International Surgery Journal
Tekam VK et al. Int Surg J. 2017 Aug;4(8):2525-2529
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20173386

Original Research Article

Clinico-bacteriological study of vesical calculus: a prospective study

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Received: 22 February 2017
Revised: 03 April 2017
Accepted: 18 May 2017

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ABSTRACT

Background: The incidence of primary bladder calculi in developed countries has been steadily and significantly declining since the 19th century because of improved diet, nutrition and infection control. In these countries, vesical calculi affect adults. However, bladder calculi remain common in developing and less developed countries. Despite the presence of several studies in countries with a high incidence of the disease, no complete uniformity in the reporting of data exists.
Methods: The present study was carried out in 76% admitted patient of vesical calculus, investigated and treated by spcl. Some stones were subjected to bacteriological culture.
Results: Incidence of vesical calculus was 1.01% of the total surgical admission and 14.87% out of total genito-urinary disease cases.Maximum number of patients were in the age group 0-10 years. Males predominated the females with a 12:1 ratio. *E.coli* was the commonest organism covering 22.3% of infection. All the cases were managed by spcl.
Conclusions: It was concluded from our study that were common in children with low socio-economic status. Metabolic, infective, stasis and vitamin a deficiency (MISA) remained the important factor in its formation. They are usually single and commonly of mixed variety.

Keywords: E. coli, MISA, Vesical calculi

INTRODUCTION

Urinary calculi are the third most common affliction of the urinary tract exceeded only by urinary infection and pathologic condition of the prostate.[1] They are common in both animal and human.[2] Exact etiopathogenesis of stone is still unknown, but misa (Metabolism, Infection, Stasis and vitamin A deficiency) have been proved to be a factor behind its formation, no matter where it forms in the body.[3] Presence of upper urinary tract calculi is not necessarily a predisposition to the formation of bladder stones.[4] The incidence of primary bladder calculi in developed countries has been steadily and significantly declining since the 19th century because of improved diet, nutrition and infection control.[5] In these countries, vesical calculi affect adults. However, bladder calculi remain common in developing and less developed countries.[6] Despite the presence of several studies in countries with a high incidence of the disease, no complete uniformity in the reporting of data exists.[7] The information obtained by bacteriological study of stones and their sensitivity to various drugs not only help in establishing the etiology but also useful in planning the treatment and prevention of the recurrence.[8-10]

METHODS

The "clinicobacteriological study of vesical calculus" was carried out in 76 patients admitted in surgical wards of Sanjay Gandhi Memorial Hospital associated with Shyam

Shah Medical College, Rewa during the period from October 2009 to September 2010. The study includes patients of vesicle calculus who were admitted through surgical OPD, casualty and transferred from others department of SGMH and SSMC Rewa.

Clinical assessment

Considered patients were interrogated for following detail;

Name, age, sex, occupation, socio-economic status, religion, residence rural / urban complaints with duration, dietary history, family history, past history, history of any previous surgical intervention specifically in relation to genito-urinary system. In past history attention was given for any similar previous episode, past history of UTI, pain, urinary tract surgery, spontaneous passage of stones or stone particles, history of catheterization or any chronic illness.

Renal/ureteric colic, retention, interruption of stream, haematuria, pyuria, dribbling, screaming, burning micturition, frequency, fever, nausea, vomiting, history of night blindness, rectal prolapse and other associated symptoms were recorded in detail with their duration. To evaluate the incidence of these symptoms in a case of vesical calculus.

In personal history, dietary history, daily intake of fluids, milk vegetarian or non-vegetarian, addiction, married or unmarried, type of food consumed. In family history, the attention was given if any member of the family was having the urinary stone problems.

Physical examination

After recording the detailed history, general examination along with symptom, sign of vitamin A deficiency and systemic examination was carried out in each patient with special attention to uro-genital system. Kidney, bladder, Loin and lumber tenderness and renal angle. Examination of external genital including penis, meatus, prepuse, hernial sites, scrotum testis and perineum. P/R examination for anal tone, palpable mass, prostate calculus rectal prolapse. Patient was assessed during micturition for flow of urine and prolapse rectum.

Investigation

Blood

Haemoglobin, total leucocyte count, differential leucocyte count, blood urea, blood sugar, serum creatinine.

Urine

- Routine examination: colour, reaction, albumin, sugar
- Microscopic examination: red blood corpuscles, pus cells, epithelial cells, crystals and casts, culture and sensitivity tests

Radiological examination

X-ray UB and KUB region, Intravenous pyelography, ultrasonography.

