Is cystolithotomy obsolete in present era? A case series on large urinary bladder stone management

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ABSTRACT

Background: Large urinary bladder (UB) calculus is now rare in urological clinical practice. UB stone presents with obstructed urinary flow, increased urinary frequency, and lower abdominal and perineal or penile pain. Male patients are affected more. Hot environmental condition, poor water intake, benign prostatic enlargement, urethral stricture, and prolonged urethral catheterization are some of the contributory factors for bladder stone formation. Herein, we have tried to highlight importance and need of open cystolithotomy in five cases of large UB calculus presented to outpatient department (OPD) with their clinical presentation, history, and investigations with probable causes and review of literature.

Case series: Five consecutive patients were evaluated, diagnosed, and operated for giant UB calculus by open cystolithotomy. Patients were discharged with suprapubic catheter (SPC) and per-urethral catheter (PUC) in situ. SPC and PUC were sequentially removed after 3 weeks of surgery. All five patients had intact UB stone removal except one where pneumatic lithotripter was used in open approach. Post-operative period of all patients was uneventful. None of the patients had any postoperative complications. Average hospital stay was 4–5 days. Visual Prostate Symptom Score (VPSS) decreased and maximum flow rate (Qmax) improved in all patients.

Conclusion: Poor health care awareness, poor socio-economic status, and faith in alternative medicine may be the causal factor behind delayed clinical presentation of large UB stones. Despite huge advances in endourology, need of open surgical approach like cystolithotomy is still there. New generation of urologists must be well versed with open approach also, as few clinical case require open approach only.

Keywords: urinary bladder, calculus, LUTS.

Type of Article: Case Series **Specialty:** Urology

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Background

Patient with urinary bladder (UB) stone(s) present with lower urinary tract symptoms (LUTS) along with or without other complaints such as lower abdominal pain, pain at tip of penis and /or perineum, dysuria, and hematuria as well [1,2]. UB stones may or may not be associated with urinary tract infection (UTI) [2]. Causes of UB stone can be prostatic enlargement, chronic UTIs, urethral stricture, UB diverticula, prolonged catheterization, neurogenic bladder, and foreign bodies in UB [2].

Prevalence of UB stone in male is much more than that of female [3].

Radiological investigations such as X-ray pelvis or KUB (kidney-ureter-bladder region), ultrasonography (USG), and CT scan (NCCT-non contrast computed tomoscan) can diagnose UB stone [4–6]. Cystoscopy also confirms UB stone, it also has extra advantage in ruling out other bladder pathologies as well [6]. Large UB stones are more common in males [7]. Giant UB calculi are now rare in present era due to better medical facilities [8]. With advances in endourology, need for open surgery is decreasing day by day. Newer urologists are theoretically, not accustomed to open surgical techniques too. But in few cases, we need open intervention in place of minimal invasive approach.

Herein, we are reporting five cases of giant UB stones with their surgical management along with literature review.

Materials and Methods

A prospective case series, of five patients (consecutive) with large UB stone, who visited urology department from November 2025 to April 2026 (6 months), and were diagnosed and operated at our institute. Stone size of more than 4 cm was considered as large in our case series. Informed written consent was obtained prior to surgical intervention

Table 1. *Demographic profile of patients.*

S. no (case)	Size of UB stone(s) (cm)	Renal stone (y/n)	Site and size of renal stone (cm)	Urine culture (y/n)	Benign prostatic enlargement (BPE)/ urethral narrowing (y/n	Earlier urological surgery	Serum prostate-specific antigen-PSA (ng/ml)
Case 1	7x6 (USG)	Y	LK-1.2; RK-4.1	NG	N	N	2.4
Case 2	7.4x6 (NCCT-KUB and USG)	Y	RK-5.8X2.4 With multiple renal calculi	***E. coli***	N	N	Not done
Case 3	6x5 & 1.5x1 (NCCT-KUB and USG)	Y	RK-1.6	***E. coli***	Y(BPE)	Y (open CLT, 18 years back)	1.8
Case 4	5x4 (USG)	N	No renal stone	NG	N	N	Not done
Case 5	4.5x4 (USG	N	No renal stone	Not done	N	N	Not done

Table 2. *Table showing stone and investigation characteristics.*

S.no. (case)	Age (years)	Education	Residence	Occupation	Drinking water
Case 1	52	4th	Rural	Weaver	Tube well
Case 2	27	5th	Suburban	Welder	Well
Case 3	55	Graduate	Urban	Clerk	Borewell
Case 4	32	6th	Rural	Farmer and taxi driver	Hand pump
Case 5	52	Illiterate	Rural	Farmer	Tube well

in all cases along with written consent to take part and for publication of their clinical information and accompanying images. Institutional Ethics committee approval was obtained for this study (VCCH/ICH/2026/005 dated 06/01/2026).

