Cyril Fernando memorial oration - 1993

Renal diseases: Sri Lankan and global spectrum

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Dr Cyril Fernando was born in Colombo in 1900, the turn of this century, and during his life span of 55 years, brought fame to the medical profession of this island. He graduated with the MBBS in 1926 at the University College Hospital in London and shortly afterwards was elected MRCP (London) without a final viva, which was dreaded by all candidates sitting that examination during the first half of this century. In 1929 he was awarded the Gold Medal at the MD (London), a singular honour and was appointed Physician to the General Hospital, Colombo in 1934. He was a great clinician, a champion in the art and an excellent diagnostician at a time without sophisticated laboratory services and radiology. His aptitude for teaching medicine and his wit were well recognised by all during his times. I had the good fortune of attending some of his ward classes in 1955 as a third MB student, just before his demise. He held many appointments including the presidency of the Ceylon Branch of the British Medical Association in 1948. So we are gathered here for this memorial Oration for the most sought after and excellent Physician of his times. The subject for this Oration would be 'Renal Disease: Sri Lankan and Global Spectrum — geographical Nephrology.

'The further you look back the further you look forward'. This was part of an address by Sir Winston Churchill at the Royal College of Physicians of London in March 1944. Certainly to gain perspectives and prospectives in renal disease it becomes necessary to look back on its history. These historical facts must be woven intricately into the yet unfinished tapestry of Nephrology to form a base on which current advances are incorporated.

The study of the evolution of renal disease began with the original morphological descriptions of the kidney by Marcello Malpigni in Padua during the 17th century. Bowman in 1842 described the glomerular capsule. Richard Bright (1827)[1] achieved his deserved place in the annals of medical history by his descriptions of nephritis. His illustrations of pathological specimens were displayed with a view to correlate the symptoms and cure of the disease with reference to morbid anatomy and are in the archives of the Royal College of Physicians. Ellis a century later (1942) attempted to classify the clinical types of nephritis.

Subsequently, the study of 'individual medicine' and patient groups was advanced by many clinicans such as Bull, Joekes and Lowrand, also Sir Harold Platt — the Nephrophile & PRCP — from England, and Franklin and Merrill from the USA during 1950 to 1960. Other landmarks were the advent of renal biopsy by Perez (1950), use of electron microscope by Farquhar (1959), the invention of the artificial kidney by Allwall in Europe and the inroads into transplant immunology by Sir Peter Medewar and Terrasaki.

However the last three decades saw the greatest advances in nephrology and it was firmly established as a major clinical speciality — a time when I became interested in the subject. Clinical, pathological and animal experimentations were integrated. Individual medicine, group and population surveys were integrated.

Sir Douglas Black — Professor & Nephrologist (Manchester U.K.)[2], analysing population medicine remarks that it constitutes a multifaceted dimension of medicine which should both interpenetrate and complement 'individual medicine' and takes into account the whole population's health needs in various disciplines.

Thus geographical nephrology and its global impact has been analysed in workshops and seminars at various international conventions. Diversities in population based nephrology depends on various factors. They are:

1. **Environmental factors:-** which include demography, climate, zoonosis, world travel, socio-economic factors, human reservoirs and hospital acquired diseases.

2. **Host factors:-** such as genetic, heredo-familial, host susceptibility and immunological mechanisms, and

3. **Agent factors:-** namely, distribution of offending agents and the identification of newer infecting agents.

Having made this short preamble on the evolution of population based geographical nephrology and having looked back sufficiently in a historical context. I will now describe and disscuss the spectrum of renal disease in Sri Lanka and compare our experience in a global context.

Observations were made in 1387 patients having renal diseases during the 5 year period 1989 to 1993

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under my care at the General Hospital, Colombo, Sri Lanka. These patients were classified as Renal Disease presenting with:

1. **Acute Renal Failure (ARF)** — 448 patients (32%).
2. **Chronic Renal Failure (CRF)** — 336 patients (25%) and
3. **Renal diseases not having renal failure** — 603 patients (43%).

I must mention that a hospital based prospective study may not represent the spectrum of renal disease in Sri Lanka as a whole although it would to a great extent give insight to the geographical case-mix of renal disease in this island.

Acute Renal Failure (ARF). This is a fascinating clinical entity with its diverse aetiology and clinical expressions and hence is a 'clinical syndrome' rather than a disease. I shall consider the Sri Lankan and Global spectrum under:

1. **Aetiology or case-mix with mortality.**
2. Two currently discussed sub-sets,
   (i) **Hospital acquired ARF.**
   (ii) **The critically or high risk ARF.**
3. **Changing patterns of the syndrome and mortality trends.**

Aetiology and mortality. The different causes — groups for ARF and their mortality rates are shown in Table 1. Of the 448 patients the large majority, 365 were medical causes (82%), while in the surgical group there were 60 cases (13%), and the pregnancy related causes were only 23 (5%). The respective mortality rates in these 3 groups were 16%, 28%, and 17% the surgical group having the highest mortality.

