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Original Research Paper

Surgery

A CLINICAL STUDY OF CALCULUS ANURIA AND MANAGEMENT OPTIONS

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ABSTRACT

AIMS AND OBJECTVES: To study the patients with calculus anuria with regard to various variables like age, sex, mode of presentation (symptoms, time prior to consultation, urine volume, RFT, electrolytes, comorbid conditions, infections), site and stone burden, various treatment options, intraoperative complications and post-operative complications and time to normalization of urine volume, RFTs, electrolytes.

MATERIAL AND METHODS: This study was carried out in GGH, GUNTUR from JAN 2017 to JAN 2019 to study the patients with calculus anuria with regard to various demographic variables, stone charecteristics, treatment options and complications.

Results: The mean age of patients was38.8 years, F: M was1:3. The symptoms of patients who reported with calculus calculus anuria were ureteric colic in 60%, loin pain 40%, serum creatine was in the range of 6 – 25mg. Electrolyte disturbance noted in our study was hyperkalemia. Usg had high accuracy in diagnosing renal calculi and CT KUB showed 100% sensitivity. The size of stone ranged from 0.8 to 4cm. Dialysis was performed in 21 patients, DJ stenting in 20 and PCN in 5 patients.URSL was performed in 33 renal units, PCNL in 5 units, push back PCNL in 5 units and open pyelolithotomy in 5 renal units. Minimal complications seen in our study were mild hematuria and surgical site infection. Time to normalization of creatinine and electrolytes in most of the cases were in the range of 4 to 10 days.

Conclusion: Calculus anuria is a urological emergency, and outcomes are excellent when diagnosis is made early and prompt treatment given. Majority of the patients with calculous anuria can be managed with endourological procedures. PCNL represents a safe and effective treatment modality with high stone free rate and minimal post-operative complications.

KEYWORDS : calculus anuria, ursl, pcnl, pcn

INTRODUCTION

The lifetime prevalence of stone disease is around 1% to 15%, and it varies according to age, gender, race, and geographic location[1]. Stone disease affected adult men more commonly[2].

Stone disease is the most common cause of obstructive uropathy.. Incidence of calculus renal failure is about 5% in patients presenting with acute kidney injury.

Calculus anuria is a urological emergency and it can be due to bilateral ureteric calculus impaction or unilateral ureteric calculus impaction of single kidney or the only functioning kidney.

Drainage of the obstructed kidney is required to relieve pain and prevent decline in function. Temporary drainage is done by minimally invasive endourologic and interventional radiologic techniques followed by a definitive procedure, and in some instances it may be a permanent treatment option.

Both PCN tubes and DJ stents have been shown to be equally effective in relieving an obstructed collecting system with similar complication rates. The duration and severity of obstruction has a significant influence on recovery of renal function. When acute complete obstruction of ureter is relieved, full recovery of GFR can occur, but prolonged duration of complete ureteral obstruction will result in diminished return of GFR. A number of different endoscopic, open, laparoscopic, and robotically assisted ablative and reconstructive options are available. Purpose of this study is to determine the clinical outcome of patients treated for calculus anuria.

MATERIAL AND METHODS

This study was carried out in the department of Urology GGH, GUNTUR from JAN 2017 to JAN 2019. Admission of patients was done through emergency and OPD. Detailed history of symptoms and signs with durations was recorded. Urine output between 0–100ml/24 hours was regarded as anuria. Blood Investigations like Blood Urea, Serum Creatinine, serum electrolytes was done. Ultrasonography of KUB area was performed in all cases to note the size and site of stone, presence of unilateral or bilateral kidneys, cortical thickness, echogenicity and degree of hydronephrosis. X-Ray KUB and CT KUB were taken for size and site of stone in the urinary tract. Urinary diversion procedures like ureteric catheter ization or percutaneous nephrostomy under fluoroscopic guidance was done on emergency basis to relieve the obstruction. Post procedure urine output will be recorded; blood urea, serum creatinine, and serum electrolytes were repeated when required during hospital stay of the patient. Hemodialysis was done in patients when required, after which definite treatment of calculi is done and intraoperative and post-operative complications were noted, time for normalization of RFTs and electrolytes.

