URINARY TRACT CALCULI: A FOUR YEARS' EXPERIENCE

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ABSTRACT

Objective: *To study the pattern and management of urolithiasis.*

Material and Methods: *This retrospective observational study was carried out at surgical D unit of Khyber Teaching Hospital, Peshawar, from January 2001 to December 2004. Data of 852 patients with urolithiasis, managed in the surgical unit in the four years period was evaluated. Information regarding age, sex, side, site, type of operation and chemical nature of the calculi was recorded on a proforma. Metabolic study was done in only selected cases.*

Results: *During the study period, 852 patients with urolithiasis were managed. Out of these, 577 (67.72%) were male and 275 (32.28%) were female, with male to female ratio of 1.2:1. Patients between 1 year and 85 years of age were operated. Maximum number of patients was between 3rd and 5th decade of life. Majority of the patients belonged to lower middle and poor socioeconomic groups. Chemical analysis showed calcium oxalate in 503 (60%) cases followed by uric acid in 126 (15%) cases. All the patients underwent open surgical procedures except 34 (3.9%) patients who had litholapexy, 5 (0.6%) patients had lithotripsy after insertion of double J stent. Thirteen (1.5%) patients underwent nephrectomy for renal stone disease.*

Conclusion: *Urolithiasis is a fairly common disease. Commonest calculi found were calcium oxalate.*

Key Words: *Urolithiasis, Open Surgery, Mortality.*

INTRODUCTION

Urolithiasis is a very common condition. It has affected mankind as far back as 700 years when a stone was recovered from an Egyptian mummy.[1] Kidney stones are quite common in industrialized nations[2]. Up to 15% of white men and 6% of women develop stones with a recurrence of 50%[3] in their life time. According to studies conducted in the subcontinent by Mc Carison[4] (1931) and Anderson[5] (1948) incidence in some parts of Indian Punjab and Rajhistan was highest in the world. Here cases of bladder stone were found to be much higher. In a study conducted in Balochistan by Arif in 1992, the number of cases of urolithiasis per 100,000 of population was from 4 to 28 in different districts.[6,7]

The management of urolithiasis has been revolutionized worldwide. Non-operative and minimal invasive endoscopic surgery has become the treatment of choice. This has significantly reduced the morbidity, duration of hospital stay and cost.

This study was aimed to find out the current pattern and management of urolithiasis in general surgery unit of Khyber Teaching Hospital, Peshawar.

MATERIAL AND METHODS

The study was conducted at surgical D unit of Khyber Teaching Hospital, Peshawar. It was a retrospective, observational study. Patients included in the study were those admitted and operated upon or stone crushed with a lithotrite. Those patients who had ureteric colic, with small stones and treated conservatively were not included in the study.

A total of 852 patients were treated by open surgery or stenting in the past 4 years from January 2001 to December 2004. Information about the duration of symptoms, family history, and site of the calculus, number, type of surgery done and chemical analysis of the calculi was

YEARLY DISTRIBUTION OF PATIENTS

Year	Male patients	Female patients	Total
2001	159	65	224
2002	149	84	233
2003	131	53	184
2004	138	73	211
Total	577	275	852

Table 1

recorded on a proforma. Site of the calculus was confirmed before surgery by ultrasound and or Intravenous urogram. The data was analyzed at the end of the study.

RESULTS

A total of 852 patients underwent surgical intervention for renal calculi during the study period. Out of these 852 patients, 577 (67.72%) were male and 275 (32.78%) were female patients. Age of the patients ranged from one year to eighty-five years. Yearly distribution of the patients is given in table I and age distribution is given in table 2. Maximum number of patients was between 3rd and 5th decade.

Site, number and type of calculi was also recorded. 500 (58.68%) patients had renal calculi, 208 (24.41%) patients had ureteric calculi and 144 (16.40%) patients had vesical calculi (table 3). Out of 500 patients with renal calculi, 335(67%) had multiple calculi and 80 (16%) patients had staghorn calculi. Recurrent stones were found in 20 (2.82%) patients. Family history was present in 256 (30%) patients.

Out of 208 patients with ureteric calculi, 50 (24.03%) had calculi in upper ureter, 45 (31.63%) had in mid ureter and 113 (54.32%) had calculi in lower ureter as given in table 4.

Out of 708 patients with kideney and ureter stones, 289 (40.81%) patients had left sided renal or ureteric calculi while 329 (46.47%) patients had right sided calculi. 90 (12.71%) patients had bilateral renal or ureteric calculi as given in table 5.

All the patients with renal calculi were operated. A detail of the operative procedures adopted is given in table 6. Ureteric calculi were managed by ureterolithotomy. Patients with vesical calculi were either managed by vesicolithotomy (110 patients) or by litholapaxy (34 patients).

Common postoperative complications were hemorrhage, transient urinary leak and wound infection.

Chemical analysis showed that 503(60.2%) were calcium oxalate stones, 88(10.5%) were calcium phosphate stones, 126(15%) were uric acid stones and 117(14%) cases had triple phosphate stones. Only 2(0.25%) patients had pure cystine calculi as showen in table 7.

