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Original Research Article

Role of urine analysis and radiology in the diagnosis of vesical calculi among patients of Darbhanga district, India

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ABSTRACT

Background: Bladder stone is a common disease in this part of our country. This study was undertaken to find out the role of urine analysis and radiology in the diagnosis of vesical calculi and average size of penis in such patients in Darbhanga district.
Methods: This study was conducted among patients admitted with features of vesical Calculi in the upgraded Department of Surgery, Dharbhanga Medical College and Hospital, Dharbhanga. SPSS software was used for data analysis.
Results: On routine urine examination oxaluria was observed in 63.3% of cases. On preoperative culture of urine, *E. coli* was the most common bacteria isolated (36.6%). Maximum number of stones were single, and most of them were found only in bladder by plain X-ray (K.U.B.). The average length of penis came down from 17 to 0.4 inch after one month of removal of stone.
Conclusions: In the study plain X-ray (K.U.B.) was to be of great value in diagnosing the presence of stone.

Keywords: Diagnosis, Penis, Vesical calculi

INTRODUCTION

Bladder stones are solid calculi that are primarily found in the urinary bladder. Usually they are calcified but they may also be non-calcific. The incidence of bladder stones is found higher in developing countries as compared to western world due to dietary factors.

The urinalysis in affected bladder stones may show blood, nitrites, or leukocytes. It may also demonstrate a low urinary pH and a urinary tract infection (UTI). A plain X-ray or KUB is often the first study ordered, but in adult men, the stone may not be calcified, such as uric acid, so plain X-rays alone may not be sufficient. CT or a bladder ultrasound can be reliably used for imaging for possible bladder stones. Stones will typically show up on ultrasound as hyperechoic areas with shadowing. Ammonium urate is radiolucent but may develop a calcific coating making it visible on KUB.[1] The lengthening and turgidity of penis and pulling of the prepuce seen in male children with vesical calculi are important sign for diagnosis.[2]

These are not seen in adult male patients. With the above background this study was undertaken to find out the role of urine analysis and radiology in the diagnosis of vesical calculi and measurement of average size of penis in such patients in Darbhanga district.

METHODS

The present three-year observational study was conducted in the upgraded Department of Surgery, Dharbhanga Medical College and Hospital, District Dharbhanga after

taking permission from the institutional ethical committee. The study included those patients who were admitted in the indoor wards of the department of Surgery with clinical features of vesical calculi.

All cases were subjected to a thorough examination with special reference to find out the measurement of size of penis. Investigations like routine examination of urine, urine culture and sensitivity (for suspected UTI) and plain x-ray (K.U.B) were performed. Subrapubic cystolithotomy was done in cases of vesical calculi after taking informed consent from all the patients. Patients were followed in the hospital during their stay for any postoperative complications. The patients were discharged from the hospital and were called for follow up to assess the size of penis.

SPSS software was used for data analysis. Results were presented in the form of percentages.

RESULTS

Reaction of urine showed that majority of stone patients had a highly alkaline urine. Oxaluria was the commonest finding on urine examination. Most of the cases were alkaline (Table 1).

Table 1: Routine urine analysis finding in 60 patients of vesical calculi.

Finding	No. of cases	Percentage
Albuminuria	10	16.6
Glycosuria	1	1.6
Reaction		
Alkaline	26	43.3
Acidic	12	20.0
Microscopic		
R.B.C	22	36.6
Pus Cell	20	33.3
Caste	7	11.6
Oxalate	38	63.3
Phosphate	12	20.0

Table 2: Preoperative urine culture result of different micro-organism in 30 patients of vesical calculi/ suspected of having urinary tract infection.

Micro-organism isolated	No. of cases	Percentage
No. of growth	10	33.3
E. coli	11	36.6
Klebsiella	3	10.0
Pseudomonas pyocyaneous	2	6.6
Streptococcus	2	6.6
Staphylococcus areus	1	3.3
Multiple organism	1	3.3

In the present series, the author has observed positive culture for various bacteria in 20 cases. *E. coli* (36.6%) was the commonest micro-organism isolated followed by *Klebsiella* (10%), *Pseudomonas* (6.6%), *Streptococcus* (6.6%) and *Staphylococcus* (3.3%) (Table 2).

Table 3: Number of stones in the bladder and urinary tract visualized in the plain x-ray (K.U.B) among the subjects.

No. of stones	No. of cases	%	Other stones in UT	No. of cases (n=60)	%
Single	52	86.6	Only in bladder	56	93.3
Two	06	10.0	Renal pelvis and bladder	02	3.3
Three	02	3.3	Ureter and bladder	02	3.3

All the stones in author's series were radio opaque and produced characteristic radio dense shadow. Maximum number of stones were single, and most of them were found only in bladder. The author found 8 cases of multiple stones, of which 6 being double and two being triple. In the present series 4 cases of bladder stones were found with associated stones in the renal pelvis (2 cases) and urether (2 cases) (Table 3).