INCLUSION CRITERIA

1. All patients who are diagnosed with calculous anuria admitted in urology wards GGH, GUNTUR during JAN 2017 to JAN 2019

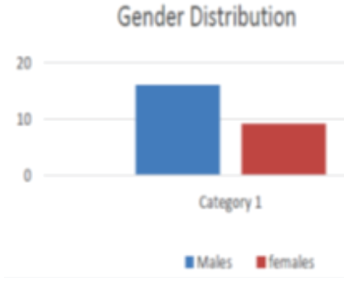
EXCLUSION CRITERIA

1. Anuria due to other causes like retroperitoneal fibrosis, malignancy, trauma, TB, schistosomiasis are excluded.

RESULTS

In our study, of the 25 patients, (36%) were female and (64%) were male, with female to male ratio 1:3

GENDER	PERCENTAGE	NUMBER
MALE	16	64
FEMALE	9	36
TOTAL	25	100

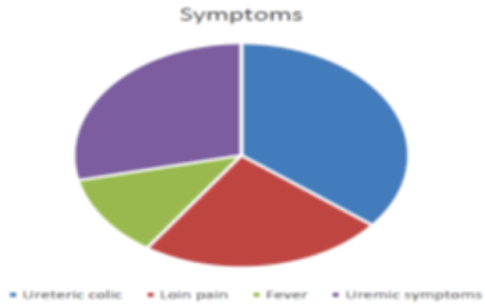


The age of these 25 patients ranged from 25 years to 65 years with a mean age of 38.8 years. The duration of anuria varied from 1 to 8 days.

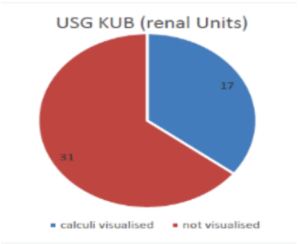
AGE	NUMBER	PERCENTAGE
1-15	0	0
16-30	4	16
31-45	12	48
46-60	7	28
61-75	2	8

Among these patients, (60%) of them presented with ureteric colic and (40%) with loin pain. (20%) had fever at presentation. (48%) had anuria with uremic symptoms like vomiting, drowsiness, pruritus, apathy, muscle twitching, and shortness of breath. (40%) had prior treatment history for stone disease.

Symptoms	Number	Percentage
ureteric colic	15	60
Loin pain	10	40
fever	5	20
Uremic symptoms	12	48

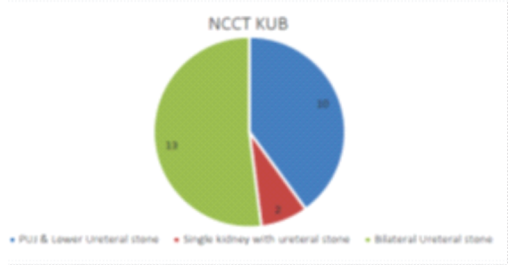


Urine volume of 90% of patients was less than 30ml/24hrs and 10% was 80ml/24hrs. At presentation Serum creatinine was in the range of 6 - 25mg with mean creatinine of 12.5 mg. Hyperkalemia was noted in 10 patients in the range of 5.8 to 7.2 mEq/l, who were treated with following options: Inj. calcium gluconate, Sodium bicarbonate, dextrose - insulin infusion along with dialysis. Comorbidities were present in (36%) cases, of which Diabetes Mellitus is seen in 5 cases, Hypertension is seen in 3 cases, diabetes and hypertension were seen in one case. (20%) presented with associated urinary tract infection. In all the cases Ultrasonography (USG) was performed, it detected calculi in 17 renal systems, of which 7 systems were upper ureteric calculi and 10 were PUJ calculi. In remaining patients ultrasound showed only hydronephrosis or hydroureteronephrosis.



In all patients X - Ray KUB was done, of which 16(33%) renal systems showed calculi and 32 systems did not show any calculi, in these patients NCCT KUB done.

