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Original Article

Clinical Profiles of Chronic Renal Failure Patients at Referral to Nephrologist

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ABSTRACT. The quality of care of patients with chronic renal failure (CRF) in their pre-dialysis state is known to have a significant impact on the mortality and morbidity of dialysis patients. We evaluated 78 patients with chronic renal disease who were referred to our center for Follow-up of nephrologists between June 2002 and July 2003. We studied the etiology of the disease and the different biological parameters at the time of first nephrology clinic visit. The mean age of the patients was above 52 years. Diabetes mellitus was the leading cause of CRF found in 28% of patients, followed by hypertension in 24% cases. Seventy percent of the patients were in a state of moderate and severe renal failure at referral with mean blood urea nitrogen (BUN) of 22 ± 13 mmol/L, serum creatinine of 390 ± 180 μ mol/L and creatinine clearance of 16.8 ± 14.2 ml/min. Our study suggests that the referring physicians should be more aware of the timing of referral of patients with CRF to nephrologists so that optimum pre-dialysis care can be ensured to improve the quality of life and better outcome of CRF patients.

Key Words: CRF patients, Renal function at referral, Najran area.

Introduction

The incidence and prevalence of chronic renal failure (CRF) have been steadily-surgin

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up worldwide¹ including Saudi Arabia,² and requiring increased dialysis and transplantation services that cause heavy economical burden to the health-care providers.¹ The incidence of end-stage renal disease (ESRD) in Saudi Arabia is reported as 110-120 per million populations per year.² There is an increased attention directed to care of patients of pre-ESRD, since it has been shown to play an important role in modifying the morbidity and

mortality of patients when started on dialysis.³ In spite of considerable efforts dedicated to the care of CRF patients, and the remarkable improvement in the quality of renal replacement therapy (RRT) such as increased dose of dialysis, and the use of erythropoietin and biocompatible membranes, the annual mortality among dialysis patients remains high. The mortality rate is 22% in America,⁴ 14.4% in Europe⁵ and 11% in Saudi Arabia.² This has resulted in the exploration of other modifiable factors that could improve the outcome of CRF patients on dialysis.

Timely referral to the nephrology clinic and quality of care before initiation of dialysis has been shown to significantly decrease the mortality/morbidity of CRF patients.³ Optimal early care involves the early detection of progressive renal disease, intervention to retard its progression, prevention of uremic complications, attenuation of co-morbid conditions and adequate preparation for RRT.

We designed this study to evaluate the current trend of referral of CRF patients at our nephrology clinic.

Patients and Methods

In this study, we studied the CRF patients who were referred for follow-up in our nephrology clinic at Prince Sultan Kidney and Heart Center (PSKHC), which is a tertiary care hospital in Najran, Saudi Arabia, between June 2002 and July 2003. At the time of the 1st visit, a preformed standardized form was used to record the disease history, age, sex, body weight, nationality, laboratory data, and the radiological assessment of kidneys (when available). Etiology of the chronic renal failure was determined upon the analysis of these above factors including biopsy reports, when available. The patients in whom history, physical examination, laboratory data did not reveal the cause of CRF and the kidneys

were not biopsied, were labeled as “unknown cause”. The laboratory data such as blood urea nitrogen (BUN), serum creatinine (s.cr.), proteinuria in 24-hours urine, serum calcium, serum potassium, serum albumin, and hemoglobin were recorded. The creatinine clearance rate (Ccr) was either directly measured by the standard urine and blood collection or calculated by the Cockcroft and Gault formula: $Ccr = (140 - \text{age}) \times \text{body weight (kg)} / \text{serum creatinine (mg/dl)} \times 72$. The calculated clearance was reduced by 15% for women, 20% for paraplegic, and 40% for quadriplegic patients. All referral patients were stratified into three groups based on their serum creatinine level at referral: mild renal impairment (s cr < 300 $\mu\text{mol/L}$); moderate renal impairment (s cr > 300 and $\leq 550 \mu\text{mol/L}$); and severe renal impairment (s cr > 550 $\mu\text{mol/L}$). This classification was mainly used for planning and scheduling of patients in the clinic, besides management during the follow-up. All data are expressed as the mean \pm SD.

Results

A total of 78 patients with CRF were referred from different disciplines to our nephrology clinic during the period of the study. There were 45 males (58%) and 62 Saudis (80%). The mean age was 52 ± 27 years and ranged from 14 to 90 years.

Diabetic nephropathy was the commonest cause of CRF diagnosed in 22 (28%) patients followed by hypertension in 19 (24%) cases. The cause of CRF was unknown in 18 (23%) patients and biopsy proven glomerulonephritis was in 8 (11%) patients. Obstructive uropathy was the cause of CRF in 6 (8%) patients and other diseases was the diagnosis in 5 (6%) of patients.

The ultrasound study of renal tract was available on 20 (26%) patients; 13 had atrophied kidneys, five had normal sized

Table 1. Laboratory parameters of the study patients at the time of referral to the nephrologist.

Parameters	Mean values	Range values
BUN (mmol/L)	21.9 ± 13.6	8 – 50
Serum creatinine (µmol/L)	390 ± 180	142 – 958
Ccr (ml/min)	16.8 ± 14.2	4 – 52
Proteinuria (g/day)	1.8 ± 0.9	0.5 – 4.2
Hemoglobin (g/dl)	11.2 ± 3.3	7.3 – 15
Serum albumin (g/L)	34.0 ± 5.3	26 – 45
Potassium (mmol/L)	4.7 ± 1.2	3.2 – 6.5
Calcium (mmol/L)	2.1 ± 0.3	1.7 – 2.6

BUN = blood urea nitrogen; Ccr = creatinine clearance.

kidneys, and two had features of obstructive uropathy.

