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An audit of end-stage renal disease in a tertiary care hospital

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2012, 29(2):207–211

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OBJECTIVE **To document the clinical profile of hemodialysis patients in a tertiary care hospital.** METHOD **The records of all patients hospitalized in the dialysis unit of the Alnoor Specialist Hospital, Makkah, Saudi Arabia, from 1 January 2000 to 31 December 2004 were reviewed. The age, sex, nationality, blood group, causes of renal failure, type of dialysis, evidence of viral infection, anemia and thrombocytopenia were recorded.** RESULTS **A total 1,357 patients were recorded, with predominance of Saudi nationality, 705 (51.9%), and male sex, 1,227 (90.4%). The age group 26–45 years was represented by 36.3% of the patients, and 686 (50.6%) had blood group O. The leading cause of renal failure was hypertension (45.9%). The majority of patients had HCV+ (78.2%), 6.9% had HBsAg+ and HIV was found only in one case, while the remaining patients (14.8%) had no indexes of viral infection. The percentage of patients who received erythropoietin was 71.1%. A hematocrit of <30% was recorded in 55.3% and albumin <30 g/dL in 35.4% of patients. Mortality among hemodialysis patients during the 5 years was 8.84%.** CONCLUSIONS **The majority of patients on hemodialysis were Saudis and hypertension was the leading cause of end stage renal failure. The recorded mortality over 5 years was less than 10%.**

Έλεγχος νεφροπάθειας τελικού σταδίου σε ένα τριτοβάθμιο νοσοκομείο

Περίληψη στο τέλος του άρθρου

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Chronic kidney disease (CKD) is a worldwide public health problem. More than one million individuals in the world are on maintenance dialysis, a number that is expected to double in the next decade. Access to dialysis differs significantly between developed and developing nations. Close to 80% of the world dialysis population is treated in Europe, North America and Japan, regions which together represent 12% of the world's population. The remaining dialysis patients are treated in the developing world.[1]

Kidney disease is affecting increasing numbers of individuals in the 21st century,[2] and acute renal failure is a significant cause of morbidity and mortality in both adults and children. Despite advances in understanding the pathophysiology of acute renal failure, little progress has been made in its treatment.[3]

The prevalence of both acute and chronic renal failure (CRF) is high in the Arab world. Data on the exact prevalence of the various renal diseases are very limited, but the reported prevalence of CRF is 80 to 120 per million population (pmp) in the Kingdom of Saudi Arabia and 225 pmp in Egypt. This is in comparison with the reported prevalence of 283 pmp in Europe, 975 pmp in the United States and 1,149 pmp in Japan. The lower prevalence rates reported in the Arab region could be due to underreporting. The economic burden of renal replacement on health care providers is enormous.[4]

A marked rise in the prevalence and incidence of end stage CKD in Saudi Arabia has been observed over the last 3 decades. This increase exceeded that reported in many other countries. The extensive and rapid changes in lifestyle, the high population growth and fast increase in life expectancy, and mass urbanization that have occurred over this period have combined to result in the current difference in CKD status. The two major factors that influence the CKD status are the shift in age demographics and the very high rate of diabetic nephropathy.[5]

The main objective of this study was to document the clinical profile of hemodialysis patients in the Alnoor Specialist Hospital over a period of 5 years.

MATERIAL AND METHOD

This observational retrospective study was conducted for

the 5 year period from 1 January 2000 to 31 December 2004, in the nephrology unit of the Alnoor Specialist Hospital, a teaching tertiary care referral unit in the Makkah region of Saudi Arabia. The dialysis unit was established in 1409 hijra (1989 AD), starting with only 7 dialysis machines, but now it has 81. The study data were retrieved from the patient files and dialysis charts of patients who received dialysis treatment in the unit. For each year all the patients who were either on regular or non-regular dialysis, and all new cases, were considered as separate (new) subjects.

All patients had undergone full medical history recording and thorough physical examination including fundoscopy. The clinical investigations included complete blood count, blood urea, creatinine, creatinine clearance, blood electrolytes, blood glucose, arterial blood gases, liver function tests, urinalysis, chest X-ray, electrocardiogram (ECG), ultrasound (US) of the kidneys and abdomen, viral hepatitis screening and human immunodeficiency virus (HIV) antibody testing; further tests such as renal biopsy and echocardiography were performed when appropriate.

Diabetes mellitus (DM) was considered to be the cause of CRF when a patient had been diabetic for many years, with the presence of retinopathy, creatinine clearance of less than 15 mL/min and normal sized kidneys on US.