Table 4: Postoperative complications in cases of vesical calculi.

Complications	No. of cases (n=60)	Percentage
Wound infection	4	6.6
Haematuria	2	3.3
Septic temperature	2	3.3
Suprapubic leak	1	1.6
Distention of abdomen	1	1.6
Total	10	16.6

A total of 10 (16.6%) out of 60 patients with vesical calculi showed postoperative complications. Wound infection was the commonest post-operative complication in the present series followed by haematuria (3.3%) and septic temperature (3.3%). Suprapubic leak and distention of abdomen was seen in 1.6% patients (Table 4).

Amongst those aged between 3-5years the average length of penis was reduced from 1.35 inches to 1.17 inches, while among those aged between 6-8 years the average length of penis was reduced from 1.9 inches to 1.38 inches and among those aged 9-11years the average length of penis was reduced from 3.0 inches to 2.6 inches. Overall, the average length of penis was reduced by 0.17 to 4 inches after one month of operation (Table 5).

Table 5: Length of penis in 15 cases of vesical calculi, one month after removal of stone.

Age group in years	No. of cases turned up for follow up	Preoperative average length of penis in inches	Postoperative average length of penis in inches
3-5 years	5	1.35	1.17
6-8 years	6	1.9	1.38
9-11years	4	3.0	2.6

DISCUSSION

Plain x-ray abdomen

All the stones in author's series were radio opaque and produced characteristic radio dense shadow. Hence the accuracy was 100%. Bailey et al, mentioned that plain x-ray pelvis will diagnose stones in 92% of patients.[3] The author feels that plain x-ray (K.U.B.) is essential in all those patients in whom symptoms are suggestive vesical calculi. Plain x-ray (K.U.B.) at the same times shows the number of stones which is of great value because at the time of operation one should look for more than one stone which are shown in the plain x-ray film. The author found 8 cases of multiple stones, of which 6 being double and two being triple. Another value of plain x- ray (K.U.B) is that, it will show stones in the urinary tract. In the present series 4 cases of bladder stones were found with associated stones in the renal pelvis (2 cases) and urether (2 cases). Sometimes stone is not visible in plain x-ray especially if the photograph is not of good quality; or the stone is soft or of pure uric acid. This should always be kept in mind when symptoms suggestive of vesical calculi are present in such situation other methods of investigations such as ultrasonography or cystoscopy should be done.

In a study by Kamal BA et al, almost all (98%) of the patients had radio-opaque calculi and the diagnosis was uroradiographic in these patients.[4] This contradicts some earlier reports that most urethral calculi are radiolucent, and that a uroradiographic diagnosis is made in only 40% of cases.[5,6]

Routine urine examination

Reaction and pH of urine showed that majority of stone patients had a highly alkaline urine. Whether this was due to tendency of alkaline urine formers to form stone or due to some other causes is not definitely known. Oxaluria was the commonest finding on urine examination and most of the cases were alkaline in this study. This is similar to the findings reported by Malladad et al.[7]

In the present series, the author has observed positive culture for various bacteria in 20 of cases. *E. coli* was the most common organism isolated. It is difficult to draw any conclusion on culture report whether the isolated bacteria are to be a causative factor of stone or the sequelae of the disease. In another study bacteriological study was conducted on pre-operative urine and operated bladder stones by Singh et al.[8] Pre-operative urine samples were collected aseptically for macroscopic and microscopic examination. Both pre-operative urine and operated renal stones were processed for bacteriological culture. The isolated microorganisms were identified by standard techniques.

Urinary tract infection was present in 27.88% cases. Majority of cases urine culture was positive (12.5%). *E. coli* (30.0%) was the commonest organism isolated. This is again comparable to our study. Present study findings are also in agreement with the findings reported by Tekam VK et al, and Holmgren K, who also reported the *E. coli* as the main responsible organism for U.T.I. Postoperatively the length of penis was reduced by17 to 0.4 inches in those cases who were followed up for one month in this study.[9,10]

Abnormally long penis in children with vesical calculus was reported by Raveenthiran V.[11] It is possible that penile length is influenced by the presence of a bladder stone. In vesical calculus, pain is often referred to the tip of the penis. Therefore, young boys with a bladder stone are known to repeatedly pull and squeeze the penis in a futile attempt of alleviating pain.[12] Physical stretching of the penis or tumescence caused by repeated massage could be responsible for lengthening of the penis. This hypothesis is supported by a recent publication.[2]

CONCLUSION

In the diagnosis plain x-ray (K.U.B.) was to be of great value in diagnosing the presence of stone.

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