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Hari Krishan AGGARWAL[1]
Deepak JAIN[1]
Vipin KAVERAPPA[1]
Ashwani KUMAR[1]
Sachin YADAV[1]
Promil JAIN[2]

RESEARCH

SPECTRUM OF RENAL DISEASES IN OLDER POPULATION IN A TERTIARY CARE HOSPITAL SETTING

ABSTRACT

Introduction: Older population is increasing worldwide due to increased life expectancy. Therefore the present study was conducted to see the spectrum of renal diseases in them.

Materials and Method: This retrospective study included 848 patients above the age of 60 years, at Kidney and Dialysis clinic, PGIMS, Rohtak (India) from Jan'2005 to Dec'2009. Patients were analysed based on clinical presentation, biochemical, and sonographic parameters and classified under different categories of renal diseases.

Results: The mean age of patients was 68.72±5.44 years. There were 65% males and 35% females. Chronic kidney disease was the commonest presentation, seen in 72.64% of patients. Acute kidney injury accounted for 16.03% whereas 8.49% of the patients had nephrotic syndrome. Chronic glomerulonephritis (27.27%) and diabetic nephropathy (23.37%) were the leading causes for chronic kidney disease. In patients presenting with acute kidney injury, 58.82% and 41.18% had an underlying medical and surgical cause respectively. Infectious diseases and dehydration were the most common medical causes. Membranous glomerulopathy was the most common cause (33.33%) of primary nephrotic syndrome.

Conclusion: Only very few studies are available on the spectrum of renal disease in older age group. So a more detailed assessment is necessary for better resource management, especially in developing countries.

Key Words: Geriatrics; Acute Kidney Injury; Renal Insufficiency; Chronic; Nephrotic Syndrome.

ARAŞTIRMA

ÜÇÜNCÜ BASAMAK BİR HİZMET HASTANESİNDE YAŞLILAR ARASINDA BÖBREK HASTALIKLARI SPEKTRUMU

ÖZ

Giriş: Doğuşta beklenen yaşam süresinin uzamasına bağlı olarak dünyada yaşlı nüfus artmaktadır. Bu amaçla, bu çalışmada yaşlı nüfusa ilişkin böbrek hastalıklarının spektrumunun incelenmesi amaçlanmıştır.

Gereç ve Yöntem: Bu retrospektif çalışma, Hindistan'da, Rohtkak Böbrek ve Diyaliz Hastanesi'ne Ocak 2005 ve Aralık 2009 yılları arasında başvuran 60 yaş üzeri 848 hastayı kapsamaktadır. Hastaların değerlendirmeleri klinik değerlendirmeler, biyokimyasal ve sonografik parametreler açısından ve böbrek hastalıklarının sınıflandırması üzerinden yapılmıştır.

Bulgular: Hastaların yaş ortalaması 68.72±5.44 olarak bulundu. Katılımcıların %65'i erkek ve %35'I kadındı. Kronik böbrek hastalığı, toplam hastaların %72.64'ünde olup en sık görülen durumdu. Akut böbrek yaralanması sıklığı %16.03 ve nefrotik sendrom yüzdesi %8.4 olarak saptandı. Kronik glomerülopati (%27.27) ve diyabetik nefropati (%23.37) kronik böbrek hastalığının en sık görüne nedenleriydi. Akut böbrek yaralanması olan hastalarda bu yaralanmanın %58.82'sinde tıbbi ve %41.18'inde de cerrahi bir neden olduğu belirlendi. En sık görülen tıbbi nedenler enfeksiyon hastalıkları ve dehidratasyon olarak saptandı. Membranöz glomerülopati ise primer nefrotik sendromun en sık nedeni olarak belirlendi (%33.33).

Sonuç: Yaşlılar arasında böbrek hastalıklarının spektrumunu ortaya koyan az sayıda çalışma vardır. Özellikle gelişmekte olan ülkelerde daha ayrıntılı çalışmaların yapılmasına gereksinim bulunmaktadır.