The patients with CRF who had pathological proteinuria (>200 mg/day) and normal or small kidneys and who ultimately developed end-stage renal disease (ESRD) with small kidneys were labeled as chronic glomerulonephritis whether or not a biopsy was obtained.

Essential hypertension was considered to be the cause of ESRD only if the patients had a history of hypertension and normal sized kidneys before the development of CRF, in the absence of pathological proteinuria.

The patients who presented with ESRD, and with small kidneys, for the first time in whom no obvious definitive cause could be found were labeled as unknown etiology. The prevalence of hepatitis B (HBV) and C (HCV) and HIV viruses for each subject during each year was recorded.

The methods used for the diagnosis of pyelonephritis and obstructive uropathy were US, retrograde pyelography, cystoscopy, and or isotope renal scan. Pyelonephritis was diagnosed on the basis of a history of recurrent urinary tract infections and demonstrable renal scarring, while obstruction was based on findings of pelvicalyceal dilatation on X-ray or US.

Data were gathered concerning age, sex, nationality, blood group, causes of renal failure, type of dialysis, presence of viral infection, anemia and thrombocytopenia, and mortality among dialysis patients. Demographic data was classified divided into age groups (i.e., <5, 5–9, 10–15, 16–25, 26–45, 46–55, 56–65, 66–75, >75 years), sex, and nationality (i.e., Saudi and non-Saudi).

RESULTS

The total number of dialysis patients over the 5-year study period was 1,357, the majority of whom were Saudi, 227 (90.4%) and male, 705 (51%). The largest group of the dialysis patients were in the age bracket 26–45 years, which represented 36.3% of the patients, followed by the age group 46–55 years with 18.9%, and the lowest percentage (0.1%) was in the age group <5 years (tab. 1).

Blood group O was the most frequent blood group among the patients, 686 (50.6%), followed by group A, 405 (29.9%). The leading cause of renal failure was hypertension (45.9%) followed by DM (17.7%). The majority of the patients had HCV+ (78.2%) while HIV was positive in only one case. Erythropoietin was received by 71.1% of patients and a hematocrit of <30% was found in 55.3% of patients. Peritoneal dialysis was conducted in 24 patients (1.8%). The mortality among hemodialysis patients over the 5 year period was 8.8% (tab. 2).

DISCUSSION

CKD is a major social health problem which is increasing because of the aging of the population, the high incidence of DM and the epidemic of silent CKD resulting from inadequate diagnosis of early chronic renal insufficiency.[6]

In Japan, the mean age at the start of dialysis was estimated at 51.5 years for men and 52.5 years for women in 1983, increasing to 63.8 years for men and 66.1 years for women in 2002. The sex difference in mean age at the start of dialysis increased from 0.9 years in 1983 to 2.3 years in 2002.[7] These numbers agree with the present study, where the largest age group of dialysis patients was the 26–45 years group, which represented 36.3%, followed by the 46–55 years group, 18.9%. DM and hypertension were the underlying causes in most cases of CKD. Evidence has supported the concept that progression to kidney failure can be delayed or prevented by controlling blood sugar levels and blood pressure and by treating proteinuria.[8]

The African-American community comprises approximately 12.4% of the total American population and accounts for 30.8% of patients diagnosed with ESRD. Two major causes of ESRD are hypertension and type 2 DM,[9] as found in the present study. In a pilot study performed in Galicia, Spain in the last quarter of 2004, patients with CKD were found to have a high prevalence of hypertension (31.5%), isolated systolic hypertension (20.1%), DM (8%), obesity (13.1%), smoking habit (22.7%), and high alcohol intake (24%).[6] In the Gassim region of Saudi Arabia, systemic hypertension (47%), followed by hereditary/congenital conditions (23%) and non-insulin dependent DM (NIDDM) (19%) were the most common causes of ESRD.[10] In a pro-

Table 1. Demographic data of patients with end-stage renal disease on dialysis.

Variables	Years of study					Total* (n=1,357)
	2000 (n=245)	2001 (n=262)	2002 (n=256)	2003 (n=305)	2004 (n=289)	
Nationality						
Saudi	89	88.5	89.1	92.1	92.7	1,227 (90.6)
Non-Saudi	11	11.5	10.9	7.9	7.3	130 (9.4)
Sex						
Male	51.4	52.3	50.8	53.4	51.6	705 (52)
Female	48.6	47.7	49.2	46.6	48.4	652 (48)
Age groups in years						
< 5	0.4	0.0	0.0	0.0	0.0	1 (0.1)
5–9	0.0	1.1	0.0	0.7	2.4	12 (0.9)
10–15	3.3	4.2	3.5	4.6	2.8	50 (3.7)
16–25	9.0	11.1	11.7	13.8	10.7	154 (11.3)
26–45	37.6	34.4	32.8	37.7	38.4	492 (36.3)
45–55	21.2	20.2	21.9	14.8	17.6	257 (18.9)
55–65	16.7	19.5	17.2	17.0	17.3	238 (17.5)
65–75	0.0	8.0	12.1	10.5	9.0	110 (8.1)
> 75	11.8	1.5	0.8	1.0	1.7	43 (3.2)