The laboratory parameters at the time of referral are shown in Table 1. The mean serum creatinine was 390 ± 180 µmol/L and the mean creatinine clearance rate was 16.8 ± 14.2 ml/min. Twenty seven (35%) patients were found to have creatinine clearance (Ccr) equal or below 10 ml/min. Hyperkalemia (potassium > 5.2 mmol/L) was found in 31 (40%) patients and hypocalcemia (calcium < 2.1 mmol/L) was in 14 (18%) patients. The mean serum albumin level was 34.0 ± 5.3 g/L and in 15 (19%) patients serum albumin was below 35 g/L. The mean hemoglobin (Hb) at referral was 11.2 ± 3.3 g/dl and in 16 (20%) patients, Hb was below 100 g/L. No patient was receiving any erythropoietin therapy.

Table 2 shows the severity of the CRF at time of referral. There were 23 (30%) patients in mild, 39 (50%) patients in moderate and 16(20%) patients in severe renal failure.

Discussion

The mean age of the referred CRF patients was above 52 years, which indicates that the number of older group of patients who are potential candidates for dialysis is increasing and this trend is in accordance with the recent international reports;⁶ This increase is due to the entry of large number of new CRF

patients over 65 years of age. In these aged patients, we should expect more associated co-morbid conditions that warrant a timely multidisciplinary approach towards the management of chronic renal diseases and co-morbid conditions to improve the quality of life and decrease the morbidity/mortality.

Diabetes mellitus (DM) was found the most common cause of CRF in our study, which is consistent with the published data from USA,¹ Europe,⁷ Japan⁸ and Saudi Arabia.² DM involves various organ systems of the body other than kidney, which makes its management difficult and challenging.

Our finding of 23% of the CRF patients with unknown etiology indicates that the patients are still referred to nephrology clinic much later than optimal. The exact etiology of CRF in many cases depends on renal biopsy that should have been performed at an early stage of the disease process.

Hypertension was also highly prevalent in our study, which was similar to that reported in the literature.⁹ Hypertension is not only a cause but also a consequence of CRF. So the prevalence of hypertension in our study does not reflect the real figure as the majority of the referred patients were in a state of moderate/severe renal failure.

However, the exact cause of CRF is difficult to determine in the developing countries, since medical facilities are still limited and unevenly

Table 2. The degree of renal failure according to the serum creatinine level at the time of referral to the nephrologist.

Severity of renal failure	Mean s cr.	No of patients
Mild renal failure (s cr. \leq 300 $\mu\text{mol/L}$)	222 \pm 57 $\mu\text{mol/L}$	23 (30%)
Moderate renal failure (s cr. >300 & <550 $\mu\text{mol/L}$)	385 \pm 71 $\mu\text{mol/L}$	39 (50%)
Severe renal failure (s cr. \geq 550 $\mu\text{mol/L}$)	688 \pm 128 $\mu\text{mol/L}$	16 (20%)

S cr. = serum creatinine.

distributed between urban and rural areas, hence etiology remains largely speculative in many cases.

The low incidence of primary glomerular diseases in our study could be due to the fact that only biopsy proven cases were included in this group. Moreover, biopsy is not practiced uniformly in all nephrology centers of the country either due to the lack of facility or due to reluctance of the physicians and/or patients. Therefore, the possibility of misclassification of patients with chronic glomerular diseases into the hypertensive group or unknown group can not be ruled out.

There is growing awareness of a need not only to identify patients with CRF at an earlier stage of the disease but also to initiate treatment strategies earlier, in order to delay both progression of CRF and co-morbid diseases.¹⁰ Fifty percent of our referred patients were in a state of moderate renal failure and twenty percent was in severe renal failure, which is relatively higher than the international trend.¹¹ This suggests the reluctance of physicians to refer the patients to the nephrologists with lower serum creatinine level as has been reported by other studies.¹²

A number of explanations can be considered for the late referral of patients such as the progression of CRF being insidious in the majority of cases, uremic symptoms appearing late, and the insensitivity of the current screening tools such as serum creatinine to identify patients in early stage of disease. Furthermore, the physicians and patients attitudes are other barriers to early referral. The large majority of these patients are often

treated by general practitioners or internists, in remote medical units, without any distinct guidelines and facilities.

The challenge, currently facing nephrologists is both how to minimize the consequences of late referral and how to improve the timelines of referral. To resolve this issue, nephrologists should take the responsibility of developing guidelines according to local needs and facilities, and convey them to their colleagues who provide primary care directly.

Pre-dialysis stage of CRF requires cost-effective management. Previous studies suggest that early pre-dialysis treatment of CRF patients offers better survival before and after the commencement of dialysis.¹³ Moreover, early referral to the nephrologist has been shown to delay the onset of renal replacement therapy (RRT) due to stabilization or even improvement of renal function in many cases and thus reducing the cost of care for patients and health care providers.^{13,14}

Although many different definitions have been used for "an early referral", it is suggested that patients with serum creatinine above 150 $\mu\text{mol/L}$ should be referred since it is increasingly recognized that creatinine as low as 300 $\mu\text{mol/L}$ may reflect ESRD in some patients.

The Canadian Society of Nephrology guidelines and others¹⁵ recommend that at least 12 months are needed prior to initiation of dialysis for adequate medical and psychological preparation as reported by others. It is therefore recommended that active interventions are mandatory to promote early diagnosis and early referral of patients with

chronic renal disease to the nephrology services to improve the quality of life and decrease the mortality and morbidity of the CRF patients.

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