Table 1. Acute Renal Failure (ARF) 448 Cases — Mortality

	No	*%*	*Deaths*	*%*
1. Medical causes	365	82	58	16
2. Surgical causes	60	13	17	28
3. Pregnancy related causes	23	5	4	17

a. **Medical causes** (Table 2) Of the medical causes venomous bites and stings were 45%, snake bite being 44%. Infections occurred in 33% hence these groups constituted 78% of the cases. Of the infections the more prevalent causes were leptospirosis (18%), malaria and G6PD deficiency (4%), gastroenteritis (5%), and septicaemia (4%). Poisoning with paraquet was 4% and copper sulphate 1%. Glomerular nephritis was a cause in 6%. Other causes were hepato-renal syndromes, drugs and herbal medicines, hypertension, myocardial infarction and post transfusional states. The respective mortality rates are also shown, the highest being with paraquat 63%, while septicaemias 38%, hepato-renal syndromes 60%, post-myocardial infarction 50% were also significantly high. The mortality in snake bite was however only 10%, leptospirosis 9% and malaria 14%.

Table 2. Acute Renal Failure (ARF) 448 Cases — Mortality — 17%

		Number of patients	*%*	*Deaths*	*%*
	Medical Causes	365	58	16	
1.	*Venomous bites*	165	45	17	10.3
	Sanke bite	162	44	16	10
	Wasp/ Scorpion	3	1	1	-
2.	*Infections*	121	33	15	12
	Leptosporosis	64	18	6	9
	Malaria/G6PD	14	4	2	14
	Gastroenteritis	17	5	1	
	Septicaemia	16	4	6	38
	Dengue HF	5	1	-	
	Others	5	1	-	
3.	*Poisonings*	27	7	11	40
	Paraquat	16	4	10	63
	Copper Sulphate	5	1	-	-
	Others	6	2	1	-
4.	Glomerulonephritis	21	6	4	19
5.	Hepato-Renal syndrome	10	3	6	60
6.	Drugs/Herbal	5	1	-	-
7.	Hypertension	4	1	-	-
8.	Myocardial Inf./CCF	4	1	2	50
9.	Unknown aetiology-TI	5	1	2	
10.	Post transfusion	3	0.5	-	-

b. **Surgical causes** (Table 3) The mean age was 34 years and the commonest cause was RTA with multiple fractures and often with muscle damage 40%, post cardiac and abdominal surgery 23%, extensive burns and electrocution 20%, and obstructive uropathy 16%. The mortality was significantly high in the RTA and burns patients, namely 38% and 50% respectively — Hypercatabolism.

Table 3. Surgical ARF (60 cases, 15-60 yrs., (Mean — 34) Mortality 17-28%)

	No	*%*	*Deaths*	*%*
Post operative	14	23	2	14
RTA	24	40	8	38
Burns/Elect/Drowning	12	20	6	50
Obstructive Uropathy	10	16	1	10

Hypercatabolic 20%
Burns 75% non-oliguric (RTA, Burns)

c. **Pregnancy related ARF** (Table 4) The mean age was only 30 years, and haemorrhage, both ante and post partum were the commonest cause with 43% while septic abortion 26%, eclampsia and PET 13% and post caesarian were 8%. The highest mortalities were in eclampsia PET, and septic abortion patients — Hypercatabolism. I shall now consider the sub-sets namely

Table 4. Pregnancy Related ARF: 23 cases 20-46 yrs (Mean — 30) Mortality — 4 (17%)

	No	*%*	*Deaths*	*%*
PET/Eclampsia	3	13	2	67
PPH/APH	10	43	-	0
Septic AB/still B	6	26	2	33
Post Caesarian	2	8	-	0
Primary ARF	1	4	-	0
Acute pyelonephritis	1	4	-	0

Hypercatabolic 20%
(Eclampsia/Septic abortions)

2a. **Hospital acquires ARF** (Table 5) There were 50 patients with a mortality of only 12%. The medical causes were 40% being gastroenteritis, sepsis, drug induced, and transfusional. The surgical causes were 40% and the pregnancy group 20% due to haemorrhage. It differs from the general case-mix of Medical 82%, Surgical 13% and Obstetric 5%. The mortality in the 3 groups was Medical 15%, Surgical 15%, and Pregnancy nil.

Table 5. Hospital Acquired ARF 50 PTS, (11%) — Mortality 12%

	No	*%*	*Deaths*	*%*
Medical	20	40	3	15
Gastroenteritis	8		-	
Septicaemias	6		3	50
Drugs	3		-	
Post Transfusion	3		-	
Surgical	20	40	3	15
Post-operative	17		2	12
Ligation-Ureter	3		1	33
Pregnancy induced	10	20	0	Nil
Haemorrhage	8		-	
Caesarian	2			

2b. **ARF in the seriously ill/high risk ARF** (Table 6) This is a serious therapeutic problem, often requiring intensive care and total parental nutrition. There were 151 patients (33%), with a high mortality of 38%. Most of the medical causes 93 (62%), belonged to the usual medical aetiologies described earlier. The mortality was 40%. The surgical patients were 46 (30%) having a mortality of 30%. In the pregnancy group, 12 cases (8%) the mortality being only 12%. All patients had a high rating in the APACHE 2 score, indicating their clinical severity. The cause for the high mortality were complications like respiratory failure requiring assisted ventilation, sepsis, MOF, DIC, rhabdomyolysis, prolonged oliguria, poor tolerance to renal replacement therapy, cardiovascular instability, episodic hypotension and cardiac arrhythmias.