Analysis after removal of stone

- Gross appearance: numbers, colour, site, shape, surface, consistency
- Cut surface of stones
- Core culture of stone.

Patient who present with retention of urine was well catheterized and retention was relief of patients. Then patients required antibiotic and analgesic and they were investigated as per protocol. Grass respiratory tract infection, anemia of hypoprotenimia were treated accordingly.

When patient fit for surgery they were subjected for suprapubic cystolithotomy. The detailed of operative findings and procedure with recorded associated pathology like BPH, with stricture urethra treated simultaneously.

After operation patients stone was analysis, cut it to see core surface of stone. Some selected cases of stone regularly send for histopathology.

The postoperatively patients treated with proper antibiotic and analgesic and after regular follow-up of patients for five to seven days patients suture was removed and patients discharge to home.

RESULTS

Incidence of vesical calculus was 1.54% out of total surgical admissions and 18.97% out of total genitourinary system disease cases. Maximum number of patients (37.5%) was in the age group 0-5 years. More than 60% cases were age group of 0-10 years. Youngest patient was 2 years and eldest patient was 90 years old. Males predominated the females with male to female ratio 9:1. Majority of cases were from low socio-economic income group (90.38%). Majority of cases were from rural areas 98.23%. Most common symptom was burning in micturition (96.15%), followed by pain in lower abdomen (94.23%) screaming (93.26%) and increase frequency of micturation (91.34%). History of night blindness was found in (0.96%) cases. Majority of cases reaction of urine was acidic (79.80%) and in (16.34%) it was alkaline. Urinary tract infection was present in 27.88% cases. Majority of cases urine culture was positive (12.5%). *E. coli* was the commonest organism *Pseudomonas aerogenosa* 3.84% *Klebsiella aureogenosa* 1.92%, *Staphylococcus aureous* and *Proteus* 0.96%

present in and mixed organism was found in 3.84% cases. All the cases were managed by suprapubic cystolithotomy. 2 patients transurethral cystoscopic manual lithotripsy and in 9 cases prostectomy was done with suprapubic approach in same sitting. In 8 cases where stone was palpable in urethra it was first pushed into the bladder with the use of Xylocaine jelly 2% then suprapubic cystolithotomy was done.

Table 1: Distribution of cases according to age and sex.

Age group	Male	%	Female	%	Total	%
0-5	19	27.14	4	66.0	23	30.26
6-10	13	18.57	-	-	13	17.10
11-20	9	12.85	1	16.6	10	13.15
21-50	14	20.0	1	16.6	15	19.7
51-70	11	15.71	-	-	11	14.47
71-100	4	5.71	-	-	04	5.26
Total	70	100.0	06	100.0	76	100.00

DISCUSSION

The present study "clinicobacteriological study of vesical calculus" was carried out in 76 patients of vesical calculus who were admitted in Surgical Wards of Sanjay Gandhi Memorial Hospital associated with Shyam Shah Medical College, Rewa during the period from October 2009 to September 2010.

Table 2: Urine culture in different cases.

Bacteria	No. of cases	Percentage
E. Coli	17	22.36
Pseudomonas aerogenosa	04	5.26
Klebsiella aerogenes	02	2.63
Mixed	02	2.63
Proteus	01	1.31

Vesical calculus has been one of the most common and distressing maladies of mankind.[11] Since the ancient times and are still with us affecting the patients of all age group, sex and socioeconomic status, although incidence varies in different groups.

Although in last ten years due to the development of newer methods of treatment for vesical calculus, it has now become possible to treat without surgery.

Table 3: Incidence.

Author	Place study	Incidence of vesical calculas %
Kabra SG	Rajasthan	3.4%
Fazil YM	Kerala	0.88%
R. Kumar	Aligarh	3.66%
Mcloid RS	Leeds Area	3.8%
Singh S	M.P. (Rewa)	2.78%
Shakya GR	M.P. (Rewa)	1.64%
Tiwari	M.P. (Rewa)	1.55%
Singh MP	M.P. (Rewa)	1.23%
Manjhi G	M.P. (Rewa)	1.54%
Present Study	M.P. (Rewa)	1.01%

Table 4: The venous symptoms as reported by various workers.

