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BILATERAL URINARY CALCULI- A CLINICAL PROFILE

General Surgery

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ABSTRACT

Background: Urinary calculi is one of the commonest diseases of urinary tract. A comprehensive clinical profiling of bilateral urinary calculi was conducted in present study.

Methods: Thirty-three eligible patients of bilateral urinary calculi were enrolled & evaluated in this two year observational study at our tertiary care centre.

Results: Most patients presented with abdominal pain (28, 84.8%). Hydronephrosis was observed in 8 (24.2%) cases, hydroureter in 4 (12.1%) cases and both in 10 (30.3%) cases. 21 patients were operated and 12 patients were treated conservatively with hydrotherapy. Pyelolithotomy was the most common operation performed (8, 38.8%). Calcium radical was the most common component (19, 90.4%). No recurrences were reported.

Conclusion: Studies with larger sample size are recommended for corroboration of the findings.

KEYWORDS

bilateral, urinary calculi

INTRODUCTION:

Urinary calculi is a debilitating entity and one of the commonest diseases of the urinary tract. Recurrent nature of painful incidences further increases the associated misery. It also suggests that factors associated with it remain alive in spite of stone removal. The sociodemographic profile has also changed from lower class & rural population to upper-middle class & urban population. Diet, metabolic abnormalities, nutritional imbalances and environmental factors have been implicated for this change. Advancement in diagnostics, over the years, has made picking up even the occult stones easier. Plus, with the underlying factors associated with process of lithiasis remaining constant, the occurrence of bilateral urinary calculi is very common. Surgical options in urinary lithiasis remain largely palliative though.

With the need of studying this important entity and dearth of research into same, the present study was carried out with the objective of comprehensive clinical profiling of bilateral urinary calculi at our tertiary care centre.

METHODOLOGY:

Type of study- Hospital based observational study
Study setting- Department of Surgery, Government Medical College & Hospital, Nagpur
Study duration- Two years
Sample Size- 33 eligible patients (consecutive sampled)

Inclusion criteria-

- All patients with bilateral urinary calculi admitted in surgical wards
- Willingness for consent

Exclusion criteria-

- Patients with vesical/urethral calculi

Procedure-

Informed written consent was elicited from all the participants. Detailed clinical history was taken, including diet (veg/non-veg/mixed) and type of water (soft/hard) being consumed. Patients were subjected to thorough clinical examination, urine microscopy, X-ray KUB and USG abdomen/pelvis. The cases confirmed on X-ray/USG were further investigated with blood & urine biochemistry & intravenous urography (IVU). The patients were subjected to the required surgery under spinal/general anaesthesia. The stone so retrieved were further subjected to chemical spot test for typing of common crystalloids. Participants were followed up for 2 years.

The study was initiated after approval from the Institutional Ethics Committee. The data were analysed using SPSS (Version 18).

RESULTS:

In this study of 33 patients of bilateral urinary calculi, majority were males (27, 81.8%) and belonged to 21-50 years age group (60.6%). Majority belonged to urban area (20, 60.6%) than rural area (13, 39.4%). Patients with mixed diet (26, 78.7%) significantly outnumbered vegetarians (7, 21.3%). Patients drinking hard (well) water had higher incidence of bilateral urinary calculi (20, 60.6%) as compared to patients consuming soft (tap) water (13, 39.4%).

Most patients presented with abdominal pain (28, 84.8%), followed by burning micturition (14, 42.4%), vomiting (12, 36.3%) and hematuria (11, 33.3%). Other less common presentations were vomiting, increased frequency of micturition, oliguria, lump in abdomen and anuria. **(Table 1)**

Table 1- Presenting complaints in bilateral urinary calculi cases

Sr No.	Symptoms	Number	Percentage
1	Abdominal pain	28	84.8%
2	Burning micturition	14	42.4%
3	Vomiting	12	36.3%
4	Hematuria	11	33.3%
5	Fever	8	24.2%
6	Increased frequency of micturition	7	21.2%
7	Oliguria	5	15.1%
8	Lump abdomen	4	12.1%
9	Anuria	3	9.1%

Urine culture was positive in 13 out of 21 cases showing pus cells in urine microscopy. Microscopic hematuria was present in 14 (42.4%) cases.

Out of 33 patients, 4 (12.2%) had serum calcium above 10.6mg/dl and 13 (39.4%) showed urinary calcium more than 300mg/100ml. Three patients (9.1%) patients had hyperuricosuria (serum uric acid >7mg%) with hyperuricemia (urinary uric acid >700mg/litre). Elevated serum phosphate levels (>4.5 mg%) were seen in 2 (6.1%) patients with urinary phosphate levels being high (>1.3 mg%) in 8 (24.3%) cases. Thirteen patients (39.4%) had blood urea more than 40mg% and 10 (30.4%) patients had serum creatinine more than 1.2mg%. Three patients had blood urea more than 100mg%, where percutaneous nephrostomy was done as an emergency measure. **(Table 2)**

Table 2- Biochemical parameters of bilateral urinary calculi patients

1. Serum & Urinary Calcium levels (n= 33)			
Serum Calcium		Urinary Calcium	
<10.5mg%	>10.5mg%	<300mg/100ml	>300mg/100ml
29 (87.8%)	4 (12.2%)	20 (60.6%)	13 (39.4%)
2. Serum & Urinary Uric Acid levels (n= 33)			
Serum Uric Acid		Urinary Uric Acid	
<7mg%	>7mg%	<700mg/litre	>700mg/litre
30 (90.9%)	3 (9.1%)	30 (90.9%)	3 (9.1%)
3. Serum & Urinary Phosphate levels (n= 33)			
Serum Phosphate		Urinary Phosphate	
<4.5mg%	>4.5mg%	<1.3mg%	>1.3mg%
31 (93.9%)	2 (6.1%)	25 (75.7%)	8 (24.3%)
4. Blood Urea & Serum Creatinine levels (n= 33)			
Blood Urea		Serum Creatinine	
<40mg%	>40mg%	<1.2mg%	>1.2mg%
20 (60.6%)	13 (39.4%)	23 (69.6%)	10 (30.4%)

Hydronephrosis was observed in 8 (24.2%) cases, hydroureter in 4 (12.1%) cases and both in 10 (30.3%) cases. Total 4 patients (12.1%) had poor (3) and non-functional (1) kidneys on IVU.