Table 6. Critically Ill (High Risk) ARF — 151 PTS, (33%) Mortality — 58 (38%)

Medical	*93 (62%)*	*Deaths (37)*	*40%*
Snake bite	36 (38%)	12	33
Leptospirosis	18 (19%)	4	22
G6PD	8 (8%)	2	25
Hepato-renal	6 (6%)	6	100
Glomerulonephriris	5 (5%)	-	-
Paraquat	4 (4%)	4	100
Septicaemia	6 (6%)	3	50
Others	10		
Surgical	46 30%		
RTA	24 (52%)	8	33
Post Operative	12 (26%)	2	17
Burns — over 40%	8 (17%)	6	75
Obstructive Uropathy	2 (5%)		
Obstetric (Pregnancy)	12 8%	4	(25)
Septic abortion	4 (33%)	2	50
Others	8 (66%)		

3. Changing patterns of ARF and mortality trends in Sri Lanka

1. The case-mix regards medical, surgical, and pregnancy ARF has not changed appreciably over the past ten years.

2. There is a definite increase in the sub-sets hospital acquired ARF and the critically ill ARF, due major surgery, increased severe RTA's MOF and sepsis.

3. Fairly constant mortality in the medical group with a fall in mortality to acceptable limits in the surgical and pregnancy patients. The overall mortality too declined to 17%. This being due to early transfer of patients to our Unit and more experience and a better management of renal replacement therapy.

4. Taking the snake bites it became evident that the mortality was higher in the younger and older age groups, (Figure 1) as noted in our patients. Mortality in ARF varies with age — Turney (Leeds UK) 1990[3].

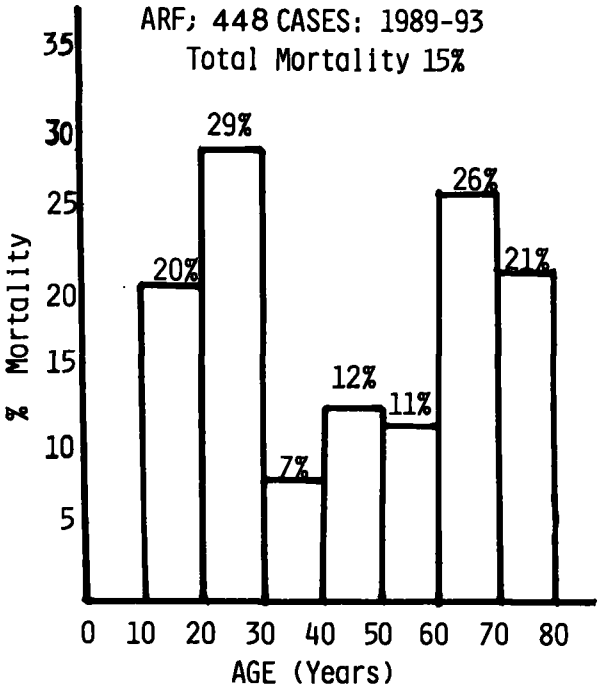

Figure 1

I shall now turn to the Global spectrum in ARF. The case-mix for ARF in Sri Lanka is somewhat unique, as it differs markedly from other geographical areas (Figure 2). As in many of the tropical and subtropical regions the aetiologies are known and clear-cut, in our series toxic or vaso-motor nephropathy causing tubulo-interstitial disease being the pathogenesis in over 70% of cases. Snake bite induced ARF amounted to just less than half of all patients usually due to Russell's viper or the humped nose viper. Myanmar (Burma), Africa, South India, the Far East, and Australia have their venomous snake species and snake bite is the cause for 70% of ARF in Myanmar[4], and from 3% to 27% in South India[5]. Interestingly snake bite is uncommon in North India, Pakistan and Bangladesh[4]. Leptospira as a cause for ARF is seen in Thailand, Malaysia and Indonesia[6]. It has also been seen in South India[7]. Malaria however has now a wider world distribution and could become an important cause for ARF[8]. The main cause in South Asian countries are gastroenteritis, infections drugs and nephrotoxins in North India[9], Gastroenteritis in Pakistan and Bangladesh drugs and nephrotoxins in the Peoples Republic of China haemorrhagic fever in Korea and sepsis in Middle Eastern countries. By contrast, in the developing nations surgery, trauma, sepsis, glomerulonephritis, vasculitis, and nephrotoxic drugs are the main causes.[10]