Author	Pain Abd.	B.M.	Diffi. in Stream.	Freq.	Screaming	Retention
Singh SS	80%	83.6%	83.15%	45.4%	27.0%	11.8
Shakaya GR	76%	52%	66.0%	49.0%	28.0%	27.0
Vidhyadhar et al	77%	78%	61.0%	55%	20.0%	-
Tiwari et al	89.2%	84.5%	64.28%	54.7%	27.38%	-
Singh MP	60.8%	92.7%	68.11%	88.4%	78.26%	23.2
Manjhi G	94.23%	96.15%	93.26%	91.34%	93.26%	37.5
Present study	92.1	94.73	71.06%	86.84	71.05%	59.2

Dietary analysis in cases of vesical calculus gives information about various properties of different foods.[12] Some are calculogenic, while the others are helpful in preventing this by various ways. This information may specially recurrence of stones. The bacteriological analysis of vesical calculus and urine impart, the

information regarding the urinary tract infection in calculus formation.[13,14] In present series, the incidence of vesical calculus in relation to total admission and total genitourinary system cases was 1.01% and 14.87% respectively.[15]

Study clearly indicated that incidence is progressively increasing in rural areas of this region. Pain in abdomen over suprapubic region was seen in 92.1% cases and it could be due to associated chronic urinary retention and urinary tract infection. Burning micturition 94.73% is almost always associated with urinary tract infection. Retention of urine 59.21% was due to stone due to stone obstructing the outflow and enlarged prostate. Supra pubic distension 36.84% due to distended bladder was seen in either impacted urethral or vesical calculus or enlarged prostate, with associated vesical calculus. Stone palapble in urethra 2.63% and enlarged prostate seen in 7.89%.

Table 5: Common bacteria on urine culture.

Authors	No. of culture	Common bacteria	%
Agrawal SL		*E.coli*	62.79
		Klebsiella	9.30
Kumar R	250	*E.coli*	37.05
		Pr. Vulgaris	15.05
		K. Aerogenes	15.05
Kevin A et al	83	*Staphylococcus*	24.09
		E.coli	21.68
Ohawa M et al	-	*E.coli*	21.60
		Klebsiella	4.00
		Proteus	11.55
Singh S	30	*E.coli*	40.0
		Klebsiella	13.33
		Proteus	6.66
Shakya G.R.	97	*E.coli*	38.14
		Klebsiella	4.12
		Staphylococcus	7.21
Tiwari et al	26	*E.coli*	30.46
		Klebsiella	3.85
		Proteus	3.85
Singh MP	44	*E.coli*	31.82
		Mixed	9.09
		Pseudomonas	4.55
Majhi G	80	*E.coli*	18.75
		Klebsiella	3.75
		Pseudomonas	3.75
		Staphylococcus	3.75
Present study	26	*E.coli*	22.36
		Klebsiella	2.63
		Pseudomonas	5.26

The urine culture was positive in 26 cases out of 76 cases (33.19%). in 24 cases, single organism was found and in 2 cases mixed organism was found. In the present series, main organism responsible for U. T. I was *E.coli* (22.36%) consistent with the findings of Kevin et al.[16] In the present series, most of the patients were free of complications.[17] The common post-operative complication was supra-pubic urinary leakage18 18.54%. wound infection was 4.28% and post-op hematuria 1.90%.[19]

Table 6: The incidence of infected stone (bacteria present in core of stone).

Authors	%	Common bacteria	% of culture
Kumar R	14.4	*E. Coli*	16
		K. aureous	6
Jackson E	71.0	*P. Mirablis*	12
		E. coli	2
Takeuchi H	79.0	*P. Mirablis*	-
		Staphylococcus	-
Mitsuo O	70.0	*P. mirablis*	8
		E. coli	5
Shigetta M	-	*E. coli*	7
Rasheed Al	17.6	-	-
Hayashi T	60.0	-	20
Gault MH	-	-	18
Shakya GR	20.7	*E. coli*	7
		Staphylococcus	1
Singh MP	38.0	*E. coli*	14
		Staphylococcus	2
Manjhi G	30.0	*E.coli*	18.75
		K. aerogenes	3.75
		Staphylococcus	3.75
Present study	11.42	*E.coli*	30.0
		Staphylococcus	10.0

Stone culture was seen positive in 8 cases 11.42%. *E. coli* was seen in majority of cases 30% while *Staphyloccocus aureus* 2 cases 10% and 12 cases of stone culture were sterile of the total 20 stone cultures examined.[20]

CONCLUSION

It is concluded from above study that vesical calculus was common in children of low socioeconomic status. Metabolism, infection, stasis and vitamin A deficiency (MISA) remained the important factors in its formation. Suprapubic cystolithotomy is the most common intervention in present scenario. *E. coli* is the predominant organism found both in urine and core culture of stone. Incidence of vesical calculus is progressively decreasing in urban region because of improved diet, nutrition, infection control and modification of life style.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Tekam VK, Choube A. Clinico-bacteriological study of vesical calculus: a prospective study. Int Surg J 2017;4:2525-9.