Out of 33 patients; 21 patients were operated upon, while 12 patients were treated with hydrotherapy. Pyelolithotomy was the most common operation performed (8, 38.8%), followed by pelonephrolithotomy and ureterolithotomy (4, 19% each). Nephrectomy was done in one case. (Table 3)

Table 3- Distribution of cases according to surgical procedure performed

Nature of operation	Unilateral	Bilateral	Percentage
Pelolithotomy	3	5	38.8%
Pelonephrolithotomy	2	2	19.0%
Ureterolithotomy	2	2	19.0%
Nephrolithotomy	1	2	14.2%
Peloureterolithotomy	0	1	4.5%
Nephrectomy	1	0	4.5%
Total	9	12	21 (100%)

Calcium radical was the most commonly observed component (19, 90.4%) during chemical analysis of retrieved stone. Next were oxalate (11, 52.3%) and phosphate (10, 47.6%) respectively. No significant morbidity was observed during follow up: wound infection reported in 2 (9.6%) cases and fever in 4 (19.2%) cases, with no recurrences reported.

DISCUSSION:

In the present study, we attempted clinical profiling of patients of bilateral urinary calculi at our tertiary centre in central India. 20-50 years was the commonest age of occurrence, which concurs with the study of Agrawal et al[1], who reported 30-60 years as the commonest age group. Our observation of male predominance by 4.5:1 correlates well with the study by Downey et al[2], who reported it at 4:1. Lower risk of stone formation in women may be due to lower urinary saturation of stone forming salts with larger amounts of urinary citrate level. We reported higher incidence of bilateral urinary calculi in those with mixed diet (78.7%) than those with vegetarian diet (21.3%). Amato et al observed it to be more common with protein rich food of animal origin.[3] Diet rich in alkali (fruits, vegetables) lowers the risk of stone formation. In the present study, patients consuming hard water had higher incidence of bilateral urinary calculi (60.6%) than those consuming soft water (39.4%). Caudarella et al[4] also found hard water to be more lithogenic. Belizzi et al[5] concluded softening of water to be considered as a valid preventive approach for urolithiasis.

Symptoms vary with the site and type of stone. Pain was the most common complaint (84.8%), followed by burning micturition (42%). Fazil in his study had also found pain as the chief complaint (97%) followed by hematuria (60%).[6] In our study, urine culture was positive in 39.3% cases and E. Coli was the commonest organism incriminated. This finding sits well with Basaklar et al[7], who reported urine culture to be positive in 35.2% cases. Sohshang et al[8] reported positive urine culture in as many as 47% cases. E. Coli was the commonest organism in both the studies.

In 39.4% cases, blood urea was raised above 40 mg% and serum creatinine was raised more than 1.2 mg% in 30.4% cases. Gupta et al[9], in his study of 2000 urinary stone patients, found 1.65% patients with serum creatinine more than 2.0 mg%. In the present study, hypercalcemia was reported in 12.2% cases and hypercalciurea in 39.4% cases. Malhotra et al[10] reported hypercalcemia in 24.6% and hypercalciurea in 12.3% amongst 130 cases. The incidence of hypercalciurea has been variable in different series. Sharma et al[11] found hypercalcemia in 8.4% cases only. We found serum 7 urine phosphate levels to be above normal in 6.1% and 24.3% patients. The incidence of uric acid lithiasis among the stone forming population varies from 5 to 39%. Of the total 33 patients, 8 (24.24%) had hydronephrosis, 4 (12.1%) had hydroureter and 10 (30.3%) had both. Three (9%) patients had poor function and one patient had non-functioning kidney in which nephrectomy was done. Basaklar et al[7] reported the incidence of hydronephrosis at 45.9%, hydroureter at 8.2% and non-function at 10.7%; which is higher than what we observed.

In the present study, 12 patients were treated symptomatically with hydrotherapy because they had calculi of size less than 0.7cm and were in regular follow-up. Goldwasser[12] had reported that high intake of water throughout the day with constantly high urine output is helpful in all types of stones. We conducted pyelolithotomy in 38.8% and ureterolithotomy & pyelonephrolithotomy in 19% cases each. Nephrectomy was done in 1 case. Esen et al[13], in their comparative study of 43 patients treated with comparative modalities, concluded that open surgery is still beneficial in staghorn calculi. Basaklar et al[7] had also observed similar surgical rates in their study.

The results of chemical analysis of stones noted were Calcium (90.4%), Carbonate (23.8%), Magnesium Ammonia (33.2%), Phosphate (47.6%), Oxalate (52.3%) and uric acid (14.2%). Ansari et al[14] analysed 1050 urinary stones, out of which 93% were Calcium and 89% oxalate.

There was not a single case of recurrence in our study, which may be due to short follow-up. Further, the relatively small sample size precludes us from drawing robust conclusions and warrants substantiation with studies with larger sample size.

DECLARATIONS:

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