Anahtar Sözcükler: Geriatri; Akut Böbrek Yaralanması; Renal Yetmezlik; Kronik Nefrotik Sendrom.

İletişim *(Correspondance)*

Hari Krishan AGGARWAL
Pt. B. D. Sharma Postgraduate Institute of Medical Sciences Rohtak-124001 (Haryana) INDIA, Department of Medicine, Rohtak HİNDİSTAN

Tlf: 919416147887
e-posta: hariaggarwal@rediffmail.com

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[1] Pt. B. D. Sharma Postgraduate Institute of Medical Sciences Rohtak- 124001 (Haryana) INDIA, Department of Medicine, Rohtak HİNDİSTAN
[2] Pt. B. D. Sharma Postgraduate Institute of Medical Sciences Rohtak- 124001(Haryana) INDIA, Department of Pathlogy, Rohtak HİNDİSTAN

Introduction

Renal diseases are one of the common diseases causing high morbidity and mortality in otherwise asymptomatic individuals. The spectrum of renal diseases varies significantly in different parts of the world and is influenced by geographical, environmental and socioeconomic factors in that region. In addition, the spectrum also varies depending upon the population group being studied: community, outdoor patients or inpatients of a general/tertiary care hospital. Apparent geographical variations in the cause of chronic renal disease have been well documented (1).

With increase in longevity, the older population is increasing worldwide. The older population is more prone to the deleterious effects of renal diseases, be it an acute insult to the normal renal functions or a chronic disease. In India, the older population accounts for 7.5% of the total population. This being a dependent group, the magnitude of the problem needs to be assessed carefully for proper planning and management of funds in this sector. For a developing country like India, where there is no definite government based insurance system, majority of the patients have to support themselves financially for their health needs. In view of the above facts a tertiary government hospital would best represent the spectrum of renal diseases, requiring hospital care.

In spite of nephrology as a speciality since seventies, there is paucity of data regarding the spectrum of renal diseases in India. Available literatures from few hospitals across the country show data on specific clinical syndromes of renal diseases or specific renal diseases rather than the spectrum as a whole. In the studies which have been published, the spectrums of renal diseases have been defined as specific syndromes: including chronic kidney diseases, acute kidney injury, glomerulonephritis, renovascular hypertension and renal amyloidosis. Therefore the present study has been planned with an aim to see the spectrum of renal diseases in older patients in a tertiary care setting in India.

Materials and Method

The study was carried out in the department of Nephrology, Pt. B. D. Sharma PGIMS, Rohtak (India). It was a retrospective, monocentric study. Total duration of the study was 5 years, from Jan. 2005 to Dec. 2009. The records of patients of more than 60 years of age, who presented at Kidney and Dialysis Clinic and were admitted at PGIMS, Rohtak during the above mentioned period were analysed based on clinical presentation, biochemical, sonographic parameters and histopathological examination of renal biopsy. The study was approved by PG board of studies of the institute and ethical committee of university of health sciences Rohtak (India). The cut off age has been reduced to 60 years in this study to define older population due to variation in life expectancy in Indian population as compared to their western counterparts.

These patients were classified under various categories of renal diseases which included acute kidney injury (AKI), chronic kidney disease (CKD), nephrotic syndrome, obstructive uropathy and miscellaneous categories. These categories were further sub-classified based on the available data.

AKI was defined when there was elevation of serum creatinine more than 50% of basal values or absolute creatinine of 0.5-1.0 mg/dl despite correction of fluids and electrolytes. The diagnosis of CKD was made; when serum creatinine concentration was elevated persistently for more than 2 mg/dl with no evidence of recovery over the next three months, clinical features of CKD and/or azotemic symptoms of more than three months duration and evidence of bilateral contracted kidneys. Exception to the latter included polycystic kidney disease, diabetic nephropathy, amyloidosis and multiple myeloma. Nephrotic syndrome was defined as proteinuria more than 3.5 g/day with hypoproteinemia, hyperlipidemia, oedema and hypercoagulability. Hypoproteinemia was defined as serum protein levels less than 6 gm/dL, whereas hyperlipidemia was defined as elevated concentration of any or all of the lipids in plasma. Aetiology was based on histopathological documentation as per the standard criteria.The results were analysed and represented in percentage.

