Original Article

Clinico-epidemiological profile of calculus disease of kidney and ureter at a tertiary care hospital

Sajeed Ahmed[1*], Rakesh Kumar[2]

[1]Assistant Professor, Department of General Surgery, Assam Medical College and Hospital, Dibrugarh, Assam, INDIA.
2Senior Resident, Pt. Madam Mohan Malviya Hospital, New Delhi, INDIA.
Email: sajeedfarah@hotmail.com

Abstract

Introduction: The calculus disease of the urinary tract is an age old disease and history dates back to the pristine of civilization. Urinary stones were known to the ancient Egyptians and had been found in mummies several thousand years old, The pattern of stone formation in undeveloped countries is similar to that of Western countries as it was seen 100 years ago with a high incidence of Bladder stone in children. **Aims and Objective:** To study Clinico-Epidemiological Profile of Calculus Disease of Kidney and Ureter at a Tertiary Care Hospital. **Methodology:** A total of 52 cases of renal and ureteric calculi case were studied. All the patients were admitted in the various surgical units of Assam Medical College, Dibrugarh**.** All patients diagnosed to have upper urinary tract calculi were included in the study. Patients with stone disease with renal failure requiring dialysis, Patients with associated stones in the lower urinary tract, Children below the age group of 12 years and patients who did not consent for the procedure or those who could not be followed up till the end of the study were excluded from the study. **Result:** Regarding the age distribution, maximum peak incidence was found to be in the 3rd decade of life contributing to about 38.46% of the total cases in this study. It was found that male patients were more common than the female patients. Male to female ratio was found to be 1.89:1. In the present series of study, majority of the patients were from poor economic group. Most of the patients were from rural areas and were cultivators. 46.16% of patient were of low socio-economic status and most of the patients were non-vegetarians. The average water intake was found to be 1.30 litres per day that flank and loin pain were the commonest symptoms. Hematuria and GI symptoms were also found to be associated in certain cases. **Conclusion:** It was noted that Calculus Disease of Kidney and Ureter are mostly associated with less intake of water, non-vegetarian diet, male sex and 3rd decade of life and most common presentation was pain and hematuria. So all these factors should be considered for prevention and management of Calculus Disease of Kidney and Ureter.

Keywords: Calculus Disease of Kidney and Ureter, flank and loin pain, Hematuria.

*Address for Correspondence:
Dr. Sajeed Ahmed, Assistant Professor, Department of General Surgery, Assam Medical College and Hospital, Dibrugarh, Assam, INDIA.
Email: sajeedfarah@hotmail.com

Received Date: 04/10/2015 Revised Date: 12/11/2015 Accepted Date: 22/12/2015

Access this article online

Quick Response Code:

Website: www.statperson.com

DOI: 26 December 2015

INTRODUCTION

The calculus disease of the urinary tract is an age old disease and history dates back to the pristine of civilization. Urinary stones were known to the ancient Egyptians and had been found in mummies several thousand years old. The discovery of a bladder stone in a grave in Egypt at El Arnera 7000 years old can be cited as an example in this regard. The existence of nephrolithiasis was known even to Hippocrates, who described the symptoms under the heading "the first disease of the kidneys". In India Susruta (500 J3.C) had clearly described various methods of lithotomy in Susruta's "Samhita". Urinary calculi are the third most common affliction of the urinary tract, exceeded only by urinary tract infection and pathologic conditions of the prostrate. Urinary stones have plagued humans since the earliest records of civilization. The problem of urinary stone formation is in a state of transition. It has been shown by Andersen [1966][1] that the state of economic development of a country has a profound effect upon the pattern of stone formation. The pattern of stone formation in undeveloped countries is similar to that of Western countries as it was seen 100 years ago with a high

How to site this article: Sajeed Ahmed, Rakesh Kumar. Clinico-epidemiological profile of calculus disease of kidney and ureter at a tertiary care hospital. *International Journal of Recent Trends in Science and Technology*. December 2015; 17(2): 149-153. http://www.statperson.com (accessed 28 December 2015).