Data are presented in %

*Data are presented in n (%)

spective study on ESRD patients in Madinah Munawarah, Saudi Arabia the highest incidence (40.6%) was in the age group 40–59 years, with predominance of males (61.6%). DM was the major etiology of ESRD in this area (42.5%).[11] In Jeddah, Saudi Arabia it was found that hypertension and DM constitute the most frequently known causes of ESRD among hemodialyzed (HD) patients.[12]

On the other hand, in the Asir region of Saudi Arabia, glomerulonephritis was the most common reported cause of ESRD, followed by DM.[13] In the present study, the leading cause of renal failure was hypertension (45.9%) followed by DM (17.7%) and peri-glomerular disease. Studies in India and Pakistan showed chronic glomerulonephritis to be the most common cause, accounting for more than one third of patients, while diabetic nephropathy accounted for approximately 20% of all patients with ESRD in India.[14]

The prevalence of hepatitis C varies according to geographical areas and risk groups. Patients with terminal chronic renal failure (TCRF) under dialysis are an important risk group for hepatitis C. In Peru, HCV infection rates in patients under hemodialysis reach 90%. The prevalence and incidence of hepatitis B in hemodialysis patients in Croatia have been estimated to 1.3% and 0.03%, respectively.[15] This is in agreement with the present study, where most of the patients (78.2%) were HCV+ and only 6.9% were HBsAg+, while only one case (0.2%) was HIV+.

Because of lack of effective medical intervention, 65–92% of ESRD patients with acute hepatitis C become chronically infected; thus the high prevalence of HCV infection in ESRD patients is due to high rates of acute HCV infection and chronicity after acute infection. The reported prevalence rates of chronic HCV infection among ESRD patients ranges from 3.4% to 80% with great geographical variation. The higher incidence and prevalence rates of HCV infection among ESRD patients indicate the possible routes of nosocomial transmission, such as contamination of the hands of staff members, sharing items between patients, dialyzer reuse, and contamination of dialysis machines.[16]

Anemia associated with CKD remains a major concern for nephrologists as it significantly increases the morbidity and mortality in this patient group. The introduction of erythropoietin has dramatically changed the treatment of anemia in uremic patients.[17] In the present study, 71.1% of the patients received erythropoietin, while patients with a hematocrit value <30% was 55.3%. The mortality among hemodialysis patients during the five year period 2000–2004 was 8.84%, with a range between 6.57% and 10.8%.

In conclusion, the majority of patients on dialysis in the study unit were male and Saudis. Hypertension was the leading cause of ESRD, followed by DM. The recorded mortality was less than 10%.

Table 2. Clinical profile of patients with end-stage renal disease on dialysis.

Variables		2000	2001	2002	2003	2004	Total*
Blood groups of patients	A	28.2	28.6	30.9	31.1	30.1	405 (29.8)
	B	14.3	14.5	14.5	17.7	17.3	214 (15.8)
	AB	3.7	3.8	3.9	3.3	4.5	52 (3.8)
	O	53.9	53.1	50.8	47.9	48.1	686 (50.6)
Patients with hepatitis and HIV	HCV+	43.7	76.3	89.8	93.8	82.4	1,061 (78.2)
	HBsAg+	8.2	6.9	5.9	6.2	7.3	93 (6.9)
	HIV+	0.4	0.4	0.0	0.0	0.0	2 (0.1)
	Normal	47.8	16.4	4.3	0.0	10.4	201 (14.1)
Anemia and hypoalbuminemia	Erythropoietin treatment	32.7	35.1	80.1	99.0	99.0	966 (71.2)
	Hematocrit <30%	36.7	53.4	65.2	55.7	63.3	750 (55.3)
	Albumin <30 g/dL	28.2	45.8	77.0	23.0	8.3	480 (35.4)
Leading causes of renal failure	Diabetes mellitus	13.1	15.6	19.9	18.0	21.1	240 (17.7)
	Hypertension	37.1	47.3	45.3	45.6	52.9	623 (45.9)
	Pregnancy related	0.8	0.8	0.8	0.0	0.0	6 (0.4)
	Vasculitis	1.2	0.4	1.2	1.0	0.0	10 (0.7)
	Congenital malformation	2.0	0.8	2.0	2.0	1.0	21 (1.5)
	Primary tubular disease	5.3	4.2	4.7	3.9	2.4	55 (4.1)
	Hereditofamilial disease	6.9	3.4	4.3	3.9	4.2	61 (4.5)
	Obstructive uropathy	5.3	3.8	3.5	2.6	3.5	50 (3.7)
	Glomerular disease	20.4	14.9	12.1	17.7	14.2	215 (15.8)
	Unknown	1.2	0.8	0.8	1.3	0.7	13 (1)
Peritoneal dialysis*		2 (0.8)	4 (1.5)	2 (0.8)	9 (2.9)	7 (2.4)	24 (1.8)
Mortality*		21 (8.6)	27 (10.3)	20 (7.8)	33 (10.8)	19 (6.6)	124 (8.8)