DISCUSSION

Various studies have been conducted in different parts of the country in the past. These studies have shown that urolithiasis is more common in the middle part of the country that is: Southern Punjab and North of Sindh. Lowest

LOCATION AND NUMBER OF CALCULI IN URINARY TRACT

Year	Kidney* (n= 500)	Ureter (n= 208)	Urinary bladder (n= 144)
2001	113	65	46
2002	146	56	31
2003	115	41	28
2004	126	46	39

* Multiple calculi --- 335 patients
* Staghorn calculi --- 80 patients

Table 3

AGE OF THE PATIENTS

Age range in years	2001	2002	2003	2004	Total
1-9	5	7	9	8	29
11-19	16	18	13	30	77
20-29	67	40	23	38	168
30-39	58	59	45	44	206
40-49	46	49	43	51	189
50-59	14	40	31	23	108
60-69	11	13	11	12	49
70-79	5	7	6	4	22
80 and above	1	2	2	1	06
Total	224	233	184	211	852

Table 2

LOCATION OF CALCULI IN THE URETER

Site in ureter	2001	2002	2003	2004	Total
Upper 3rd	19	13	9	9	50
Middle 3rd	12	13	12	8	45
Lower 3rd	34	30	25	24	113
Total	65	56	46	41	208

Table 4

incidence was found in northern areas.[7, 9, 10]

This study was conducted in a general surgical unit. Urolithiasis constituted about 15% of routine list of surgery. In NWFP, a higher incidence has been reported in the past.[11] In urology centers in Balochistan and Sindh up to 50% of operations are performed for urolithiasis.[12,13]. In Christian Hospital Taxilla, 482 cases per year have undergone surgery between 1982 and 1990.[14] In Nawab Shah Teaching Hospital, between 1980 and 1987, 37% patients had urolithiasis and accounted for 10.75% of total surgical patients.[15] Urolithiasis accounts for 16% of all urological admissions and 12% of total hospital admissions in western countries.[16]

Our study showed that urolithiasis affected all age groups from 1 year to 85 years. Maximum number of patients was between 3rd and 5th decade, the most productive period of life. These figures are same as that in other studies.[12] Family history was found in 30% of the patients, indicating genetic predisposition in the etiology of urolithiasis.[18]

Out of total number of patients with renal or ureteric calculi, 46.47% had stones on the right side, 40.81% had on the left side. This observation is the same as that in other studies.[12,17] In our study 12.7% patients had bilateral renal or ureteric calculi and 20 (2.82%) patients had recurrent renal calculi.

Majority of the patients, in our study, belonged to middle and lower socioeconomic groups. This is in contrast to what has been noted in the west. Social class and occupation are important pre-urinary risk factors of urolithiasis. 80% of our patients belonged to lower socioeconomic group. The exact reason for a higher occurrence in lower socioeconomic group is not clear.

In the west, upper socioeconomic group, with high protein diet and consumption of milk and dairy products have a higher incidence of upper urinary tract calculi.[19] Higher incidence is also reported in Singapore.[20]

Other factors involved are Gout, Hyperparathyroidism, urinary stasis, chronic infections, cystinurea[23], xanthinurea[28], foreign bodies, tuberculosis, prolonged immobility.[1,24,27] The factors involved in vesical calculi are voiding dysfunction, foreign bodies, reconstructed bladder, detrusor failure and diet.[1,8]

Chemical analysis of the calculi was done in all of our cases. Stone analysis alone can help in the management and obviate a formal metabolic evaluation.[21] Our study revealed that 60% of the urinary tract calculi were composed of calcium oxalate, 10.50% were calcium phosphate calculi, 13% were uric acid calculi. Gout being one cause of uric acid calculi.[22] In our study, 16% had staghorn calculi, composed of calcium-magnesium-ammonium and phosphate infected calculi. Only 0.25% cases had pure cystine calculi.

Calcium oxalate calculi are more common in our region[1,12]. The figure of chemical analysis in our study is nearly the same as in other studies. A study by Thomas has reported calcium oxalate stones in 60% cases, calcium phosphate stones in 20%, uric acid stones in 10%, triple phosphate stones in 7% and cystine stones in 3%[25,26].

SIDE AFFECTED (KIDNEY AND URETER)

Year	Left	Right	Bilateral	Total
2001	71	86	21	178
2002	81	93	28	202
2003	67	72	17	156
2004	70	78	24	172
Total	289	329	90	708

Table 5

TYPE OF SURGERY PERFORMED

Type of surgery	2001	2002	2003	2004	Total
Pyelolithotomy	84	94	78	76	332
Pyelonephrolithotomy	10	23	16	24	73
Nephrolithotomy	5	15	9	19	48
Partial nephrectomy	8	9	7	5	29
Total nephrectomy	6	4	2	1	13
Others (Stenting)	0	1	3	1	5
Ureterolithotomy	65	56	46	41	208
Vesicolithotomy	32	24	22	32	110
Litholapaxy	14	7	6	7	34
Total	224	233	184	211	852

Table 6

All these patients underwent open surgical procedures. Only 39 patients were treated by endoscopic methods including stenting and litholapaxy. Almost 90% of these cases could have been dealt without open surgery, were the facilities available. In developed countries 90% of renal calculi are treated by extracorporeal shock wave lithotripsy or by minimally invasive surgery like percutaneous nephrolithotomy. Ureteric and vesical calculi are also treated endoscopically or by shock wave lithotripsy.

CHEMICAL ANALYSIS OF CALCULI

Chemical analysis	Number of patients	%age
Calcium oxalate	503	60
Calcium phosphate	88	10.5
Uric acid	126	15
Triple phosphate	117	14
Pure Cystine	2	0.25

Table 7

CONCLUSION

It is evident from the study that urolithiasis is fairly common problem affecting the patients in the most productive part of life. Management of these cases by open surgery is an old method causing unnecessary surgical trauma, operative and postoperative complications. Patients have to take long periods off work, which is a big loss to the public and private sector in financial terms. Almost 95% cases can be managed without open surgical procedures. Attention should also be paid to the prevention of urolithiasis. Patients should be educated to take plenty of water and avoid taking certain foods in various types of calculi. Screening of people with family history of urolithiasis should also be considered.

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