Results

A total of 848 older patients presented between Jan 2005 and Dec 2009, out of which 552(65%) were males and 296(35%) were females. Mean age was 68.72±5.44 years. CKD was the commonest presentation and was seen in 72.64% of the patients. AKI was the second most common presentation followed by nephrotic syndrome (Table 1).

Among 136 patients presenting with AKI, 58.82% had underlying medical cause whereas surgical causes accounted for 41.18% of the cases. Acute gastroenteritis was the commonest underlying medical cause accounting for 17.64% of patients followed by congestive heart failure and hepato-renal syndrome. Falciparum malaria, septicaemia and drugs also played a significant role in acute deterioration of renal func-

Table 1— Spectrum of Renal Diseases in Older.

	n	%
AKI	136	16.03
CKD	616	72.64
Nephrotic syndrome	72	8.49
Renal artery stenosis	16	1.89
Renal cell carcinoma	08	0.95
Total	**848**	**100.00**

tions. Amongst the surgical causes, benign hypertrophy of prostate was the most common aetiology resulting in AKI (Table 2).

Out of 616 patients presenting with CKD, the commonest presentation was chronic glomerulonephritis which accounted for 27.27% of the patients. Diabetic nephropathy was seen in 23.37% of these patients. Chronic interstitial nephritis, benign nephrosclerosis and obstructive Uropathy were the other significant causes of CKD. Among 2.59% of the patient population the primary pathological process could not be attributed to any defined aetiology and was classified as miscellaneous (Table 3).

Among 72 patients who presented with nephrotic syndrome, renal biopsy was done in 59 patients. One third of the patients had histo-pathological features attributable to membranous glomerulopathy. Minimal change disease was the second most common aetiology. The other histo-pathological variants included focal segmental glomerulosclerosis and renal amyloidosis (Table 4).

Table 2— Causes of AKI.

	n	%
Medical Causes		
Acute gastroenteritis	24	17.64
Septicemia	08	5.88
Falciparum malaria	08	5.88
Congestive cardiac failure	16	11.76
Hepato-renal syndrome	16	11.76
Drugs and poisoning	08	5.88
Surgical causes		
Post-operative and trauma	24	17.64
BPH	32	23.52
Total	**136**	**100.00**

Table 3— Causes of CKDs.

	n	%
Chronic glomerulonephritis	168	27.27
Diabetic nephropathy	144	23.37
Chronic interstitial nephritis	112	18.18
Benign nephrosclerosis	96	15.58
Amyloidosis	16	2.59
ADPKD	16	2.59
Obstruction		
• Calculus	08	1.29
• Non-calculus	40	6.49
Miscellaneous	16	2.59
Total	**616**	**100.00**

Discussion

With increasing life expectancy, proportion of older men and women suffering from renal disorders is on the rising trend. Greater proportions of older population are now seen occupying hospital beds with problems related to their kidneys.

Out of 848 older patients with renal diseases, CKD was the commonest presentation and was seen in 616 patients followed AKI seen in 136 patients. Nephrotic syndrome followed with 72 patients, with renal artery stenosis and renal cell carcinoma contributing to 16 and 8 cases respectively.

AKI is becoming increasingly common in older people. Age-related changes in the renal and immunological system with the presence of multiple comorbidities render older patients more prone to renal injury. Hypovolemia, sepsis, iatrogenic complications related to drug toxicity, and perioperative complications therefore often occur in older patients. Although AKI is treated in the same way in older individuals and younger patients, older individuals are more vulnerable to

Table 4— Causes of Nephrotic Syndrome.

	n	%
Membranous glomerulopathy	24	33.33
Minimal change disease	16	22.22
Focal segmental glomerulosclerosis	08	11.11
Amyloidosis	08	11.11
Diabetes	03	4.17
Biopsy not done	13	18.06
Total	**72**	**100.00**

dialysis-related complications such as hemodynamic instability, bleeding, and mild disequilibrium syndrome.