Inclusion criteria were age > 18 years, patients with LUTS with radiologically confirmed UB stone, patients with written consent for surgery.

Exclusion criteria included patients without consent for surgery, patients who strictly wanted endoscopic surgery (and did not give consent for open surgery), patients with severe comorbidities, and patients with sepsis.

Demographic profile was noted for each patient [Table 1].

VPSS was calculated preoperatively and postoperatively (at 3 weeks), for all patients as a part of LUTS evaluation [Table 3]. Uroflowmetry (maximum flow rate, i.e., Qmax) was also done in all patients as a part of LUTS evaluation and in ruling out bladder outlet obstruction and /or urethral stricture [Table 3].

All cases were operated by one surgeon under spinal anesthesia via lower Pfannenstiel incision. Surgical procedure done was open cystolithotomy (CLT). Open approach was selected partly due to patient preference and due to its feasibility and effectiveness as a surgical choice. Patients with positive urine culture test were given antibiotics accordingly while in patients with sterile growth (in urine culture and sensitivity test) and those without urine culture and sensitivity test, broad spectrum antibiotics were given based on hospital antibiotic policy. Repeat urine culture and sensitivity test were not done for reconfirming sterile or no growth for earlier positive cultures. Standard surgical steps were followed during the procedure. Average (Mean) duration of hospital stay was 4–5 days. First follow-up was at suture removal, i.e., 10–12 days followed by at 3 weeks (second OPD visit), where VPSS, uroflowmetry, and KFT were repeated, and then three monthly (regular OPD visit) for each patient. Complications such as wound infection, urinary infection, urinary leak, bleeding, and catheter blockage were assessed during the hospital course and then at first follow-up visit. Need for re-admission and re-operation, was made, at second follow-up visit.

Investigations used:

1. Routine blood investigations - complete blood picture, kidney function test (KFT), urine culture, and sensitivity test.
2. Uroflowmetry (preoperatively and postoperatively after 3 weeks) [Table 3].
3. Radiological investigations - USG-KUB (Ultrasonography-Kidney, Ureter and Bladder region) and NCCT-KUB (Non-contrast computed tomoscan - kidney, ureter, and bladder region) [Table 2].
4. Besides these, all necessary preoperative investigations were done as per pre-anaesthetic check-up.
5. Cystoscopy was done in all cases prior to open surgery to rule out distal obstruction and UB pathology.
6. Repeat KFT after 3 weeks (if raised preoperatively) [Table 3].

Table 3. *Comparison of pre- and post-operative parameters (creatinine, urea, VPSS, and Qmax).*

S.no. (case)	Age (years)	Preoperative serum creatinine (mg/dL)	Preoperative blood urea (mg/dL)	Postoperative serum creatinine (mg/dL)	Postoperative blood urea (mg/dL)	Preoperative VPSS	Postoperative VPSS	Preoperative Qmax (ml/s)	Postoperative Qmax (ml/s)
Case 1	52	4.06	56.42	1.8	48.41	23	10	No flow recorded	12
Case 2	27	1.35	48.23	1.1	45	23	7	5	13
Case 3	55	1.35	47.70	1.28	36.72	21	15	No flow recorded	12
Case 4	32	0.87	20.98	Not done	Not done	16	8	10	14
Case 5	52	0.68	38.59	Not done	Not done	18	8	4	12

Results

Case 1

A 52-year-old male patient was referred to urology OPD by a physician with ultrasonography report. On detailed history, pt revealed about increased urinary frequency, poor urine flow along with intermittency, and urinary incontinence for 5 years. He had on and off bilateral flank pain for the last 3–4 years. Until now, he was taking local treatment with non-allopathic consultations.

On routine blood investigations, he had deranged renal function (raised serum creatinine and blood urea) [Table 3]. Ultrasonography showed a large vesical calculus along with bilateral renal calculi with bilateral moderate hydro-ureteronephrosis [Figure 1 and Figure 2].

