin. Marked improvement was found in the patients’ general physical well-being, together with reduction in symptoms, in group A patients. This study showed the importance of ‘Pathyapathya’ in Ayurvedic management of the disease. This management may bring some new hope to the patients of diabetic nephropathy, which usually terminates to chronic renal failure and ultimately to death.

*Assistant Director of Ayurved, Government of Maharashtra, Pune*

**HOD, Panchkarma Department, Tilak Ayurved College, Pune**

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