In the present study volume loss due to acute gastroenteritis was the most common medical cause of AKI in 17.64% of the patients. The Older are more prone to develop pre-renal AKI due to dehydration because of diminished fluid intake and impairment of the ageing kidneys to conserve sodium and water.The resulting pre-renal azotaemia, if not attended to, progresses to established AKI (2). Dehydration accounts for 23-50% of reversible or irreversible AKI in the older population (3). Intravascular volume loss in patients with bacillary dysentery, cholera and viral gastroenteritis is the leading cause of AKI in the tropics and that this condition is not confined to children but occurs in all age groups (4). In the present study, dehydration accounts for 18% of the geriatric cases, comparable to that of Kumar et al and Sico et al (2,3).

Occurrence of AKI in severe falciparum malaria is quite common in Southeast Asia and Indian subcontinent where intensity of malaria transmission is usually low with occasional microfoci of intense transmission. There is a perceptible change in the clinical presentation of severe malaria in India in last 10–15 years; a gradual shift from single to multiple complications. A significant increase in the incidence of malarial AKI has been reported from several centres across India.While AKI due to leptospiral infection is on the decline, malaria has become the emerging cause of AKI (5,6). Precise mechanism of renal failure in falciparum malaria is not clearly known. Several hypotheses including mechanical obstruction by infected erythrocytes, immune mediated glomerular pathology, fluid loss due to multiple mechanisms and alterationsin the renal microcirculation, etc have been proposed (7,8). Out of the 8 patients who presented with malarial AKI in our study, Plasmodium falciparum was isolated in 62.5% patients, while rest 37.5% had mixed infection of Plasmodium falciparum and Plasmodium vivax. These findings are consistent with one of the earlier studies which attributed 66.66% of malarial AKI to Plasmodium falciparum infections (9).

CKD is becoming increasingly common. The burden of CKD in India cannot be assessed accurately. The approximate prevalence of CKD is 800 per million population (pmp), and the incidence of end-stage renal disease (ESRD) is 150–200 pmp (10). The United States Renal Data System has reliably estimated that the number of patients on maintenance dialysis in the United States will double over the next few years, and a relatively large number of newly diagnosed CKD patients every year (incident CKD patients) are older (11). In Europe, an epidemiological survey of the Île-de-France area showed a striking age-related increase in the annual incidence of CKD: the incidence rate among patients aged more than 75 years was almost seven times that of patients aged 20–39 years and more than twice that of patients aged 40–59 years (12). The increased incidence of CKD among the older translates into a similarly increased prevalence: the Third National Health and Nutrition Examination Survey (NHANES III) of a nationally representative sample of adults in the United States between 1988 and 1994 found that 7.6% of the individuals aged 60–69 years, and 25.9% of those aged at least 75 years, had a glomerular filtration rate (GFR) of 15–60 ml per minute per 1.73 m^2, as against only 1.8% of those aged 40–59 years and 0.2% of those aged less than 40 years (13).

In the present study 72.64% of the patients presented with CKD, chronic glomerulonephritis being the most common cause, accounting for 27.27% of the patients. This was closely followed by diabetic nephropathy which accounted for 23.37% of the cases. Our findings are consistent with various studies done on Indian population which implicates chronic glomerulonephritis as the commonest cause of CKD, irrespective of the age group being studied (14-16). The incidence is higher since the poor socio-economic status predisposes the general population to various infection related glomerulonephritis. This is in contrast with studies which states diabetic nephropathy as the single most common cause of CKD in North American and European population.

Diabetes has emerged as a major health care problem in India. According to the Diabetes Atlas published by the International Diabetes Federation (IDF), there are an estimated 40 million persons with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025 by which time every fifth diabetic subject in the world would be an Indian (17). Genetic predisposition combined with life style changes, associated with urbanization and globalization, contribute to this rapid rise of diabetes in India. Due to these sheer numbers, India is now considered diabetic capital of the world (18). With improvement in socio-economic status and changing lifestyle coupled with better control of infectious diseases, which was rampant during the earlier decades, it is inevitable that diabetic nephropathy will emerge as the single most common cause of CKD in India.