After other preoperative investigations, preoperative optimization, and preanesthetic checkup, he was planned for open cystolithotomy, as stone size was very large and patient didn't want staged endoscopic procedure for the same and so, he underwent, open cystolithotomy with supra pubic cystostomy (SPC) (with Foley's catheter), per urethral foley's catheter, and drain placement. Drain was removed on postoperative day two. Patient was then discharged with supra pubic foley's catheter (SPC) and per urethral foley's catheter (PUC) to be kept in situ for 3 weeks, with advice of regular antiseptic dressing. Post catheter removal, he had good urinary flow, with improved KFT, and improved VPSS score at 3 weeks [Table 3]. He underwent left percutaneous nephrolithotomy (PCNL) with right Double J (DJ) stent insertion for bilateral renal calculi after 4 weeks of catheter removal and underwent for contralateral PCNL, i.e., right side after 3 weeks of first PCNL. Patient is stone free at 9 months of follow-up with no recurrence in kidney and UB with good urinary flow.

Case 2

A 27-year-old male patient came tour OPD with complaints of urinary incontinence with on and off abdominal pain. On detailed history, it was found that he had UB stone since the age of 8 years (as per his parents), which was not operated despite advice by a registered medical practitioner at that time. Until now, he and his family were consulting non-medical personnel and herbal and non-allopathic treatment for his urinary problem.

Necessary preoperative and routine investigations suggested raised serum creatinine and a large UB calculus along with multiple right renal calculi in NCCT-KUB [Tables 2 and 3].

As stone size was, huge and was difficult in operating via endoscopic approach in single stage and, patient had deranged serum creatinine, he underwent open cystolithotomy with SPC with drain placement and PUC. During surgery, a great difficulty was faced on removing stone in toto, as stone was densely adhered to posterior UB

Figure 1. *Ultrasonographic film showing calculi in urinary bladder and both kidneys.*

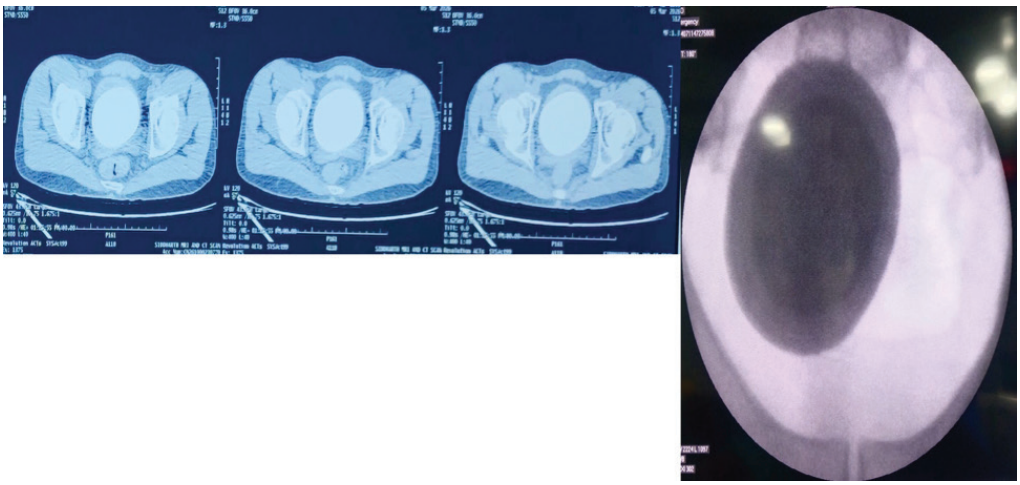

Figure 2. *Non-contrast computed tomoscan showing large urinary bladder calculus and fluoroscopic picture of urinary bladder calculus (visible as large round radio-opaque shadow).*

