Conservative Management in CKD, Where are We?, Scope & Justification for expansion!

V.L. Gupta

Abstract

According to WHO, projections of burden of illness, in developing economies, non-communicable diseases, (NCDs), are fast overtaking communicable diseases. By the end of current decade, probably, we need to revise our priorities to tackle NCDs. Chronic Kidney Disease, (CKD) is one of the important NCD.

Approximately 100000-150000 new patients of CKD-V, or End Stage Renal disease,(ESRD) are added to already existing pool of ESRDs annually in India, who need Renal Replacement Therapy, (RRT). By the best of estimates, we have facilities to provide RRT in 25-30% of this ESRD population. Our economy also does not permit us to tackle the burden of illness, besides lack of infrastructure, logistics, expertise, awareness, and lack of education.

Vision, therefore, to tackle this explosion, include targeting primary prevention in high risk population. Secondary prevention, i.e. measures to deaccelerate or delay progression of CKD, (from Stage I to Stage V,ESRD), using all evidence based guidelines, with goal of reduction in number of ESRDs. And thirdly to promote kidney transplant in ESRD patient, which is the, “Gold Standard” & Cost Effective management for ESRD. This involves starting, 1. Prevention Program for CKD, establishing CKD clinics, & regular follow up. 2.Nationally promoting, Cadaver or Diseased organ transplant program to fill the gap between demand & supply of the organs.

Key Words

Non-Communicable Diseases(NCDs), Chronic Kidney Disease(CKD), End Stage Renal Disease(ESRD), Renal Replacement Therapy(RRT), Evidence Based Guidelines, Cost Effective Management, CKD Clinics, Diseased Organ Transplant

Chronic kidney disease (CKD) is a collective term covering a number of primary disease processes that result in structural or functional kidney abnormalities, or both, persisting for at least 3 months. Abnormal urinalysis results with proteinuria or hematuria and abnormal kidney structure or histologic features, with or without a decreased glomerular filtration rate (glomerular filtration rate [GFR] < 60 mL/minute/1.73 m2), are the defining manifestations.1 CKD is subdivided into five stages according to the GFR (Table 1), which reflects the observation that in the majority of cases, CKD progresses slowly through the stages before reaching end-stage renal disease (ESRD) that necessitates renal replacement therapy (RRT). The CKD staging system has two important implications: First, it suggests that if CKD is detected at an early stage, intervention may be possible to prevent or slow progression to more advanced stages.2 Second, it reflects the observation that as GFR declines, the risk profile of patients and associated complications changes. Thus, the staging system provides a useful framework for
structuring therapy and prioritizing interventions to produce a comprehensive strategy for the management of CKD.

Definition of End-stage Renal Disease (CKD-V). End stage renal disease (ESRD) is that stage of kidney impairment which is irreversible, cannot be controlled by conservative management alone, and requires dialysis or Kidney Transplantation to maintain life.

### The Prevalence of CKD is High

**NKF-K/DOQI Estimates of Prevalence of CKD in the U.S.**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Description</th>
<th>GFR (ml/min/1.73 m²)</th>
<th>Prevalence (000s)</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kidney Damage with Normal or ↑ GFR</td>
<td>&gt;90</td>
<td>5900</td>
<td>5.8</td>
</tr>
<tr>
<td>2</td>
<td>Mild ↓ GFR</td>
<td>60-89</td>
<td>5300</td>
<td>3.0</td>
</tr>
<tr>
<td>3</td>
<td>Moderate ↓ GFR</td>
<td>30-59</td>
<td>7600</td>
<td>4.3</td>
</tr>
<tr>
<td>4</td>
<td>Severe ↓ GFR</td>
<td>15-29</td>
<td>400</td>
<td>0.2</td>
</tr>
<tr>
<td>5</td>
<td>Kidney Failure</td>
<td>&lt;15 or Dialysis</td>
<td>300</td>
<td>0.1</td>
</tr>
</tbody>
</table>

**Table 1., Staging of CKD, and it’s Prevalence**

Though, the prevalence of CKD V (ESRD), is comparatively less, stage I CKD, has all the potential to progress and go for advanced stages, and ultimately to stage V, or ESRD. Unless diagnosed earlier (Stage, I, & II, Table 1,2), all the evidence based measures are implemented to slow or deaccelerate the progress, the advancement is rapid enough to add the numbers to ESRD pool.
Table 2. Prevalence of CKD, according to Serum Creatinine Levels, (Corresponds with CKD, Stage II, III, IV, and V(ESRD))