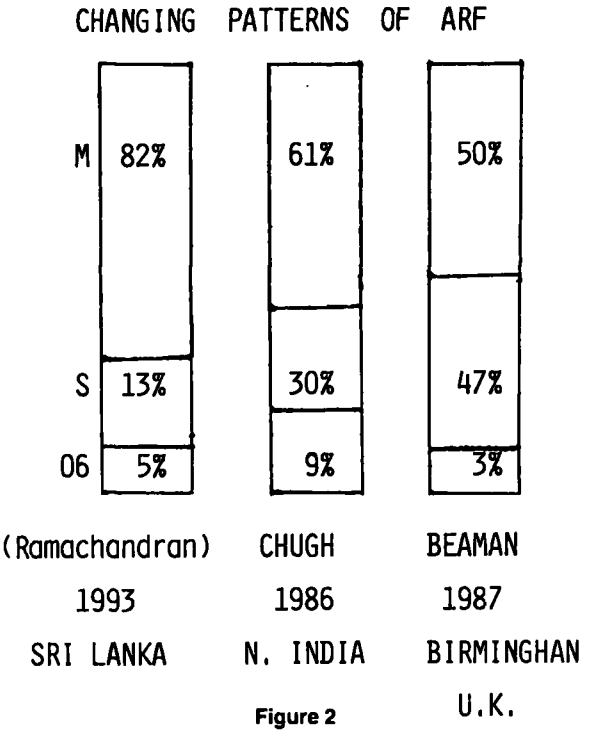

Figure 2

It would be apparent that environmental factors predominates in Sri Lanka and the tropics while agent and host factors are of importance in the developed global regions. Fortunately Sri Lanka does not have its share of ARF due to plant toxins (South East Asia) and Viral haemorrhagic fevers as in Central and South Africa eg: Lassa, Marburg, and Ebola viruses, and also Hantane virus causing Korean Haemorrhagic fevers which are globally widespread. However one has to be vigilant regarding the latter in the future — a condition which could simulate leptospirosis to a nicety.

Hospital acquired ARF is of considerable interest. In our series it was a 11% incidence having a mortality of only 12%. Chugh 1992[11] reported a mortality of 41% from Chandigarh, India, while many of his patients were critically ill. From the USA Shusterman 1987[12] reported a similar mortality identifying risk factors like septic shock,

drug therapy, diabetes, age, and hypertension. Hence our lower mortality is again due to the case-mix and also to the lower proportion of critically ill cases. With respect to the critically ill ARF our mortality was high 38%, a figure comparable to global mortality rates. Moorhead 1989[13] from London had a mortality of 70%, sepsis giving poor prognosis. Wheeler 1986 from Leicester, UK,[14] gave a mortality of 47% to even 80% elderly cases, sepsis, vasculitis, mechanical ventilation, pancreatitis and aortic surgery affecting the mortality. These patients probably had a lower APACHE2 < 18 score than with the Sri Lankan experience — ie more severely ill patients of an older age group. With respect to changing patterns of ARF, there is no increase in the surgical causes — 3% in 1992-93. This trend was different in studies reported from India[9] and from UK (Beaman 1987)[15] due to increasing RTA and major surgery (Figure 2).

Mortality trends in different global locations are not comparable. It relies heavily on case-mix, the critically ill, the greying population, diabetes, hypertension, sepsis and malignancies as observed by Turney from Leeds[3], and Stewart Cameron[16], from London 1990. Prolonged recovery and MOF also influences mortality — Butkus 1983 — USA experience[17]. Thus Sri Lanka with its large quota of tubulo-interstitial disease of medical origin enjoys a very acceptable overall mortality rate of only 17%, the age range of our case-mix also contributing to it, mainly 30-40 years.

I shall now discuss chronic renal failure (CRF) under the following headings:

1. The case-mix and relevant features.
2. Global case-mix with its variations.
3. Racial differences — global experience.
4. Mortality and treatment modalities.
5. Preventive aspects.

1. **Case-mix in Sri Lanka** (Table 7) The 336 patients (25%) included 52 cases (15%) having acute or chronic renal failure. The total mortality was 38% in the absence of adequate renal replacement therapy. ESRD of unknown origin occurred in 28%, a third of these cases having small kidneys. Chronic GN was 22%. As most cases with ESRD are due to glomerulonephritis it could be assumed that 50% of the patients have CRF due to GN. Non-obstructive pyelonephritis was noted in 14%. Other important causes are diabetic nephropathy 12% obstructive uropathy 13%, and polycystic disease 2%. Their mortalities are given in this slide. Other causes were SLE, transplant rejection, hypertension, nephrectomy, post snake bite. Alport's disease and myelomatosis. Looking back there has been no great change in the major incidences in my previous study (Ramachandran 1986)[18]. I shall discuss some of these conditions briefly.

Table 7. CRF: 336 Patients (25%); Mortality 129 (38%) (Includes Acute on CRF in 52 Patients)

1.	ESRD	94 (28%)	28 (51%)
	Small Kidneys	33 (35%)	21 (64%)
	Normal Kidneys	61 (65%)	27 (44%)
2.	Chronic GN/Nephritis	78 (22%)	24 (30%)
3.	Chronic Non-obstructive Pyelonephritis	47 (14%)	18 (38%)
4.	SLE	4 (1%)	3 (75%)
5.	Diabetic nephropathy	42 (12%)	19 (45%)
6.	Obstructive Uropathy	43 (13%)	18 (41%)
7.	Polycystic disease	6 (2%)	2 (33%)
8.	Transplant rejection	10 (3%)	8 (80%)
9.	Hypertension	14 (4%)	5 (36%)
10.	Nephrectomy	3 (1%)	2 (66%)
11.	Snake bite	4 (1%)	2 (50%)
12.	Other: Alports (2), myeloma (2), SBE (1)		

i. **ESRD: GN: Pyelonephritis:** the mean age was 34 years indicating the large proportion of young patients having this malady — a sad story. By the time chronic uraemia sets in the renal histology only shows advanced glomerulo-sclerosis, tubulointerstitial disease, vascular changes, indications of primary disorder not being evident. These patients would need conservative management or renal replacement therapy depending on the severity of uraemia.

