



MANAGEMENT OF URETERIC CALCULI ACCORDING TO THEIR LOCATION AND SIZE – A STUDY

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ABSTRACT

Urinary calculi are the third most common affliction of the urinary tract, exceeded only by urinary tract infections and pathologic conditions of the prostate¹.

SYMPTOMS & SIGNS AT PRESENTATION

A.Pain- The vast majority of urinary stones present with the acute onset of pain due to acute obstruction and distension of the upper urinary tract. The severity and location of the pain can vary from patient to patient due to stone size, stone location, degree of obstruction, acuity of obstruction, and variation in individual anatomy (e.g., intra renal versus extra renal pelvis)². Small ureteral stones frequently present with severe pain, while large stag horn calculi may present with a dull ache or flank discomfort.

a.Renal pelvis-Stones in the renal pelvis > 1 cm in diameter commonly obstruct the uretero-pelvic junction, generally causing severe pain in the costo-vertebral angle, just lateral to the sacro-spinalis muscle and just below the 12th rib³.

b.Upper ureter-The proximal ureter includes that portion that runs from the uretero-pelvic junction to the upper part of the sacroiliac joint. When the stone is arrested high in the ureter the pain passes from the loin to the groin along the distribution of ilio-hypogastric and ilio-inguinal nerve. The pain of upper ureteral stones radiates to the lumbar region and flank⁴.

c.Mid ureter- The middle ureter overlies the sacral ala. Mid ureteral calculi tend to cause pain that radiates caudally and anteriorly toward the mid and lower abdomen in a curved, band-like fashion. If the stone is obstructed in mid ureter pain in right side present at Mc Burney's point mimic to acute appendicitis or acute diverticulitis.

d.Distal ureter- Distal ureter extends from the lower edge of the sacroiliac joint to the uretero-vesical junction. Calculi in the lower ureter often cause pain that radiates to the groin or testicle in males and the labia majora in females. This referred pain is often generated from the ilio-inguinal or genital branch of the genitor-femoral nerves.

B.HEMATURIA- A complete urinalysis helps to confirm the diagnosis of a urinary stone by assessing for hematuria and crystalluria and documenting urinary pH.

C.FREQUENCY AND BURNING MICTURATION- These symptoms are frequently associated in lower ureteric calculi.

D.ASSOCIATED FEVER -The association of urinary stones with fever is a relative medical emergency. Signs of clinical sepsis are variable and include fever, tachycardia, hypotension, and cutaneous vasodilation⁵.

E.NAUSEA AND VOMITING- Upper-tract obstruction is frequently associated with nausea and vomiting. Intravenous fluids are required to restore a euvolemic state.

RADIOLOGICAL INVESTIGATIONS

1.X-Ray KUB - Radio-opaque stone are visible in 90% of cases in line of ureter (near tip of transverse processes of lumbar vertebrae, sacroiliac joint and medial to ischial spine).

2.Ultrasonography -The ultrasound examination should be directed by notation of suspicious areas seen on a KUB film and for radiolucent stone which are not seen in X-ray KUB film. It is, however operator-dependent. The distal ureter is easily visualized through the acoustic window of a full bladder. It has minimal radiation exposure so it is safe in pregnant woman. It is also give information about size and location of stone.

3.Computed tomography - Non-contrast spiral CT scans are now the imaging modality of choice in patients presenting with acute renal colic. It is rapid and is now less expensive than an intravenous pyelogram (IVP).

4. Intravenous pyelography - An IVP can document simultaneously nephrolithiasis and upper-tract anatomy.

KEYWORDS : ureteric calculi, radiating pain, URS, IVP, haematuria, ESWL, ureterolithotomy.

INTERVENTION

1.CONSERVATIVE MANAGEMENT: Most ureteral calculi pass and do not require intervention. Spontaneous passage depends on stone size, shape, location, and associated ureteral edema (which is likely to depend on the length of time that a stone has not progressed). Ureteral calculi 4–6 mm in size have a 40–50% chance of spontaneous passage. In contrast, calculi >6 mm have a <5% chance of spontaneous passage⁶. This does not mean that a 1 cm stone will not pass or that a 1-2 mm stone will always pass uneventfully. The vast majority of stones that pass do so within a 6 week period after the onset of symptoms. Ureteral calculi discovered in the distal ureter at the time of presentation have a 50% chance of spontaneous passage, in contrast to a 25% and 10% chance in the mid and proximal ureter, respectively.

2.EXTRACORPOREAL SHOCK WAVE LITHOTRIPSY (ESWL): Extracorporeal shock wave lithotripsy has required an energy

source to create the shock wave, a coupling mechanism to transfer the energy from outside to inside the body. It is good option for radio-opaque stone, kidney stone less 20mm and ureteric stone less than 10mm size⁷. It is not good for radio lucent stone, middle and lower ureteric stone, obstruction distal to stone, bleeding disorder patients.

3.URETEROSCOPIC STONE EXTRACTION (URS): Ureteroscopic stone extraction is highly efficacious for lower ureteral calculi. The use of small-caliber ureteroscopes and the advent of balloon dilation or ureteral access sheaths have increased stone-free rates dramatically⁸. Stone-free rates range from 66% to 100% and are dependent on stone burden and location, length of time that stone has been impacted, history of retroperitoneal surgery, and the experience of the operator. Complication rates range from 5% to 30%; the rates increase when manipulations venture into the proximal ureter. Ureteral

stricture rates are <5%. Postoperative vesico-ureteral reflux is extremely rare. Calculi that measure <8 mm are frequently removed intact. Excessive force with any instrument in the ureter may result in ureteral injury⁹. A variety of lithotripters can be placed through an ureteroscope, including electro-hydraulic, solid and hollow-core ultrasonic probes, a variety of laser systems, and pneumatic systems such as the Swiss lithoclast¹⁰.