CKD is a global threat to health in general and for developing countries in particular, because therapy is expensive and life-long. In India ~90% patients cannot afford the cost. Over 1 million people worldwide are alive on dialysis or with a functioning graft [1]. Incidence of CKD has doubled in the last 15 years. In the USA, ~30 million people suffer from CKD [2] and by 2010 >600 000 patients will require renal replacement therapy, costing US$28 billion [3]. This study shows that the prevalence of CRF in India is ~0.8%. In community-based studies, the CKD prevalence has been reported between 0.16% and 0.79%. The studies were designed to detect stage 3 CKD or worse and the real prevalence of CKD is higher than the reported number.5-7 The ESRD incidences has been reported to be 160–232 per million population (pmp)8,9 and the projected ESRD prevalence was 785–870 pmp.9,10 “Screening and Early Evaluation of Kidney Disease” (SEEK), a community-based voluntary health screening program was started in India in 2006 and tests serum creatinine and urine analysis. SEEK reported a very high prevalence of 17.4% of CKD (unpublished and presented in the Annual Conference of the Indian Society of Nephrology) using an abbreviated modified diet in renal disease (MDRD) formula, a glomerular filtration (GFR) estimation formula.

1 in every 10, Indian is potential candidate for CKD. With rising prevalence of Diabetes Mellitus, and Hypertension in Indian population, which are common and important causes of CKD, there is upward trend in CKD prevalence, to the extent that it is a priority in the list of non-communicable diseases.
Approximately 100000-150000, new patients of ESRD are added annually to already existing pool of ESRD patients, who are in need of RRT. As of today, with existing infrastructure, logistics, available expertise, economic considerations, and awareness, 30-35% of these patients get renal replacement therapy, i.e. maintainance dialysis or renal transplantation. Total number of CKD-V, & ESRD patients present at, is on rise because of better conservative and palliative care available to them, survive without RRT.(Fig.1)

There are not enough, accessible dialysis facilities, available, beside economics does not permit to put or to provide dialysis to each and every patient of ESRD. Renal transplantation which is the, “Gold Standard” and cost effective management strategy for ESRD, has not taken off, because of lack of transplant facilities and more importantly because of paucity of donors.(Table.3)

Diseased organ donations, or cadaver transplant program which is a potential source of organs to fill in gap between demand and supply is yet to be implemented in a significant way, because of various, social, cultural, legal, & religious issues. The situation though better, is not different in developed economies, where prevalence of dialysis is increasing, waiting list of patients requiring transplant(Fig.2), is increasing.

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**Fig.1. Dynamics of ESRD, in India, Numbers are approximate, & crude estimates, X= no.of ESRDs existing, X+ 160000, new ESRDs added annually, Y+ 40000, patients going for dialysis, Z+ 8000, patients undergoing renal transplantation. D= no. of deaths. \( X^2 = x+150000-40000-80000-D \)**
The Indian CKD Registry, a voluntary reporting body of CKD patients data, initiated in June 2005, has 199 contributing centers. The database has 63,538 patients enrolled, 70% of them males and 73.6% of them have CKD stage 4 and 5. Diabetes is the cause of kidney disease in 30% of these patients. Only 20% of the ESRD registry patients are on some form of RRT. The existing registry has the limitation of being hospital-based and not accurate estimate of population data. The data is available at www.ckdri.org.11

In summary, the yearly incidence of ESRD in India is approximately 150–200 pmp and DM is an important cause of CKD in approximately 30–40% of the patients. Patients with CKD are likely to die of CVD than to reach ESRD.