ii. **Diabetic Nephropathy.** The mean age was higher than in the former group, 50 years. A small proportion of patients rapidly progress to CRF. A similar observation was made in a study on young diabetics, about 8% having rapid 'malignant' course towards uraemia (Ramachandran 1983)[19].

iii. **Obstructive Uropathy.** The mean age group was 40 years and renal stones accounted for half the cases, while the other causes were prostatic and bladder disease and stictures.

iv. **Polycystic disease.** The mean age was 46 years and a proportion of patients passed into CRF although it is known that progression to uraemia is usually slow.

Some clinical features in these 334 patients having CRF are shown in Table 8. They were anaemia 54%, hypertension 80%, peripheral neuropathy 48% and minor bleeding tendency 43%. While all these adversely affect the quality of life and their treatment procedures the strikingly high incidence of hypertension not only has its therapeutic problems but also affects adversely the progression to chronic uraemia. This would be relevant to the more rapid progression in some of the patients in Sri Lanka in particular, and in a more general manner to the relative younger age of patients with CRF having primary renal disease (ESRD).

Table 8. CRF — Clinical Features — 334 pts.

	No.	*%*
Anaemia	180	(54%)
Hypertension	268	(80%)
Neuropathy	162	(48%)
Bleeding	146	(43%)

CRF: *Racial Differences*

Higher incidence of CRF in Negros
Mexican Americans, Hispanics
Higher incidence of Hypertension
Increased rate of progression
SLE — progressive in blacks
IV Heroin and HIV

2. **The Global case-mix for CRF** needs comment. From data published in global centres Sri Lanka is not unique in its case-mix as was noted with ARF. Most countries have similar aetiologies with differences in their incidence. This is generally true for the tropics including India[20], UK[21], USA[22], European countries, as noted in the EDTA (European Dialysis and Transplant Register) registers and the Middle East[23]. In general GN accounted for 40% to 80%, and Diabetes for 10% to 13%. However, there are some diseases not seen in Sri Lanka like schistosomiasis or bilharzia, sickle cell anaemia and quartan malaria in Africa and Balkan nephropathy in Central Europe — of environmental and genetic origin. Contrarywise, some differing incidences for CRF globally are amyloidosis 10% in locations in the Middle East,[23] analgesic nephropathy and tubulo-interstitial disease 12% and polycystic disease up to 12% from Australia (Gwyn Williams 1991)[24]. Other conditions are the high incidence of reflux nephropathy in Australasia Ross Bailey 1991[25], increased incidence of stone disease in the 'stone belt' like Pakistan and parts of USA, and a rising incidence of vasculitis in the USA, excluding SLE (Nissenson 1990)[22], and a high incidence of diabetes coming into the transplant programmes in the USA, as much as 30%. Interestingly, new patterns are also emerging like hepatitis B and HIV infections and less recognised disease like Arteriosclerotic renal artery stenosis with CRF in the elderly (Farrington and Sweeny 1993)[26].

3. **Regarding Racial differences for CRF** Recents studies in the USA have been most revealing (*KI*, Editorial 1991)[27]. There is a high incidence of CRF among Africans, Americans, Mexicans, and Hispanics, than in the white population. Race specific differences may be genetic or even environmental. Furthermore, there is a higher incidence of hypertension and diabetes in the Americans of African origin. Their rates of progression to CRF also is more rapid, as is also noted with SLE. Similarly, I.V. heroin and HIV infections affect non-whites at risk more often than whites at similar risk. Thus racial and genetic factors may not be without relevance to Sri Lanka with a high incidence of hypertension and the lower average age in CRF. Pertinent is that the average age in European countries is 55 to 64 (EDTA), genetic factors a low incidence of hypertension, and good management have been incriminated.

4. **Mortality and Treatment modalities.** This brings us to the more depressing aspect of renal failure in Sri Lanka. In the absence of adequate treatment facilities the mortality as shown earlier was high, causes for death being ischaemic heart disease, cerebrovascular accidents, sepsis, cardiac failure, hyperkalaemia, and untreated uraemia. The treatment modalities used are shown in Table 9. It becomes apparent that the treatment available are unsatisfactory to say the least. Of the 336 patients only 28 had renal transplants abroad from non-related live donors. To date there are 20 survivals giving a mortality of 28%, a 70% survival. The Colombo University Units have over 150 transplants to their credit (unpublished data). In the best of centres the graft survival would be even 90% at 5 years. It is estimated that about 30 new cases of CRF per million population per year emerge and hence the presently appalling situation must be improved, the setting up of Dialysis and Transplant Units becomes mandatory. This however involves logistics, finance, ethics audit and the GNP of the country. It has been a dilemma in virtually all developing global nations. CAPD programmes too need consideration. This brings us to the:

Table 9. CRF: 336 Patients

	No.	*Mortality*
Conservative only	26 (7%)	nil
Intermittent PD	214 (67%)	41%
PD and Haemodialysis	38 (9%)	16%
Haemodialysis only	30 (9%)	33%
Renal transplant	28 (8%)	28%

(IHD, CVA, Sepsis, CCF) Mortality causes

5. **Preventive aspects** Early diagnosis, adequate therapy and surveillance of kidney disease needs no emphasis[28], regarding its progression to CRF, becomes imperative. Although there are controversies regarding diet and drug regimes, the control of hypertension in retarding the progression to uraemia is universally agreed upon, — a problem pertinent to Sri Lanka. Setting up of renal units in Sri Lanka with qualified and dedicated Nephrologists and Transplant Surgeons will to some extent be the start of an organised approach in the management of renal disease and renal failure, both preventive and curative. I shall now consider renal diseases not in renal failure, acute or chronic. However, when

the incidences are given, those patients also having renal failure will be included in the statistical computation.

6. Renal Diseases (Table 10) The majority were Urinary Tract Infections (UTI) 12%, Glomerulonephritis and SLE 16% and Stone disease 10%. Other conditions were diabetic nephropathy 5%, polycystic disease 1%, congenital abnormalities 2%, genito-urinary malignancies and vascular diseases of the renal vessels.

Table 10. Renal Diseases

	No	*%*
Urinary tract infections	165	12%
Glomerulonephritis and SLE	224	17%
Calculus disease	141	10%
Diabetic nephropathy	74	5%
Polycystic disease	18	1%
Other congenital diseases	23	2%
GU malignancy	13	1%
Vascular diseases	3	0.3%

i. **Urinary Tract Infections** (Table 11) Females predominated 60%, with a mean age 38 years and the mean age for men was 62 years. Dysuria occurred in 90% and 10% were asymptomatic. Associated conditions were diabetes 28%, calculi 23%, pregnancy 10%, prostatic disease 18%, catheter induced in 15%, and polycystic disease 4%. The organisms isolated were E. Coli 35%, other coliforms 35%, — total 70%, proteus sp. 11%, Klebsiella 9%, pseudomonas 2% and staphylococcus aureus and faecalis 7%. Negative cultures were 12%. Reflux was noted in only a small proportion of patients. This spectrum in Sri Lanka is in general similar to observations in the tropical countries, but differs from the Australian experience with higher incidences for UTI and reflux.[25] In their experience and in those of Ross Bailey of New Zealand the incidence of reflux in children may be even 35%.

Table 11. Urinary Tract Infections (UTI) — 165 pts, (12%)

Female 60%, mean age 38 yrs, men 62 yrs, Diabetes	-	28%
calculi	-	23%
polycystic 4% Pregnancy	-	10%
prostatic disease 18%, catheter	-	15%
Escherichia coli	-	35%
other coliforms	-	25%
proteus sp,	-	11%
Klebsiella aerogenosa	-	9%
pseudomonas 2% staph	-	7%

ii. **Primary GN and SLE (Table 12)** Renal biopsy was performed in 61 patients in this group. Of 49 patients with primary disease, the clinical expressions were urinary abnormalities, nephrotic syndrome, hypertension and ARF of unknown origin. Minimal change was 21%, while acute diffuse GN was 7%, mesangial proliferative, the commonest with 34%, mesangial cappillary 13%, membraneous GN 7%, focal glomerulosclerosis 5% and others 10%. The crescentic GN was 3%. In another Sri Lankan study[29], Angunawella, Sheriff, and Fernando 1992, 40% had minimal change, a much higher figure, and mesangial proliferative was only 13% and crescentic forms 7% showing that, variations occur within the same location. Furthermore, similar variations are evident from papers published globally from the developing and the developed countries. The cause is probably of genetic origin. I should mention an entity of current importance, that is mesangial IgA or Berger's disease, a form of GN with deposits of IgA where racial differences are prominent. Sinniah reported a high incidence in Singapore, and Kincaid Smith a high incidence from Australia. The Maoris in New Zealand and those of African origin in the USA and South Africa have a low incidence, while it is 7% in India and 6% in Malaysia. Angunawella and others have reported IgA disease in Sri Lanka. Thus genetic and host factors undoubtedly have an influence in the occurrence and type of GN globally.

Table 12. GN: 61 Patients, SLE 12 Renal Biopsises

Minimal change	-	21%
Acute diffuse proliferative GN	-	7%
Mesangial proliferative	-	34%
Mesangio capillary	-	13%
Membranous GN	-	7%
Focal glom sclerosis	-	5%
Non-specific	-	10%
Crescentic GN	-	3%

IgA Nephropathy (Berger's Disease)

Whites, Australia, Singapore, lower incidence in Negroid/Maoris
India 7%, Malaysia 6%

SLE: 20 Patients 1.4% CRF 4

12 biopsies: WHO classification

Type 4 and 5-54%
Angunawella et al-60%
Mongoloid races — high

With respect to SLE. Biopsy in 12 patients according to the WHO classification showed type 4 and 5 in 54% showing severity and extent of the disease. Angunawella and others (1993)[30] reported an incidence of 60% for these types. This condition had a high incidence amongst the Mongolian races including Singaporeans, a genetic or host influence. Other forms of vasculitis were not observed in our series although it is becoming increasi-

ngly important as a cause for GN in the West (Serra, Cameron 1984[31], Nissensson 1990[22]).

iii. **Calculous Disease** The incidence was 8% (109) patients, which is quite appreciable although Sri Lanka is strictly not in the stone belt. Males predominated (83%) and large staghorn calculi occurred in 31%. The incidence varies between and within populations even within the stone belt as geographical factors and average ambient temperatures play their role. Hence it is no surprise that the incidence in the UK is only 3% while in parts of USA it could be as high as 12%, a survey done in 1986[32]. The observation that bladder stones are commoner in developing countries is not evident in this study.