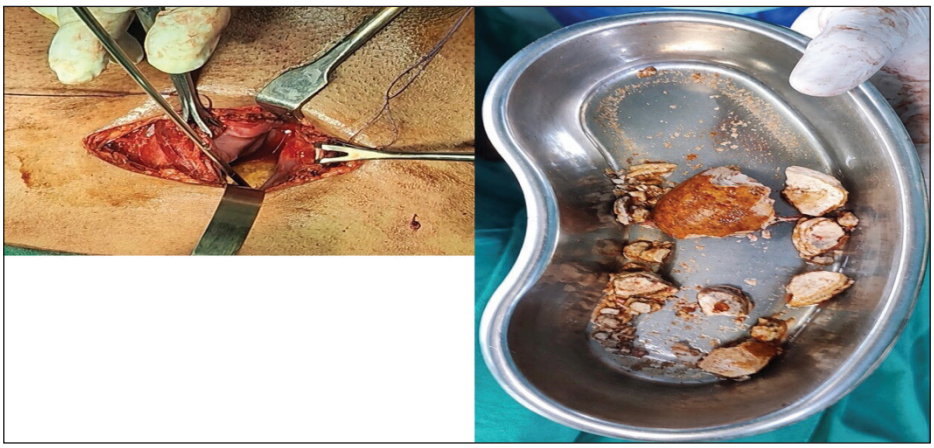

Figure 3. *Intraoperative photograph showing urinary bladder stone along with pneumatic lithotripter probe (shown by black arrow).*

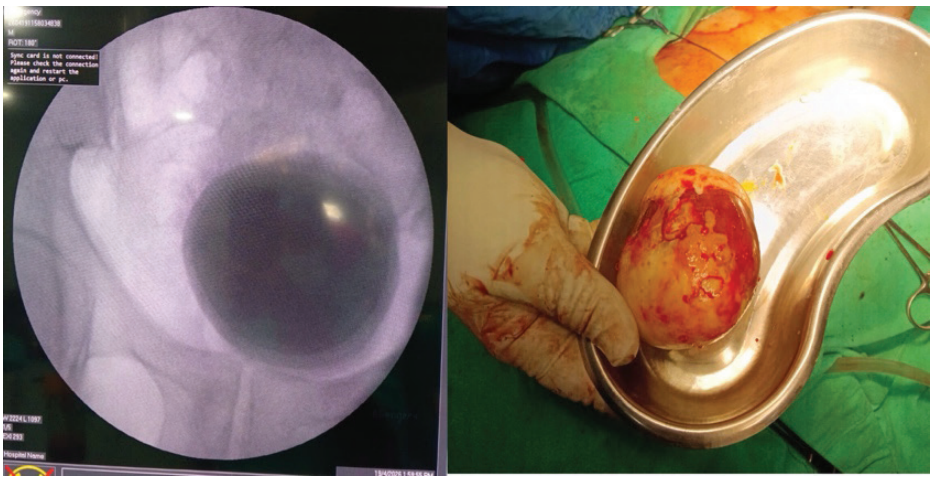

Figure 4. *Fluoroscopic view along with extracted Urinary bladder calculus.*

wall, so, UB stone was partially fragmented with pneumatic lithotripter, and then stone pieces were extracted out [Figure 3].

UB washed with normal saline. UB was closed in two layers with absorbable suture. Remaining wound was closed over drain. Drain was removed on once drain content was <15 ml. Patient was then discharged with SPC and PUC with advice of regular antiseptic dressing on fourth postoperative day. On regular follow-up at 3 weeks (for catheter removal), patient had improved symptom score and adequate flow of urine with improved KFT [Table 3]. Patient was planned for unilateral PCNL followed by contralateral side; however, patient did not follow-up for renal stone surgery.

Case 3

Patient had complaints of bothersome mixed LUTS for 8–10 years, which had increased in severity in the last 1 month with no history of urinary retention. He also had history of on and off bilateral flank pain for 8–10 years and dysuria for last one to two months. He also took local remedies and herbal treatment for the same and often visited non-medicine personnel for treatment. On evaluation, he had a large vesical calculus and another small vesical calculus, along with right renal calculus. He also underwent open cystolithotomy after preoperative optimization considering feasibility and ease (as stone size was too big to be operated via cystolithotripsy or cystolitholapaxy) [Figure 4].

His postoperative period was uneventful. On 2nd follow-up visit, he had improved urinary flow along with improved VPSS and KFT. He was operated for renal calculus (right sided PCNL), a week after PUC and SPC removal, i.e., 2nd follow-up visit. Postoperative period was uneventful. After 3 months follow-up, patient had good urine flow and was asymptomatic with no stone recurrence.

Case 4

Patient visited OPD with complaints of on and off lower abdominal and bilateral flank pain for 2–3 years. He also had increased daytime and nighttime urinary frequency

for last 2–3 years. He had normal urinary flow and at time his urinary flow was poor; however he had no episode of urinary retention until now. On evaluation, he had a giant vesical calculus.

After preanesthetic checkup and preoperative optimization, he also underwent open cystolithotomy with PUC and SPC with drain placement [Figure 5].