incidence of Bladder stone in children. In highly developed countries, incidence of Bladder stones is rare but most stones occur in the upper urinary tract in adults and contain a large proportion of calcium oxalate. In the countries of the Arabian peninsula where hot climatic conditions prevail and there is shifting of economic pattern from Agriculture to Industrial economy, incidence of renal colic becomes one of the commonest cause of emergency hospitalization [Kassirni *et al* 1986. There has been an increased incidence of urolithiasis in Europe, North America and Japan within the last 100 years. It is accepted that economic and industrial development has I increased the incidence of the disease in western countries [M. Lguchi *et al* 1990]. In India in ancient time [Susruta 1500 B.C.] described about lithotomy in the Susruta's SAMIHTA [L.M. Zimmerman and 1. Veith 1961][2]. Susruta also described about the perineal method of' Bladder stone removal [R. H. Meade 1968] stressing the importance of avoiding injury to the seminal vesicle, spermatic cord and rectum [Bishop 1960][3]. One of the earliest statistical studies is that of Yelloly who wrote in 1829 A.D. and 1830. He made a general survey in Great Britain bused on hospital records and found the average incidence of cases treated in hospitalin Great Britain to be 1 per 100,000 population. The high incidence geographical areas include- South West United States [the stone belt], Mesopotamia and East-South China [Joly 1931], Northern India, Pakistan, Central Europe, the British Isles, Scandinavia, Northern Australia and the Mediteranean countries [Walkiemeyer, 1982][4]. Thailand has been reported as having the highest incidence in the world where the incidence is 8 per 1000 [Pitts. 1980][5]. In Ilan, in 1991 epidemiological studies were performed on 1,184 cases and incidence of urohithiasis was found to be 147 per 100,000 population by Lin *et al* [1994][6]. Out of the total case surveyed 1071 were of upper urinary tract stone. Incidence of urolithiasis in India range from 0-438 per 100,000 population with a high incidence in Punjab, Hyderabad and Manipur (Mc Carrisson, 1991)and Andhra Pradesh [Aurora and Ramalinga Swami 1961][7]. Rao reported the incidence in Mehsana district of Gujarat in his study during 1953-55 that there is a varying incidence from 7 - 103 per 100,000 population in different parts of the same district. Vashi [1959][8] found that there was fairly high Incidence in Manipur in the part of lndo-Burma Border. L.B.K. Singh et at [1982][9] reported that Manipur can be classified as a stone belt area. R.N. Sarma *et al* [1985][10] considered that Jammu is also a stone belt. The Incidence of upper tract urinary calculi was 0.15% of all the hospital admissions and 1.25% of all the surgical admissions. Incidence of Bladder stone was 9%. Thus the overall incidence of calculus disease in Jammu region was about 0.16% of the hospital admission and 1.37% of all the surgical admission. In Northern India the incidence of upper urinary tract calculi has been stated to be 50-100 cases per 10000 hospital admission. In the report of Gupta *et al* [1970][11] the incidence of upper tract stone was 0.7% of all the hospital admissions and 2.2% of all the surgical admissions. Chally *et al* [1979] found 0.94% in Kerala. Calculus disease of the urinary tract may occur at any age group, no age group is immune to it. The youngest age group recorded by J R. Ghazail [1975][12] was under 5 years, by T. P. Noble [1931] was under 2 years. Robert McCanission [1931] in his lecture on the causation of stone in India said that childhood incidence is more than in the elderly.In United States and England, the incidence is more in the latter half of life. Pritam Das [1971] found that renal and ureteric calculi occurred mostly in patients between 21-50 years of age. The male sexare invariably more prone to develop urinary lithiasis than the female. There are about 2 cases in the former to everyone in the latter, as shown by Winsbury White [1952][13] R. N. Sharma *et al* [1985][10] studied about the upper urinary calculi in the Jammu region and found a higher incidence in male. They found that the male and female ratio was 3:1. Occupation and Socio-economic status has an important role in the causations of urinary stone. Andersen *et al* [1963][14] observed that cases of urinary stones were predominantly found in individuals from rural agricultural classes and found much less in individuals living in urban areas. As per classification of socio-economic group by Indian council of Medical Research [ICMR], upper urinary tract stones were more common in group I and II [This include Govt. officers, businessmen and other similar status]. The lower urinary tract stone incidence were more in lower income group. In a study of' 192 cases of urinary stone by Y. M. FazilMaricker [1977][15] in Kerala, found that about92.8%were male and 35% were from higher income group. Burkland and Rosenberg 1955[16] in their survey of' urolithiasis in the United States, questioned urologists about their opinion regarding the prevention of recurrent urinary stone disease. "Forcing Water" received the highest total number of positive responses, along with elimination of infection and elimination of obstruction.