4. **Diabetic Nephropathy.** The overall incidence was 5%, 58% of them presenting with CRF. Retinopathy occurred in all patients while hypertension was a feature in 81%. Males were 81% and females 19% and the mean age was 52 years. Microalbuminuria is often associated with hypertension and a genetic predisposition for hypertension a determinant for progression which would be relevant to the Sri Lankan experience. In my earlier studies[33] glomerulosclerosis was the commonest lesion in the kidney whilst the nodular lesion described by Kimmelsteil and Wilsom in 1936 was only 10%, this being in variance with the Western series (Gelman et al 1959). In general, the incidence of diabetic nephropathy is around 5% in most global locations. However, In studies in the USA nationals of African origin have more hypertension and progress to renal failure more easily than the whites indicating again genetic influences. Interestingly, some populations in Africa itself have a slow progression to renal failure showing that their low protein diet may be of importance, an environmental factor[27].

5. **Autosomal dominant adult polycystic disease (APKD)** This is a disease of interest to nephrologists world over. There were 18 cases (1.2%), 6 of whom had CRF. Male female ratio was 4:1 and the mean age was 46 years. Hypertension was a feature in all patients having CRF while the remaining had an incidence of 66%. Family screening was not possible in all cases due to poor patient compliance, but only 4 (22%) had a definite family history. APKD has two distinct genetic inheritance, one on the short arm of chromosome 6 (APKD 1) and the other on chromosome 2 (APKD 2), the latter presenting in later life and often in CRF[26] (Farringdo and Sweny 1993). Thus the inheritance and progression of the disease is complex, a feature in all studies in this fascinating condition. Surprisingly, the incidence in most tropical countries is around 1% to 2% with their quota of consanguinous marriages while it is significantly higher in Australasia and the West.

6. **Regarding other congenital and heredo-familial diseases.** Although genetic in origin, it is only of interest in individual medicine. There was an incidence of 1.6%, medullary sponge kidneys and renal tubular acidosis with extensive calcinosis could be exciting maladies.

7. **Vascular diseases.** Mainly renal artery stenosis due to aortoarteritis has been described in many locations but is common in North India (Chugh 1992).[34] Sporadic cases occur in Sri Lanka as in other geographical locations.

I think that my subject the renal spectrum in Sri Lanka and the global spectrum has been discussed sufficiently in the light of our experience and the global literature. It is apparent that the case-mix fir ARF is quite unique to Sri Lanka and although there has been no great changing patterns observed there is an increasing consciousness of hospital acquired and the critically ill ARF with a very acceptable mortality. The global spectrum for ARF has been highlighted. The need for an improved nephrological service with the setting up of specialised units has been stressed taking into account the totally inadequate facilities for the proper management of patients having CRF. The place of the 'Triad of diseases' causing global differences in Nephrology has been stressed with special reference to genetic and racial differences. The striking incidence of hypertension in our studies and its relevance to the progression of renal disease to uraemia and also its relevance to the population of young and middle aged patients having CRF from primary and secondary renal diseases is quite revealing. The histological spectrum of glomerulonephritis and SLE has been described and discussed. Features pertaining to other renal disorders have also been described with relevance to a global setting.

Population based geographical medicine is an exciting aspect of nephrology. This has been discussed in many International Congresses with an exchange of ideas and experiences, world authorities participating in them. Sri Lankan nephrologists of the future could imbibe much by attending these Congresses with their research and experience.

Professor Robert Cohen distinguished 5 main elements in population medicine. They are 1. Descriptive epidemiology. 2. Statistical analysis. 3. The organisation of health and related services. 4. Preventive medicine approaches and genetic counselling. and 5. Evaluation and audit.

It was my intention to make every effort to at least fullfil in some small measure all the aspects pertaining to nephrology in this Oration. This would be fitting in remembering this eminent Physician Cyril F. Fernando who dominated the Sri Lankan medical stage during the second quarter of this century.

I conclude with my remarks "Those who are involved in medical research could not be living in a more exciting time" Sir James Gowans — Harvean Oration 1987, Royal College of Physicians of London.

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Thank you all for having gathered here tonight.