4. URETEROLITHOTOMY: Long-standing ureteral calculi those inaccessible with endoscopy and those resistant to ESWL can be extracted with ureterolithotomy¹¹.

AIMS AND OBJECTIVES

To study different treatment modalities for management of ureteric stones according to their size and location.

MATERIAL AND METHOD

This study was conducted in various patients of ureteric calculi, who were admitted in various general surgical ward of M.B.Government Hospital, Udaipur from the year 2012 onward. Those with symptoms and signs and Ureteric stone confirmed by radio imaging were admitted and treated according to size and location of stone in ureter.

Inclusion criteria:

1. Adult more than 18 yrs irrespective of sex.
2. Ureteric stone confirmed by radio imaging.

Exclusion criteria:

1. Pregnant and Lactating women.
2. Patient below age 18yrs.
3. Patients of ARF or CRF.

CLINICAL HISTORY:

A detail history of all the cases were taken, with special reference to the symptoms related to urinary tract like pain, radiation, frequency, burning micturation, difficulty in micturation, hematuria, fever and other complaints, in chronological order. In the history of past illness, special attention was paid to any drug treatment, surgical procedures, chronic disease and similar attacks. History of personal habits including diet, smoking, tobacco and alcohol was also taken.

General physical examination:

Following a detailed history patient was completely evaluated clinically with special reference to cardiopulmonary function, renal function and genitourinary system. Per rectal examination was done to rule out enlarge prostate as cause of retention of urine.

Routine Investigation:

Various investigations were done including Hb, TLC, BT, CT, Blood Sugar, Blood Urea, S.Creatinine, X-Ray chest, X-Ray KUB, urine complete and culture sensitivity, ECG.

Special investigation:

Ultrasound for KUB is done for distribute the patients according to size and location of ureteric stone. Intra venous pyelogram (IVP) was done for functioning status of kidney.

Intervention:

According to size and site of ureteric calculus different treatment modalities were used.

1. Stone present in upper ureter-
Stone size <8mm- conservatively managed.
Stone size 8-10mm URS was done.
Stone size >10mm uretero-lithotomy was done.
2. Stone present in mid ureter-
Stone Size < 8mm - conservatively managed.

- Stone size 8-10mm URS was done.
- Stone size >10mm uretero-lithotomy was done.
- 3. Stone present in lower ureter-
Stone Size <8mm- conservatively managed
Stone size >8mm URS was done.

In conservative management hydration therapy was given for three consecutive days. ESWL was not available in our institute.

OBSERVATIONS

TABLE – 1 AGE DISTRIBUTION AMONG STUDY SUBJECTS

Age (yrs.)	No. of case	%
18-40	30	60
41-60	15	30
>60	5	10

Maximum no. (60%) of patients were in age group 18 – 40 yrs, followed by 41-60yrs (30%) and >60yrs (10%).

TABLE – 2 DISTRIBUTIONS ACCORDING TO SYMPTOM

Chief complain	No. of cases	%
Pain	50	100
Dysuria	31	62
Haematuria	17	34
Retention urine	0	0
Fever	15	30
Vomiting	30	60

The common presenting symptoms were pain (100%) followed by Dysuria (62%), Vomiting (60%), Haematuria (34%), Fever (30%) in this study.

TABLE NO – 3 DISTRIBUTION OF CASES OF STONE SIZE <8mm AND ACCORDING TO THEIR LOCATION AND MANAGEMENT

Location	Conservative	URS	Open Uretero-lithotomy
Upper	4	0	0
Middle	6	0	0
Lower	8	2	0

It is evident from above table that all stone of <8mm size which was present in upper and mid ureter was managed conservatively. In lower ureteric stone 75% patients was managed conservatively and 25% by URS.

TABLE NO – 4 DISTRIBUTION OF CASES OF STONE SIZE 8-10mm AND ACCORDING TO THEIR LOCATION AND MANAGEMENT

Location	Conservative	URS	Open Ureterolithotomy
Upper	0	2	0
Middle	1	9	0
Lower	0	7	0

It is evident from above table that all stone of 8-10mm size which was present in upper and lower ureter was managed by URS. In mid ureteric stone 10% patients was managed conservatively and 90% by URS.

TABLE NO –5 DISTRIBUTION OF CASES OF STONE SIZE >10mm AND ACCORDING TO THEIR LOCATION AND MANAGEMENT

Location	Conservative	URS	Open Ureterolithotomy
Upper	0	0	10
Middle	0	0	1
Lower	0	0	0

It is evident from above table that all stone of >10mm size which was present in upper and middle ureter was managed by open uretero-lithotomy.

CONCLUSION

It can be concluded from this study that ureteric stone are common in young and productive age population. Patients of ureteric stone present with colicky pain and dysuria.

Management of stone is depending on the size, location, and patient's particular social status and the equipment available at a given institution.

Ureteric stone commonly manage conservatively with size less than 8mm size in different location of ureter.

Ureteroscopic removal of stone is better procedure for stone size is < 10mm and present in distal ureter.

Ureterolithotomy is better for stone size > 10mm and stone present in upper or mid ureter. Complications are common in this procedure as compare to ureteroscopic removal of stone.

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