MATERIAL AND METHOD

In this study, a total of 52 cases of renal and ureteric calculi case were studied. All the patients were admitted in the various surgical units of Assam Medical College, Dibrugarh**.** All patients diagnosed to have upper urinary tract calculi included in the study. Patients with stone disease with renal failure requiring dialysis, Patients with associated stones in the lower urinary tract, Children below the age group of 12 years and patients who did not consent for the procedure or those who could not be

followed up till the end of the study were excluded from the study. Patients with renal stones in whom P.C.N.L was indicated could not be included in the study as facilities for this procedure were not available in our hospital. 52 patients fulfilled the above criteria for the study and were included in the study. Of these 52 patients 26 had Ureteric calculi and 26 had renal calculi.

RESULT

Table 1: Age distribution

AGE GROUP *(in years)*	NUMBER *(n)*	PERCENTAGE *(%)*
10—19	1	1.92
20—29	20	38.46
30—39	13	25.00
40—49	12	23.08
50—59	4	7.69
60—69	2	3.85
> 70	0	0.00
TOTAL	**52**	**100.00**

Regarding the age distribution, maximum peak incidence was found to be in the 3rd decade of life contributing to about 38.46% of the total cases in this study. The next most common age group was found to be in the 4th decade contributing to about 25% of the cases. The youngest patient recorded in this study was a patient of 18 years of age while the eldest one was 65 years of age. The mean age with standard deviation was found to be 35.67 ± 10.40

Table 2: Sex distribution

SEX	NUMBER (n)	PERCENTAGE (%)	RATIO *(Male : Female)*
Male	34	65.38	1.89 : 1
Female	18	34.62	
Total	**52**	**100.00**	

As regards to the sex distribution, it was found that male patients were more common than the female patients. Out of the 52 cases, 34 were males while 18 were females. Thus the male to female ratio was found to be 1.89:1

Table 3: Occupational status

OCUPATION	NUMBER *(n)*	PERCENTAGE *(%)*
Cultivators	16	30.76
Service	7	13.46
Business	6	11.53
Students	5	9.61
Homemaker	12	23.07
Labour	6	11.53
TOTAL	**52**	**100.00**

In the present series of study, majority of the patients were from poor economic group. Most of the patients were from rural areas and were cultivators. 46.16% of patient were low socio-economic status.

DIETARY HABITS

In this series of study, it was found that most of the patients were non-vegetarians although they were not regular consumers of meat and fish.

WATER INTAKE

According to the history of the patients daily intake of water it was found that about half of the cases used to drink one litre or one and half litre per day. The average water intake was found to be 1.30 litres per day.

Table 4: Symptomatology

SYMPTOMS	NUMBER *(n)*	PERCENTAGE *(%)*
Flank Pain	30	57.69
Loin Pain	20	38.46
Hematuria	9	17.31
Frequency	11	21.15
Fever	13	25.00
Vomiting	12	23.08
Oliguria	2	3.85

Although, patients presented with variable symptoms but pain was found to be the commonest presenting symptom, irrespective of the site. It was found that flank and loin pain were the commonest symptoms. Hematuria and GI symptoms were also found to be associated in certain cases.

DISCUSSION

Urolithiasis is a universal problem, affecting patients across geographical, cultural, and racial boundaries. The prevalence of urinary stones has progressively increased in the industrialized nations, and a similar trend is being observed in developing countries due to changing social and economic conditions. The rising prevalence of urinary stone disease has had a significant impact on the healthcare system due to the direct costs involved and the morbidity associated with complications such as infection and chronic renal failure. Concomitant with the increasing prevalence of urolithiasis is the growing utilization of imaging for diagnosis, treatment planning, and post treatment follow-up. Imaging in urolithiasis has evolved over the years due to technologic advances and a better understanding of the disease process. Though a number of workers put forward their views regarding the general incidence in a particular region, incidence in relation to age and sex, etiological factors and different methods of investigation and managements. This study is an attempt to investigate among the local population the overall incidence of age and sex distribution, the incidence among the different occupational and socioeconomic groups, the site and size incidence, symptomatology and the modes of presentation and to discuss the different open surgical operations that are

carried on in our setup. AGE INCIDENCE: The highest age incidence of the cases noted in this study were in the age group 20-49 years of life. Regarding the age distribution, maximum peak incidence was found to be in the 3rd decade of life contributing to about 38.46% of the total cases in this study. The next most common age group was found to be in the 4th decade contributing to about 25% of the cases. Hermon *et al* [1925] studied 880 cases of upper urinary tract stone and found that the majority were found to be between the ages of 20-49 years. R.N. Sharma *et al* [1985] from Jammu reported that the commonest age incidence for upper urinary tract calculi is in the 3rd and 4th decades. Klufio G.O. *et al* [1996][17] stated that the high incidence were in the age group ranging from 20-61 years of age. In Schwartz's Principles of Surgery [8th Ed.2005], it has been written that the peak age incidence was between 20-40 years of age.