In all the patients NCCT KUB was done. Bilateral obstruction was present in (52%), among these (32%) showed Bilateral lower ureteral stone and (8%) of them showed bilateral upper ureteric stones, (12%) of them showed one in upper ureter and one in lower ureter. Unilateral ureteral calculi and associated congenital abnormalities (congenital absent kidney) was present in (8%). The remaining (40%) showed PUJ stone and lower ureteral stone in contralateral kidney. The size of the stone in the study ranged from 0.8 cm to 4 cm.



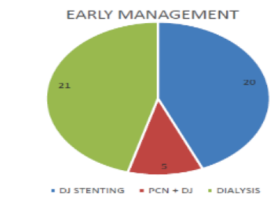
EARLY MANAGEMENT

Among 25 patients who presented with anuria dialysis was done in emergency in 21 patients. Five patients had pyonephrosis and PCN was performed in them. Bilateral DJ stenting was done in 23 cases. Unilateral DJ stenting in congenitally absent kidney on one side was done in 2

patients. Post obstructive diuresis was observed in 15 patients after early management these patients were managed meticulously so as to maintain euvolaemia Serum creatinine was normalized (normal creatinine according to age) in 20 patients (80%) after 7- 10 days. In 5 (20%) patients, whose creatinine was stabilized between 2-7 mg at the end of 10 days, were discharged and observed for one month. In those patients who reviewed after one month, the repeated creatinine level normalized in four patients, creatinine level decreased but not normalized in one patient(2-5mg%). In these patients 4 had co-morbid Illness like diabetes with pyonephrosis. Normalized level of creatinine does not depended on initial creatinine.

Five patients with septicemia were managed with higher antibiotics, dialysis and ventilator care, all of them were recovered from the sepsis.

PROCEDURE	NUMBER OF PATIENTS	PERCENTAGE
DJ stenting	Unilateral - 2 Bilateral - 18	80
PCN + DJ stenting	5	20
DIALYSIS	21	84



DEFINITIVE TREATMENT

After relief of obstruction and stabilizing patient, definite treatment of calculi was done

In patients with Single kidney (i.e. 2 patients {8%}) with lower ureteric stone were managed with URSL. Of 10 Patients with PUJ stone and with lower ureteric stone in contralateral kidney 5 patients with PUJ stones were managed with open pylolithotomy, and 5 with PCNLs and in all the cases of ureteric stones were managed with URSL. Bilateral lower ureteral stones (8 patients) managed with bilateral URSL, Bilateral upper ureteric stones (2 patients) were managed with pushback PCNL and URSL each In remaining 3 cases with one in upper and lower ureteric stones were managed with push back PCNL and URSL respectively

PROCEDURE	NUMBER OF RENAL UNITS
URSL	33
OPEN PYELOLITHOTOMY	5
PCNL	5
PUSH BACK PCNL	5

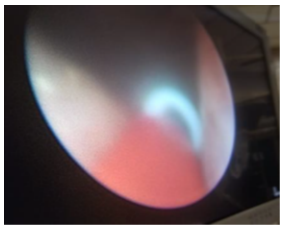
Bilateral Distal ureter stone

bilateral proximal ureteral stones

Puj and distal ureter stone.

Proximal and distal ureter stone

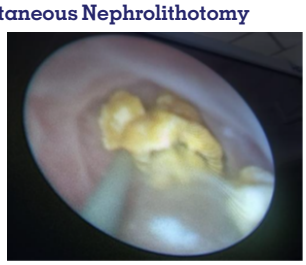
Percutaneous Nephrostomy



Intraop Double J Stent

Post DJ stent

Intra op Percutaneous Nephrolithotomy



Intra op URSL UreteroRenoscopic Lithotripsy

Post ursl + Pcnl

Post URSL

DISCUSSION

In the present study, majority of the patients with anuria had features of ureteric colic. They presented with history of low urine output and vague symptoms of nausea, vomiting, anorexia, muscle cramps, pruritis, mental instability, visual disturbances, increased thirst, malaise, weakness and loss of appetite or uremic symptoms. Chaabouni et al[3] observed that the symptoms in majority of their patients who had calculous anuria were polymorphic. In the present study sensitivity of ultrasound in diagnosing ureteric calculi was 14% and internal echoes suggestive of infection were seen in 5 out of 5 patients with pyonephrosis (100%), x- ray KUB was performed in 25 patients of which 16 renal units showed calculi.

