

FREQUENCY AND CAUSES OF END STAGE RENAL DISEASE (ESRD) IN PATIENTS WITH HIGHLY SUSPECTED CLINICAL FEATURES OF ESRD

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ABSTRACT

Objective: To determine the frequency of ESRD and common factors leading to it among patient presenting with highly suspected clinical features.

Material and methods: This is a descriptive (cross sectional) study carried out at the Department of Nephrology, Lady Reading Hospital Peshawar, from 5th August 2011 to 4th February 2012. A total of 292 patients presenting with highly suspected clinical features of ESRD were included in this study.

Results: Out of 292 patients, 176(60.3%) were male and 116(39.7%) were female. Male to female ratio was 1.52:1. Mean age at presentation was $46.44 + 12.96$ years (yrs) SD, with a range 19-64 yrs. The ESRD was found in 59(20.2%) patients, the most common risk factor found was glomerulonephritis (GN) in 117(40.1%) patients, followed by hypertension (HTN) 74(25.3%), diabetes mellitus (DM) 33(11.3%) and renal calculi in 15(5.1%) patients.

Conclusion: GN is the most common risk factor for ESRD. HTN is present in one fourth, while DM is the also an important reason for it. Epidemiology changes consistently and so our strategies should, to combat the confronting challenges.

Key words: End Stage Renal Disease, Hypertension, Diabetes Mellitus, Glomerulonephritis.

Operational definition of highly suspected clinical presentation: Were considered among patients presenting with 2 or more than 2 of the following features with duration of minimum 2 weeks:

1. Dyspnea (labored and difficult breathing) on clinical examination at the time of presentation.
2. Persisting vomiting (to eject part or all of the contents of stomach through the mouth usually in a series of involuntary spasmic moment) which occurs with intake of any type of solid or liquid material.
3. Acidotic breathing (deep, slow and gasping type breathing) on clinical examination.
4. Anuria (urine output less than 50ml/day) measure by 24 hour urine collection in a graduated jar.
5. Oliguria (urine output less than 400ml/day) measured by 24 hour urine collection in a graduated

INTRODUCTION

ESRD affects more than 1500 people per million population (ppm) in countries with a high prevalence, such as Japan, Taiwan, and the US. Approximately two-thirds of people with ESRD receive haemodialysis (HD), one quarter have kidney transplants, and one tenth receive peritoneal dialysis¹. During recent years, the number of patients with ESRD has been raising

worldwide⁴ and the health care cost exceeds \$17 billion annually in the US alone². The morbidity and mortality is exceptionally high, >20% per year³. According to a recent estimate in Pakistan, 16,000 people are dying due to ESRD annually⁵ and lot of work has been done

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on its treatment. HD services are available in almost every city of the country.

However less attention has been paid in prevention of kidney diseases. In a local study the prevalence of ESRD is 17.35%⁶ and is an overwhelming medical, economic and social problem for the patients and their families all over the world especially in developing countries like India and Pakistan. Frequency of common risk factors leading to ESRD in Pakistan include chronic GN 37%, DM 10%, HTN 12% and renal calculi 5%⁷ and many others are considered indirect risk factors⁸. Which include age, gender, race, education, weight, proteinuria, low hemoglobin, nocturia, hyper-uricemia, smoking and recreational drugs. Moreover poorly controlled hypertension (HTN), first degree relative on dialysis or with transplant, familial kidney diseases, acquired kidney diseases, HIV and drug toxicity are also important risk factors for ESRD⁹.

In Pakistan less attention has been given to prevention of kidney diseases. Lack of community nephrology services¹⁰, inadequate and delayed nephrology referral¹¹, lack of infrastructure, limited education and

financial constraints have severely hampered efforts of nephrology community to it¹². Identification of the risk factors are of paramount important as timely intervention, not only reduces the magnitude of renal injury but also stop a vicious circle of persistent proteinuria that leads to irreversible loss of renal function once established.

Current study aims to determine the frequency and factors leading to ESRD. Timely intervention as strict control of blood pressure (BP) in diabetic and hypertensive patients, reduction in proteinuria in nephritic patients adds in preserving the glomerular filtration rate (GFR). It delays the progression of renal disease in these patients. This study will also help in better understanding of frequency of risk factors leading to ESRD at local level and therefore will be helpful in designing better strategies to combat this silent killer.