Table 1: Age incidences of various studies

Author	Total no. of cases	Highest age incidence
Hermon *et al* (1925)	880	20-49 yrs
R.N.Sharma *et al* (1985)	170	20-49 yrs
Present study (2012-13)	52	20-49yrs

Thus the peak incidence of age was similar to the above mentioned authors.

SEX INCIDENCE

As regards to the sex distribution, it was found that male patients were more common than the female patients. Out of the 52 cases, 34 were males while 18 were females. In this study it was found that the female ratio was 1.89 :Aydin S. *et al* [1994][18] studied 390 patients with urinary tract calculi. They observed that male and female ratio was found to 2.2: 1.Ekwere P.D. [1995][19] reported a prospective observation on 96 south eastern Nigerians with urinary calculi during a period of 5 years in which the male-female ratio was found to be 2.7:1.

Table 2: Showing the sex ratio in different studies

Author	Total no. of cases	Male: female ratio
Aydin S.(1994)	390	2.2:1
Ekwere P.D.(1995)	96	2.7:1
Present study(2005-06)	52	1.89:1

In Love and Bailey's Text Book of Surgery (26 ed. 2013) the male is to female ratio is stated to be 4:3.Thus the present study almost correlates to these studies.

Scales and colleagues (2005) found that although overall population-adjusted discharges for a diagnosis of renal or ureteral calculus increased by only 1.6% from 1997 to 2002, discharges for women increased by 17%.Stamatelou and colleagues (2003) also noted a slight decrease in the male-to-female ratio of stone disease, from 1.75 (between 1976 and 1980) to 1.54 (between 1988 and 1994) using the NHANES dataset.

OCCUPATION AND SOCIO-ECONOMIC STATUS

In the present study majority of the cases were from low socio- income group and are cultivators by occupation [34.62%]. Students and house-wife comprises of 7.69% and 25% respectively, while labour represents 11.54%. Thus the low income group comprised of 46.16% .It means most of the patients are of low socio economic status. Atan and colleagues (2005) found a significantly higher incidence of stones among steel workers exposed to high temperatures (8%) compared with those working in normal temperatures (0.9%). Mericker [1977] found 65% of cases from low income group while 75.44% of cases from farmers were noted by Prasong Watane *et al* [1983].In this study the main reason for the increased incidence in the lower socioeconomic status may be due to the increased attendance of people belonging to this socioeconomic group in our hospital.

DIETARY HABITS

In this study it was found that all the cases were non-vegetarian but their protein intake in the form of milk and milk products, meat etc. were less probably due to their low income. But in almost all the cases, lack in their daily intake of fluid is observed and this may be one of the contributing factors in causing urolithiasis. It was found that nearly half of the patients, the daily intake of water was about 1 litre or even less. The average intake of water in 24 hours was found to be 1.30 litres. SYMPTOMATOLOGY: In this study Flank and loin pain are the most common complains of the patients which was 57.69% and 38.46% respectively. Other complains noted were haematuria 17.31%, frequency 21.15%, fever 25% and vomiting 23.08%, which are associated symptoms. Majority of the patients had multiple complaints and very few had presented with it single complaint. From this study, it was found that pain was the most common presenting symptom ranging from mild to severe. This study somehow correlates with the study of Y. M. FazilMaricker [1977] on 192 urolithiasis cases in Kerala where he found that the most presenting symptom was pain which comprised of 97%. R. N. Sharma *et al* [1985] reported about the symptomatology of upper urinary tract stone and found pain to be the presenting symptom in 143 out of 170 cases of upper urinary tract calculi. Asymptoinatic "Silent stone" was not encountered in this study as Keyes [1921] reported 11 cases of silent stones out of 244 cases.

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Source of Support: None Declared
Conflict of Interest: None Declared