Date are expressed in %

*Data are expressed in n (%)

Recommendation

Appropriate management of hypertension, DM and glomerular disease will reduce the occurrence of ESRD. There is a need for further research in all aspects of prevention and treatment to delineate the role of the various factors that affect ESRD in Saudi Arabia, with the overall goal of preventing development of the disease in the population.

ETHICAL ISSUES

The study protocol was approved by the institutional review board.

CONFLICT OF INTEREST

We declare that we have no financial or personal relationship(s), which may have inappropriately influenced us in writing this paper.

ΠΕΡΙΛΗΨΗ

Έλεγχος νεφροπάθειας τελικού σταδίου σε ένα τριτοβάθμιο νοσοκομείο

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ΣΚΟΠΟΣ Καταγραφή του κλινικού προφίλ των ασθενών που υποβάλλονταν σε αιμοκάθαρση σε ένα τριτοβάθμιο νοσοκομείο. **ΥΛΙΚΟ-ΜΕΘΟΔΟΣ** Έγινε ανασκόπηση των αρχείων όλων των ασθενών που νοσηλεύτηκαν στη μονάδα

αιμοκάθαρσης του νοσοκομείου Alnoor Specialist, στη Makkah της Σαουδικής Αραβίας κατά το χρονικό διάστημα από 01.01.2000–31.12.2004. Καταγράφηκαν η ηλικία, το φύλο, η εθνικότητα, η ομάδα αίματος, τα αίτια της νεφρικής ανεπάρκειας, το είδος της αιμοκάθαρσης, οι ενδείξεις ιογενούς λοίμωξης, η αναιμία και η θρομβοπενία. **ΑΠΟΤΕΛΕΣΜΑΤΑ** Έγινε καταγραφή 1.357 συνολικά ασθενών, από τους οποίους οι 705 (51,9%) ήταν Σαουδάραβες στην εθνικότητα και οι 1.227 από αυτούς ήταν άρρενες (90,4%). Η ηλικιακή ομάδα των 26–45 ετών αντιπροσώπευε το 36,3% των ασθενών και οι 686 (50,6%) είχαν ομάδα αίματος Ο. Η κυρίαρχη αιτία της νεφρικής ανεπάρκειας ήταν η υπέρταση (45,9%). Η πλειοψηφία των ασθενών ήταν θετικοί σε HCV (78,2%), ποσοστό 6,9% ήταν θετικοί σε HBsAg, ενώ εντοπίστηκε μόνο μία περίπτωση ασθενούς HIV+ και οι υπόλοιποι ασθενείς (14,8%) δεν είχαν εργαστηριακές ενδείξεις ιογενούς λοίμωξης. Το ποσοστό των ασθενών που έλαβαν ερυθροποιητίνη ανερχόταν σε 71,1%. Τιμές αιματοκρίτη <30% καταγράφηκαν σε ποσοστό 55,3% των ασθενών και επίπεδα λευκωματίνης <30 g/dL στο 35,4% των ασθενών. Η θνησιμότητα μεταξύ των ασθενών που υποβλήθηκαν σε αιμοκάθαρση κατά τη διάρκεια των 5 ετών ανήλθε σε ποσοστό 8,84%. **ΣΥΜΠΕΡΑΣΜΑΤΑ** Η πλειονότητα των ασθενών που υποβάλλονταν σε αιμοκάθαρση ήταν Σαουδάραβες και η υπέρταση αποτελούσε την κυρίαρχη αιτία για τελικού σταδίου νεφρική ανεπάρκεια. Η θνησιμότητα που καταγράφηκε κατά τη διάρκεια των 5 ετών ήταν <10%.

Λέξεις ευρετηρίου: Αιμοκάθαρση, Θνησιμότητα, Κλινικό προφίλ, Νεφρική νόσος

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