MATERIAL AND METHODS:

This study was carried out in the Department of Nephrology, Lady Reading Hospital, Peshawar, from 5th August 2011 to 4th February 2012. 292 consecutive patients with highly suspected clinical features of ESRD, presented to nephrology OPD or to the emergency department of the institute, were admitted and gone through evaluation for establishing the diagnosis and the cause of ESRD.

Inclusion criteria:

All patients presenting with highly suspected clinical features of ESRD.

Patients aged 15 years and above of either gender.

Exclusion Criteria:

Patients with renal transplant having ESRD.

Patients already diagnosed with ESRD and admitted in ward or following up in outdoor.

Patients with liver diseases.

Informed consent was taken from each patient satisfying the inclusion and exclusion criteria. All patients underwent a detailed history, examination and a set of investigations including abdominal ultrasonography and GFR measurement by cock graft gault formula for the confirmation of ESRD. Once confirmed, all patients were carefully scrutinized for the common factors causing ESRD. All information was gathered and analyzed with SPSS version 10.

RESULTS:

Out of 292 patients, 176(60.3%) were male and 116(39.7%) were female, with male to female ratio 1.52:1. The age of the patients ranged from 19-64 yrs, with a mean age of 46.44+12.96 SD yrs.

Age wise division of patients was done into four categories; the most common age group for presenting with highly suspected clinical features of ESRD was 46-60 yrs. There were 52(17.8%) patients of the age <30 yrs, 65(22.3%) of age range 31-45 yrs, 127(43.5%) of age range 46-60 yrs and 48 (11.3%) presented at age >60 yrs. (Table 1).

ESRD was found in 59(20.2%) patients. The most common risk factor found was GN in 117(40.1%) patients, followed by HTN in 74(25.3%), DM in 33(11.3%) and renal calculi in 15(5.1%) patients. Distribution of ESRD was approximately same in proportion in all age groups. With age < or equal to 30 yrs have 21.2%, 31-45 yrs have 20%, 46-60 yrs age groups have 20.5% and patients having >60 yrs of age have 18.8% patients with ESRD. (Table 2).

Gender wise distribution of ESRD showed no difference, with 21% in male and 19% in female. DM was 10.8% in male as compared to 12.1% in female, renal calculi was 6.8% and 2.6%, HTN was 27.3% and 22.4%, while GN was 36.4% and 45.7% in male and female distribution respectively as the risk factors for ESRD. (Table 4).

DISCUSSION

CKD is an important chronic disease globally¹³. HTN has been documented as risk factors for CKD¹⁸. HTN occurs in 72 million people¹⁴ and second leading cause of ESRD in the US, accounts for 30% of the ESRD population¹⁵. Our study showed HTN to be a leading

Table No 1: Age wise distribution of patients in four categories

Age(yrs)	Frequency	%	Cumulative %
< 30	52	17.8	17.8
31 - 45	65	22.3	40.1
46 - 60	127	43.5	83.6
61 +	48	16.4	100.0
Total	292	100.0	

Table No 2: Age wise distribution of ESRD patients.

Age(yrs)	ESRD		Total
	Found	Not found	
<30	11(21.2%)	41(78.8%)	52(100%)
31-45	13(20%)	52(80%)	65(100%)
46-60	26(20.5%)	101(79.5%)	127(100%)
60 Onwards	9(8.8%)	39(81.2%)	48(100%)
Total	59(20.2%)	233(79.8%)	292(100%)

Table No 3: Common risk factors leading to ESRD

		No of patients	%
ESRD	Found	59	20.2%
	Not found	233	79.8%
Uncontrolled DM	Found	33	11.3%
	Not found	259	88.7%
Renal Calculi	Found	15	5.1%
	Not found	277	94.9%
Uncontrolled HTN	Found	74	25.3%
	Not found	218	74.7%
GN	Found	117	40.1%
	Not found	175	59.9%