<table>
<thead>
<tr>
<th>RENAL TRANSPLANT</th>
<th>DIALYSIS</th>
</tr>
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<tbody>
<tr>
<td>• GOLD STANDARD</td>
<td>* TARNISHED GOLD</td>
</tr>
<tr>
<td>• COMPLETE REPLACEMENT</td>
<td>* PARTIAL REPLACEMENT</td>
</tr>
<tr>
<td>• RATIONALE</td>
<td>* SUBSTITUTION</td>
</tr>
<tr>
<td>• BETTER SURVIVAL</td>
<td>* INFERIOR</td>
</tr>
<tr>
<td>• BETTER QUALITY OF LIFE</td>
<td>* COMPROMISED</td>
</tr>
<tr>
<td>• QUALYS</td>
<td>* QUALYS</td>
</tr>
<tr>
<td>• DALYS</td>
<td>* DALYS</td>
</tr>
<tr>
<td>• QUALY ADJUSTED CE</td>
<td>* REDUCED</td>
</tr>
</tbody>
</table>

Table.3. Renal Replacement Therapy, Renal Tx Vs. Dialysis

Approach to management: Road Map:

**Primary Prevention:** This is part of National Prevention Program, for CKD, which will also include, Secondary Prevention part. The primary prevention envisage the regular screening and follow up for patients at risk of developing CKD, viz. diabetes mellitus, Hypertension, awareness and avoidance of Acute Kidney Injury(AKI), health education and awareness camps.

**Secondary Prevention:** Once CKD is diagnosed, secondary prevention should target slowing down and deaccelerating the progress of CKD I to CKD V & ESRD. So the onset of ESRD is delayed and ultimate burden is reduced. All evidence based measures to slow down the progress should be implemented scrupulously, (Fig.3), best done by establishing “CKD CLINICS” with regular follow up schedule and multidisciplinary approach.

To tackle the burden of established “ESRDs”, measures to promote renal transplant nationally. This will not materialize unless, diseased Organ donation, or Cadaver organ transplant is encouraged and promoted by all Stake holders.(Fig.4)
To establish more and more dialysis facilities, for delivery of “Quality dialysis”, which will include not only increasing infrastructure & Logistics but also seriously Capacity Building.

Those CKD V, or ESRD, patients, not on RRT, should be provided, evidence based conservative and palliative management, so that they have improved Quality of Life, as well as Improved survival.

Fig.2. USRDS, data, Renal Tx. Vs. Dialysis

Fig.3. RAAS, Block, effect on GFR decline in diabetic nephropathy
Potential Population Risk factors for CKD

Primary Prevention
National Prevention Program
Hospital Based
Community Based

Secondary Prevention
CKD, Clinics
Reg. follow up
Measures to slow down
GFR Decline

Fig. 4. Approach to Management of CKD, Road Map

Goals of Management, Tackling CKD Explosion:

- Reduce incidence of CKD, through primary prevention, under National Prevention Program
- Slow down progression of CKD to ESRD, through secondary prevention, under NPP, thereby reducing number of incident ESRDs. - CKD Clinics
- Evidence based, conservative and palliative care for CKD-V & ESRDs, not on RRT, through CKD clinics, thereby improving survival and quality of life.
- Promote Renal transplant program, through diseased organ transplant or Cadaver Transplant
- Enhance Quality Dialysis facilities.

References:

7. Ilangovan Veerappan, Georgi Abraham: Chronic Kidney Disease: Current Status, Challenges and Management in India, Chapter 130 Section 17; pg 593-97
BIOGRAPHY

DR. V.L. GUPTA, MD, PhD, BA, MNAMS, FICP, FICE, FISN, is consultant nephrologist at Ashwini Kidney Dialysis Center, and Avanti Institute of Cardiology, Nagpur. He is Ex-Professor & Head dept. of nephrology, Super Speciality hospital & PG Institute of Medical Sciences. He has also been, Director, Clinical Epidemiology Unit, GMC, Nagpur. He has UG, & PG teaching experience of over thirty two years in medicine and nephrology. He has been UG & PG examiner across universities in India. He was postgraduate guide for MD, DNB, and PhD for RSTM university Nagpur.

Winner of research awards & medals, He is recipient of several oration and lecturer ship awards at National level, including “Searle Oration” API 2004. He was awarded, “INCLEN, USAID, fellowship in Clinical Epidemiology, in 1987-88, during which he was part of Master’s program and was trained in Clinical Epidemiology, Research Methodology, at UNC, NC, USA, 87-88, beside he has received several other fellowships at national & international level. Being member over dozen professional bodies, and scientific societies. He has been heading several of them. His name has been included in “Asia’s Who’s Who” of Medicine, 2014. He has authored and published three books, beside contributing to other published monograms & Books, has published over 90 research papers.