Patient was operated by open approach, considering patient choice. Patient postoperative period was uneventful. Patient passed urine with a good flow (after PUC and SPC removal at 3 weeks), and his third month follow-up is awaited.

Case 5

This patient came to casualty with complaint of acute urinary retention. He was immediately catheterized with 14fr foley's catheter. On history and further examination, he had lower abdominal pain and obstructed urinary flow in the last 1 year. Ultrasonography suggested a large UB calculus of size 4.5 cm with cystitis.

Patient was counselled for cystolithotripsy (percutaneous and transurethral), but due to patient preference (he was adamant for intact removal of bladder stone), open surgical procedure was done. After adequate proper active optimization, open cystolithotomy (with drain placement) was performed via Pfannenstiel incision. Intact stone was removed [Figure 6].

Postoperative period was uneventful. Patient was discharged on PUC and SPC with postoperative instructions. PUC removal was done after 3 weeks. At 3 and 6 months follow-up; patient was stone free, had good urinary flow, and no urinary complaints.

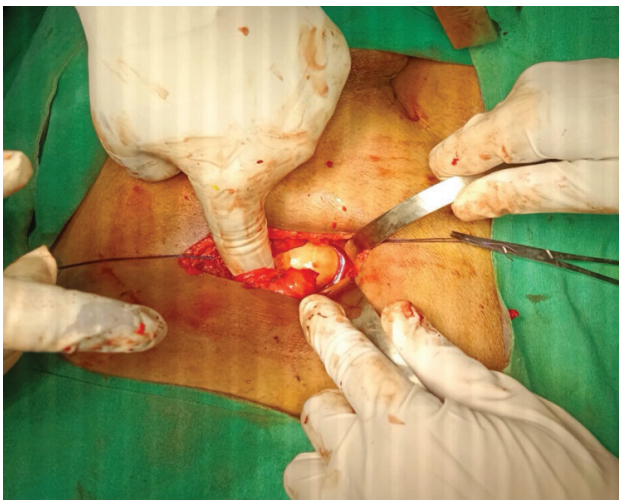

Figure 5. *Intraoperative photo of urinary bladder calculus (shown in black arrow).*

Discussion

Male-to-female prevalence of bladder stone ranges from 4:1 to 10:1; however, in our case series, all patients were male [2,3] [Table 1]. Incidence of UB stones increases with age, with maximum incidence in fifties or sixties [3]. Three out of five patients in this study were in their fifties [Table 1].

UB stones are classified as primary or endemic, if they occur in absence of any urinary tract pathology; secondary bladder stones, which occur in presence of urinary tract pathologies; and migratory bladder stones, which occur due to migration of stone from the kidneys [3]. UB stones were not classified in our case series.

Bladder stones have variable presentation with or without constellation of symptoms. Patients may present as LUTS and /or with hematuria, lower abdominal pain, penile pain and perineal pain, dysuria, urinary

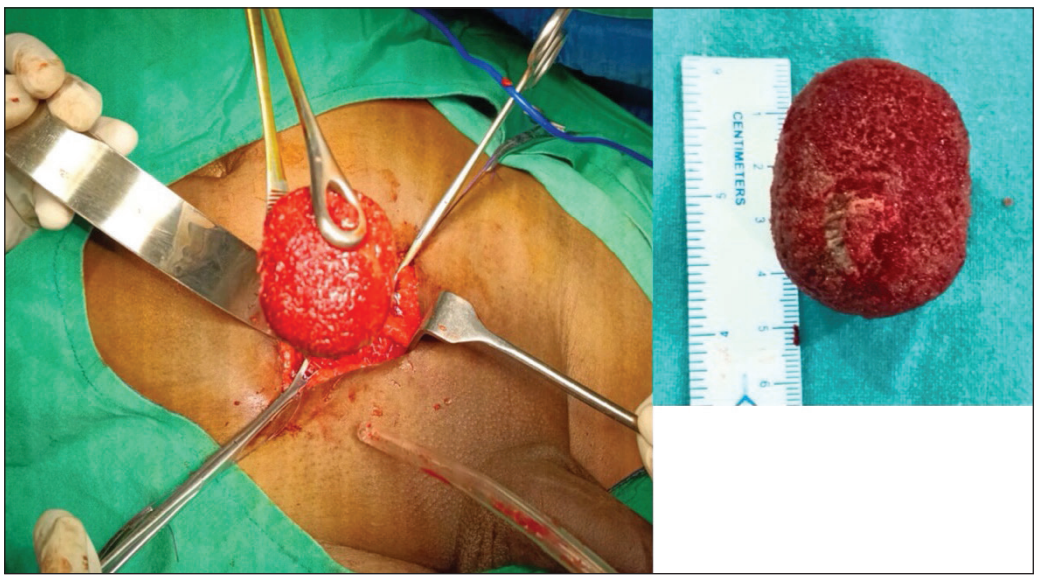

Figure 6. *Intraoperative photograph showing extraction of urinary bladder calculus along with measurement of the calculus.*