Table No 4: Gender wise distribution of ESRD patients

		Gender			
		Male		Female	
		Patients (no)	%	Patients (no)	%
ESRD	Found	37	21.0%	22	19.0%
	Not found	139	79.0%	94	81.0%
Uncontrolled DM	Found	19	10.8%	14	12.1%
	Not found	157	89.2%	102	87.9%
Renal Calculi	Found	12	6.8%	3	2.6%
	Not found	164	93.2%	113	97.4%
Uncontrolled HTN	Found	48	27.3%	26	22.4%
	Not found	128	72.7%	90	77.6%
GN	Found	64	36.4%	53	45.7%
	Not found	112	63.6%	63	54.3%

cause of ESRD. REGARD study, in the US (n=2772 patients), suggests several BP indexes including diastolic BP, pulse pressure and mean arterial pressure may be associated with ESRD incidence but systolic BP may have the strongest association¹⁶. HTN incidence rates remain considerably higher in black individuals in all age groups¹⁷. A large prospective cohort study among Chinese population also showed that incidence and mortality of ESRD was much high in HTN i.e. 30.7 and 20.9 per 100,000 person-years in persons aged 40 years and older¹⁸. In another study, the incidence of ESRD, among 7827 patients with treatment resistant HTN and 2147 non resistant HTN was almost the same¹⁹.

DM remained the primary cause of incident ESRD, with reported rates of 148.8 cases per million in 2004¹⁷. In the US between 1994 and 2004, 423 white patients with type 1 DM and macro-albuminuria were followed. ESRD developed in 172 patients (incidence rate, 5.8/100 person-years), and 29 died without ESRD (mortality rate, 1/100 person-years). The 15-year cumulative risks were

52% for ESRD and 11% for pre-ESRD death²⁰.

Diabetes-related ESRD incidence in the diabetic population has declined in all age-groups in the US, probably because of a reduction in the prevalence of ESRD risk factors, improved treatment and care²². The same decline in diabetic ESRD is also confirmed by theUSRDS and the National Health Interview Survey as reported in the Centers for Disease Control and Prevention's report between 1990 and 2002²³. It is comforting to practitioners to attribute this improvement to a widely advocated regimen of reno-protection, consisting of careful regulation of BP, improved glycemic control, and lifestyle modification. There is need to clarify the source of this epidemiologic change that will lessen the projected burden on medical and socioeconomic resources in the immediate future²³. Our study also showed, DM to be an important risk factor in ESRD and further studies are suggested to keep ourselves updated about the changes in epidemiology.

On the other hand, in China, primary glomerular disease is the most common renal disease, IgAN represents >40% and the most important cause of ESRD. Diabetic nephropathy is less common but increasing progressively. There is a future trend toward an increase in the incidence of diabetic nephropathy²¹

In another study in China the main causes of ESRD were GN (45%), DM (19%), HTN (13%), polycystic kidney disease (2%) and others or unknown (20%)²⁴ and our study also confirmed, GN to be the leading cause of ESRD in this setup. Though GN is still the most common cause of ESRD in China; there is a changing trend in epidemiology. Studies have revealed that the prevalence of DM and HTN, are increasing dramatically²⁶. The change in epidemiology is confirmed in other reports. The cause of ESRD changed from chronic GN (32.1%) to DM (40.1%) as shown by Beijing HD Quality Control and Improvement Center reported the trends in incidence, prevalence, and mortality of ESRD patients on maintenance HD. The incidence increased from 94 pmp in 2007 to 147.3 pmp in 2010²⁵.

According to a questionnaire survey and some reports, education program for Chinese nephrologists and practitioners was proposed to be strengthened²⁶. With the epidemic rise of ESRD in many countries of the world, there is an urgent need to develop and implement strategies aiming at preventing the development and progression of CKD.

Our study also showed renal calculi as a cause of ESRD in 5.1% of patients with ESRD. In another follow up study, stone formers were at increased risk for CKD, sustained elevation in creatinine and a sustained reduced GFR²⁷. The proportion of nephrolithiasis related ESRD was 0.63% and mean delay of the evolution of the stone renal disease to chronic renal failure was 85.8 months. The feminine gender, obesity and elevated alkaline phosphatases >128 IU/L were significantly correlated with fast evolution of ESRD. The median evolution to ESRD was 12 months²⁸. In another study even a single kidney stone episode during follow-up was associated with a significant increase in the likelihood of adverse renal outcomes including ESRD²⁹

In USRDS 2012, since 2000, the age adjusted incident rate of ESRD has grown up in all age groups in 2010³⁰. Our study showed almost equal incident of ESRD from age <30-60 yrs, but did not show prominent gender differences in the frequency or risk factors of ESRD.

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