A study reported that there was a high incidence of renal disease in the ethnic Indian population in the United Kingdom, with a highly significant association between the diagnosis of interstitial nephritis and Indian race (19). In the present study chronic interstitial nephritis (CIN) accounted

for 18.18% of cases of CKD, laying stress on the fact that CIN is indeed an important cause of CKD in India and needs special attention to identify its true role.

Nephrotic syndrome was diagnosed if the patient had proteinuria >3.5 gm/day with or without hypoproteinemia, hyperlipidaemia, oedema and hypercoagulability. Aetiology was based on histopathological documentation as per the standard criteria. The nephrotic syndrome in older patients is as common as in younger adults, but is often misdiagnosed as 'heart failure' by primary physicians because of its rarity. Inevitably, both survival and the toll of treatment side effects are higher than in their younger counterparts. Nevertheless, the effects of the nephrotic syndrome itself can be disastrous in debilitated older individuals and treatment, where available, should not be withheld on grounds of age alone.

In the present study, among 72 patients who presented with nephrotic syndrome, biopsy was done in 59 patients. Rest of the patients were excluded since they did not consent for renal biopsy. 33.33% of the patients had underlying membranous glomerulopathy, which was the commonest presentation. This was followed by minimal change disease and focal segmental glomerulo-sclerosis (FSGS) which contributed to 22.22% and 11.11% of the patients respectively. In various studies on the nephrotic syndrome in adults aged over 60 years, membranous nephropathy has been described as the most common cause, affecting 35-40% of the patients and amyloidosis as the most common cause of secondary nephrotic syndrome attributable to 10-13% of the patients (20,21). 11.11% of the patients had FSGS on renal biopsy which was consistent with studies reporting relatively high frequency ofFSGS in nephrotic patients over 65 year old (22,23). Nephrotic syndrome in the Older may indicate underlying malignancy. This is especially important if the histology of the renal lesion shows membranous glomerular nephritis and malignancy must be excluded even in the absence of symptoms and signs to suggest its presence. Nephrotic syndrome is Older is common, also they have higher incidence of hypertension, diminished renal functions and respond more slowly and less often to classical therapy (24).

Renal amyloidosis was the most common secondary glomerular disease presenting as nephrotic syndrome and accounted for 11.11% of the cases. In a country like India where prevalence of tuberculosis is very high, it was imperative that it would emerge as the most common aetiology leading to renal amyloidosis, contributing to 62.5% of these cases. 25% of these cases were attributed to chronic suppurative lung diseases, whereas 12.5% of the cases were due to underlying multiple myeloma. These findings were consistent with earlier reported pattern of renal amyloidosis in Indian adults (25). Interestingly, a study conducted on systemic amyloidosis in Uganda reported tuberculosis as the commonest cause followed by chronic suppurative lung diseases (26). This re-emphasizes the fact that in under-developed and developing nations, tuberculosis is rampant and necessary measures need to be taken to tackle this problem.

In conclusion, developing countries like India has a heavy burden of renal patients and very limited resources to tackle this ever growing problem. The burden of patients with AKI and CKD requiring dialysis is increasing at a constant rate. A huge proportion of these cases are secondary to diabetes mellitus, hypertension, renal calculi and infectious diseases which can be tackled if adequate measures are taken at community level, so that the damage to kidney culminating in end stage renal disease can be prevented. Renal transplantation as a treatment option is provided by few select tertiary care hospitals across the country. Due to economic constraints majority of the patients with end stage renal disease cannot afford transplantation; hence they are depended on dialysis as a modality for maintaining and prolonging life. Only few studies are available on specific renal syndromes and a very few on the spectrum of renal diseases as a whole. The present study being a monocentric and reterospective study, generalisation to other ethnic groups and population cannot be made. Once more studies are available, the information can be used for better resource management and policies to address these important issues.

Conflict of Interest

None.

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