In the present study NCCT scan of KUB region with thin sections (5mm) was highly sensitive in detecting bilateral ureteric calculi. Plain CT scan of KUB was done as a part of the study to detect calculi, and when X-ray KUB did not reveal any radiopaque densities and ultrasound showed hydrone phrosis. MDCT can readily diagnose radiolucent stones which may not have been seen on IVU, as well as small stones even in the distal ureter.

Bilateral ureteric calculi were seen in all the 13 patients, unilateral calculi along with contralateral congenital absent kidney in 2 patients and unilateral calculi was seen in 10 patients along with contralateral stone in opposite kidney (PUJ) in whom the CT scan was performed. In the workup of urolithiasis, the unenhanced CT has a sensitivity ranging between 96% and 100% and specificity ranging between 92% and 100%[29].In our study CT has shown all stones with sensitivity and specificity of 100%. Stones in the distal ureter can be difficult to differentiate from pelvic calcifications. In these cases, the urologist needs to look for other signs of obstruction which indicate the presence of a stone, including ureteral dilation, inflammatory changes in the perinephric fat, hydronephrosis, and a soft tissue rim surrounding the calcification within the ureter. The soft tissue rim around a stone represents irritation and edema in the ureteral wall[4,5].

In our Study emergency intervention options are DJ stenting / PCN and dialysis. Dialysis was required in 21 patients. In a similar study of calculous anuria by Regalado et al[6] and Bennani et al[7] showed good results on performing emergency DJ stenting or percutaneous nephrostomy. Khalil F[8] suggested the management of calculous anuria by prompt renal drainage with percutaneous nephrostomy or Dj stenting in their study the same percutaneous tract was used later for nephrolithotripsy.

In our study 5 patients who had associated infection along with anuria. Emergency PCN was done in all [9,10].

The primary treatment option in the study was URSL. URSL was done in 33 renal units. Pneumatic lithotripsy was the energy source used and is highly effective in stone fragmentation. In 7 Upper ureteric stones which were managed by URSL used laser energy source for lithotripsy[11] .

Kupeli et al[12] evaluated 1970 cases of ureteric calculi, of these 1580 were treated by ESWL and 484 by URSL. They concluded that URSL is the most effective treatment of choice in lower ureteric stones and Pneumolithotrispy is the most effective and less complicated energy source.

Unilateral pushback PCNL was done for 5 patients with upper ureteric calculi. In an about 5 patients who have PUJ stone was managed by PCNL.

Overall 5 open pyelolithotomies were performed. The main indication for pyelolithotomy was large stone burden with active infection.

Our study showed minimal postoperative complications like mild hematuria which lasted for 1 to 2 days following URSL and PCNL In our study post obstructive diuresis was seen in 15 patients after emergency treatment. Creatinine normalized in 20 patients (80%). In about 5 patients serum Creatinine remained between 2-5 mg even after stone removal and later after review of these patients in one month the repeated creatinine level normalized in four patients, and decreased but not normalized in one patient(2-5mg).

Results of our study are comparable with the results of Zhonghua *et al*, but difference is that they did emergency operation in majority of cases[13]. Whereas in our study we did emergency urinary diversion first, and after stabilizing the patient definite procedure was performed. The staged management in form of early urinary diversion and definite surgical treatment can save the patient from developing chronic renal failure[14].

CONCLUSION:

Calculus anuria is a urological emergency, and outcomes are excellent when diagnosis is made early and prompt treatment given. USG is the first-line imaging modality and is highly accurate in diagnosing in renal calculi, it is not very sensitive for ureteric calculi. Initial treatment of choice is early intervention with DJ stenting / PCN. Reversibility of renal function depends upon factors such as age, comorbities, duration of obstruction, absence of infection, presence of intra-renal or extra renal pelvis in obstructed kidneys. Initial creatinine or level of obstruction had no role in influencing the reversibility of renal failure. Majority of the patients with calculous anuria can be managed with endourological procedures like ureteroscopy[15] and pneumatic/ laser lithotripsy, PCNL which represents a safe and effective treatment modality with high stone free rate and minimal post-operative complications.

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