	Postoperative VPSS	Postoperative Qmax (ml/s)	Renal function (creatinine/ urea) in mg/dL	Catheter removal dates	Total duration of follow-up (Post catheter removal) (months)	Complications	Stone recurrence	Additional renal stone procedure	Lost to follow-up
Case 1	10	12	1.8/48.41	SPC-23/11/2026 PUC-30/11/2026	9	None	No	Left PCNL-03/12/2026 Right PCNL-26/12/2026	No

	Postoperative VPSS	Postoperative Qmax(mL/s)	Renal Function (Creatinine/urea) in mg/dL	Catheter removal dates	Complications	Stone recurrence	Additional renal stone procedure	Duration of follow-up (Post catheter removal)	Lost to follow-up
Case 2	7	13	1.1/45	SPC-28/01/2026 PUC-04/02/2026	None	Patient lost to follow-up	None	1	Yes

	Postoperative VPSS	Postoperative Qmax(ml/s)	Renal function (creatinine/urea) in mg/dL	Catheter removal dates	Complications	Stone recurrence	Additional renal stone procedure	Duration of follow-up (Post catheter removal) (months)	Lost to follow-up
Case 3	15	12	1.28/36.72	SPC-18/02/2026 PUC-25/02/2026	None	Right PCNL-05/03/2026	Yes	6	No

	Postoperative VPSS	Postoperative Qmax (mL/s)	Renal function (creatinine/urea) in mg/dL	Catheter removal dates	Complications	Stone recurrence	Additional renal stone procedure	Duration of follow-up (Post catheter removal) (months)	Lost to follow-up
Case 4	8	14	0.87/20.98	SPC-18/06/2026 PUC-25/06/2026	None	No	None	Awaited	No

	Postoperative VPSS	Postoperative Qmax(ml/s)	Renal function (creatinine/urea) in mg/dL	Catheter removal dates	Complications	Stone recurrence	Additional renal stone procedure	Duration of follow-up (Post catheter removal) (months)	Lost to follow-up
Case 5	8	12	0.68/38.59	SPC-10/02/2026 PUC-18/02/2026	None	No	No	6	No

	Probable cause of bladder stone formation	Relevant factors associated with bladder stone formation
Case1	• High bladder neck • Accustomed to local treatment for pain and urinary complaint	• Upper tract calculi. • Post void residual urine
Case 2	• High bladder neck • Accustomed to local treatment for pain	• Upper tract calculi • Urinary Infection • Post void residual urine
Case 3	• Earlier open surgery for bladder stone (incomplete stone removal or de novo stone formation from suture inside bladder mucosa)	• Benign prostatic enlargement • Urinary Infection • Post void residual urine
Case 4	• High bladder neck	• Post void residual urine
Case 5	• Accustomed to local treatment for pain and urinary complaint	• Urinary Infection

incontinence, and urinary retention [2]. However, in some cases, UB stone may present as recurrent UTIs [9]. In this study, all five patients had different clinical presentation with different symptomatology. None of the patient had fever during first presentation.

Urinary stasis is the main mechanism behind bladder stone formation [10]. Bladder outlet obstruction, mostly due to benign prostatic enlargement, accounts for majority of UB calculus; however, in this case series, only one patient had benign prostatic enlargement [11] [Table 2]. Factors such as low educational level, low socio-economic, dry climate, dietary habits, and high exposure to the sun are associated with a high incidence of urinary tract calculi [12]. These factors were also found to be contributory in delayed clinical presentation in our cases, as, majority of cases were from poor socio-economic status with increased outdoor activity with high sunlight exposure [Table 1]. One special finding, in this study, was that the source of drinking water for all patients was underground water, i.e., from borewell, tubewell, well, and hand pump [Table 1]. Similar findings were suggested by Manna et al. [13]. Three out of five patients were from rural area with poor health facilities, which might be the contributing factor of delayed clinician visit, along with poor economic condition, similar to study by Scotland KB et al. [Table 1] [14]. Treatment with non-allopathic treatment and use of local remedies might also be a supportive cause of delayed clinical visit to a urologist or a registered clinician for such large bladder stones in this series, as almost all patients followed alternative medical therapy for long duration for their urinary symptoms [15]. Stone analysis was not done in all five cases due to monetary concerns.