References

1. Fine LG. Pathological specimens of the kidney examined by Richard Bright. *Kidney International* 1986; 29: 779-783.
2. Sir Douglas Black Population Medicine. *Journal of the Royal College of Physicians of London* 1991; 25: 87-89.
3. Turney JH, Marshall DH, Brownjohn AM, Ellis CM, Parsons FM. The evolution of acute renal failure. *Quarterly Journal of Medicine* 1990; 273: 83-104.
4. Warrell DA. Snake venoms in science and clinical medicine. *Transaction of the Royal Society of Tropical Medicine and Hygiene* 1989; 84: 200-209.
5. Krishnakumar A, Vimala A, Krishnakumar G, Rahim R. Patterns of acute renal failure in South India, 6th Asian Colloquium in Nephrology, KL, Malaysia, Abstract, p 104, 1985.
6. Sitprija V. Leptospirosis, Oxford Textbook of Medicine. Oxford University Press. 1987; 5: 327-331.
7. Muthusethupathy MA, Shivakumar S. Leptospiral renal failure in Madras City. *Indian Journal of Nephrology* 1991; 1: 15-17.
8. Fox R. Diagnosis and treatment of Malaria in Britain. *British Medical Journal* 1993; 306: 1175-1180.
9. Chugh KS, Sakhula V, Malhotra HS, Pereira BJG, Changing trends in acute renal failure in third-world countries — Chandigarh study. *Quarterly Journal of Medicine* 1989; 272: 1117-1123.
10. Dawborn JK, Acute renal failure. *Medicine International Renal Diseases* 1991; 3578-3585.
11. Jha V, Malhotra HS, Sakhula V, Chugh KS, Spectrum of hospital-acquired acute renal failure in the developing countries — Chandigarh study. *Quarterly Journal of Medicine* 1992; 84: 497-485.
12. Shusterman N, Strom BL, Murray TG. Risk factors and outcome of hospital-acquired acute renal failure. *American Journal of Medicine* 1987; 83: 65-68.
13. Maher ER, Robinson KN, Scoble JE, Farrimond JG, Browne DRG, Sweny P, Moorhead JF. Prognosis of critically-ill patients with acute renal failure: APACHE 2 score and other predictive factors. *Quarterly Journal of Medicine* 1989; 269: 857-866.
14. Wheeler DC, Feehally J, Walls J. High risk acute renal failure. *Quarterly Journal of Medicine* 1986; 234: 977-984.
15. Beaman M, Turney JH, Rodger RSC. Changing pattern of acute renal failure. *Quarterly Journal of Medicine* 1987; 237: 15-23.
16. Cameron JS. Acute renal failure — Thirty years on. *Quarterly Journal of Medicine* 1990; 273: 1-2.
17. Butkus DE. Persistent high mortality in acute renal failure. *Archives of Internal Medicine* 1983; 143: 209-211.
18. Ramachandran S. Renal failure — Profiles and Challenges. *Ceylon Medical Journal* 1987; 32: 59-74.
19. Ramachandran S. The young diabetic — a clinical study. *Ceylon Medical Journal* 1983; 28: 63-69.
20. Renal disease in South India, Chapter 30, Tropical Nephrology, Ed. Kibukamusoke JW, 1984, Citforge Pvt Ltd., Australia, p. 448-455.
21. Williams B, Burton P, Feehally J. Walls J. The changing face of end stage renal disease in a UK renal unit. *Journal of the Royal College of Physicians of London* 1989; 23: 116-120.
22. Nissenson AR, Port FK. Outcome of end-stage renal disease in patients with rare causes of renal failure. *Quarterly Journal of Medicine* 1990; 273: 63-74.
23. Hussein M, Mooij J, Roujouleh H, Bakir N. End-stage renal disease in Saudi Arabia. *Saudi Kidney Disease and Transplantation Bulletin* 1991; 2: 79-84.
24. Williams DG. The common causes of chronic renal failure. *Medicine International, Renal disease* 1991; 3563-3567.
25. Bailey RR, Second C. J Hodson Symposium on Reflux Nephropathy, End stage reflux nephropathy, p 41, 1991.
26. Farringdon K, Sweny P. Nephrology, dialysis and transplantation. *Postgraduate Medical Journal* 1993; 69: 536-546.
27. Editorial review — Racial differences in the incidence and progression of renal diseases. *Kidney International* 1991; 40: 815-822.
28. Nahas AM EL, Wight JP. The management of chronic renal failure: ten unanswered questions. *Quarterly Journal of Medicine* 1991; 294: 799-809.
29. Angunawela P, Sheriff MHR, Fernando H. Clinicopathological study of renal biopsies — a two year study, 1992, 105th Anniversary Sessions of the Sri Lanka Medical Association, Abstract, p 27.
30. Angunawela P, Jayawickrema SR, Sheriff R. Systemic lupus Erythematosus: renal involvement and disease activity. *Journal of the Ceylon College of Physicians* 1993; 26: 45-48.
31. Serra A, Cameron JS, Turner DR, Hartley B. Vasculitis affecting the kidney: Presentation, histopathology, and long term outcome. *Quarterly Journal of Medicine* 1984; 210: 181-207.
32. Kinkaid Smith P. Urinary calculi, Medicine International, Renal disorders, 1986; 2: 1358-1362.
33. Ramachandran S. Renal complications in Diabetes Mellitus. *Ceylon Medical Journal* 1972; 17: 3-17.
34. Chugh KS, Sakhuja V, Malik N. Renovascular hypertension due to Takayasu's arteritis 9th Asian Colloquium in Nephrology, 1992, Seoul, Korea, Abstracts, p 92-95.