Different definitions are there in literature for giant UB calculi. One definition is UB stone measuring more than 4 cm in its largest diameter [16] while other define giant UB calculi as a stone more than 100 g in weight [17]. In this case series all five cases had UB stone of size > 4 cm, and this stone size was considered as large or giant in this case series. Weight of removed bladder stones was not measured in our case series.

Large UB stones also cause urinary stasis that may be a contributory factor in enlargement of primary renal stone and formation of secondary renal stones as well. Large UB stone a contributory factor in causing renal dysfunction [18]. Three patients in our case series had deranged serum creatinine and blood urea, which normalized after UB stone removal (confirmed by improved KFT after 3 weeks of surgery) [Table 3]. None of our patients had or developed CKD.

In our series, all cases underwent ultrasonography (USG) and two patients had NCCT-KUB as well [Table 2].

Most bladder stones can be managed with endoscopic surgery [19]. In cases of extremely large bladder stones, open suprapubic cystolithotomy should be considered [19]. In this study, as all cases had UB stones >4 cm, only open approach was followed. The main advantages of open approach for bladder stone removal are reduced surgical duration, easier extraction of large and/or multiple bladder stones, the ability to remove very hard stones (i.e., difficult to fragment), and the removal stones adhered to the bladder lining, like case 2 in this series. However, the disadvantages are also there, such as increased hospital stay, more postoperative pain, the need for an incision, use of drains, risk of wound complications, and prolonged Foley catheterization. However, none of our cases had any wound complications. Increased International Prostate Symptom Score (IPSS), in patients with lower urinary symptoms is associated factor for bladder stone besides intraprostatic protrusion (IPP) and lower maximum flow rate (Qmax) [21]. In our study too, VPSS score, (an alternative to IPSS) and Qmax improved after removal of bladder stone in all patients [Table 3]. Hindi translated version of VPSS was used, as most of the patients visiting our OPD have limited education, and VPSS is found to be useful in such cases for evaluation of LUTS [22].

UB stone(s) should always be suspected in all patients presenting with LUTS and lower abdominal and penile pain. Large UB stones are still common in our part of world, probably due to health unawareness, poor socio-economic conditions, and poor health care facility in nearby areas. Faith in non-allopathic treatment might be one of the major reasons for such large bladder stones [23]. Source of drinking water also pose an elevated risk in formation of stones in urinary tract and thus bladder stones as well.

Conclusion

Poor socio-economic condition, poor health care facility, health unawareness, and faith on alternative medicine seem to be possible cause for large UB stones. In modern world, open approaches for surgical management are becoming obsolete; however, their relevance is still there like open cystolithotomy for large bladder stone is still needed, despite huge advances in endourology. Open approach though becoming rarer day by day, new urologists must also theoretically and surgically, accustom themselves with open techniques as well.

Whats new?

With advancement in endourology, large size urinary bladder (UB) stones are now very rare. Newer generation of urologists across the world has shifted from open approach to laparoscopic, robotic, and endoscopic approach. With these scenarios, the basic concepts of open surgery are now limited to textbooks only. Only few urologists know and operate by open techniques, while others hesitate to go for open surgical techniques, either due to non-regular practice with open techniques or due to peer pressure and fear of losing patients (maximum of them want non-open surgeries). In our part of world also, things are same but still health care facility and patient economic constraints pose a great difficulty in doing minimal invasive surgeries in such patients.
In this case series, the authors want to discuss the effect of patient socio-economic and demographic condition on UB stone and role and importance of open surgery for the same in the present time.

Limitations

Small sample size, single center study, lack of comparator group, no stone analysis, and shorter follow-up are some limitations of this study.

Conflict of Interest

The authors declare that they have no conflict of interest regarding the publication of this article.

Funding

No funding was done for this study.

Consent for publication

Our patient gave written consent for participation in this case report with understanding that intent was to publish.

Consent to participate and Ethics approval

Patients gave consent for participation in this case series, also, ethical committee clearance was obtained for the same.

Data Availability statement

The data presented in this study are available within the article.

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