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CALCULUS RENAL FAILURE;

A STUDY TO PROFILE THE CALCULUS RENAL FAILURE AND ITS MANAGEMENT STRATEGY

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ABSTRACT… Background: Urolithiasis is a common urological disease in Pakistan. Calculus renal failure is a urological emergency that required immediate intervention to prevent further deterioration of renal function. **Objectives:** The purpose of this study is to present clinical profile of calculus renal failure patient and to report our experience of management of such patients. **Study Design:** Descriptive Cross sectional study. **Setting and Period:** Department of urology Services Hospital from July 2015 to December 2016 were included. **Materials and Methods:** Patients of all ages of either sex who presented with calculus renal failure. The patients with obstructive uropathy due to causes other than stone disease were excluded. Demographic information along with detailed history recorded. Baseline investigations included Complete blood counts, serum creatinine, serum electrolytes and ultrasound for KUB. For stone position Xray KUB in every case & CT in selected cases performed. Functional status of individual kidney was assessed by renal scan with differential GFR. After initial emergency treatment, all patients were subjected to definite treatment depending upon stone location and functional status of kidney. **Results:** A total of 68 patients were recruited for this study. The mean age of the patients was 48.8 $\pm$ 14.13 with range 23-90. 52(76.5%) of the patients were male and 16(23.5%) were females. Most common presentation was lumber pain 46 (67.6%) followed by anorexia 42 (61.8%). The average presence of the symptoms was 17.70 days. At initial management of the condition contained, 16(23.5%) of the patients managed by peritoneal dialysis /Hemodialysis, 10(14.7%) by unilateral PCN, 16(23.5%) by Bilateral PCN, unilateral JJ stenting done in 8(11.8%) while bilateral JJ stenting in 07 (10.9%), 6(8.8%). 10(14.7%) patient were managed with URS/ Lithoclast therapy without any prior diversion. Renal function in 08 patients (11.8%) did not improved after initial management and they remained on maintenance dialysis. **Conclusion:** In time diagnosis and early proper treatment improves the outcome.

Key words: Renal Failure, Urolithiasis, Urinary Diversion, Ureterorenoscopy.

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INTRODUCTION

Urinary stone disease is well known for centuries and history goes back to the Ancient Egyptians and Mesopotamia.[1] Being geographically located in African Asian stone bet, Urinary stone disease is one of the most common urological disease in Pakistan with estimated prevalence of 10-15%.[2] This disease is neither age specific, nor gender specific.[3] The workup and management of urolithiasis constitute about 50% of all urologic work load of every urology department in Pakistan.[4]

Most common presentation of urinary stone disease is pain. The diagnostic investigations for stone disease varies from simple X ray, ultrasound to Computer tomography(CT), depending upon availability of diagnostic facilities in that urology centre.[5] Stone disease is managed according to stone size, site & renal function of that kidney, available facilities & experty. The management includes medical expulsion therapy, Extra shock

wave lithotripsy, ureterorenoscopy (URS)/ lithoclast, percutaneous nephrolithotomy (PCNL).[6]

Most of urology centres in Pakistan, even at district level are at least equipped with facilities of X-rays & ultrasounds to diagnose urinary stone disease, and equipped with instruments at the minimum for open stone surgery.

But the problem is asymptomatic or neglected stone disease that leads to renal failure.[7] The presentation ranges from simply asymptomatic or symptoms of chronic kidney disease to life threating metabolic abnormalities.[6] Obstructing stones leads to pre renal acute kidney disease by obstructing urinary flow, often associated with rapid deterioration in renal function. If urinary obstruction not corrected timely, it may lead to irreversible renal damage. The presence of other risk factors like diabetes and hypertension, in presence of obstructive uropathy, accelerate renal damage process. All that leads to chronic kidney disease and renal failure, which is linked with meaningful morbidity and cost of health care.[8,9] Timely diagnosis and management prevents all these complications and restore renal function in most of the patients.[10] In this study, we want to report our experience of management of such patients presented with renal failure due to stone disease.

MATERIAL AND METHODS

The study was conducted in department of urology Services Institute of Medical Sciences /Services Hospital Lahore. The study duration was 18 months from July 2015 to Dec 2016. All the patient who presented with renal failure due to stone disease included in the study. Patients with Obstructive Uropathy due to other causes like malignancy, ureteric injury, ureterocele and ureteric stricture were excluded. At the time of admission, patients were observed for the consciousness, other diagnostic values and symptoms. Demographics information along with diagnostic history of all the participants was collected. Complete blood count, serum electrolytes, serum creatinine were evaluated. Ultrasound KUB & XRay KUB were done in every case while CT advised in cases of radiolucent stones. All the patients were given an initial management as per the conditions and requirements that range from urinary diversion in form of percutaneous nephrostomy (PCN) or by JJ stent to Dialysis. Later the definite treatment was provided depending upon location of stone and functional status of Kidney in the form of URS, open stone surgery and nephrectomy. If renal function were in acceptable levels at the time of initial presentation with stable condition of patient, Ureterorenoscopy with lithoclast was performed. These patients were followed up with ultrasound and creatinine.

Statistical Analysis

All the collected data was stored electronically & analyzed later by using SPSS version 20. Descriptive statistics were applied to calculate mean and standard deviation. Frequency distribution and percentages were calculated for qualitative variables like gender, history of symptoms etc. Over all a P values less than 0.05 was considered statistically significant.

RESULTS

A total of 68 patients were recruited for this study. The mean age of the patients was 48.8 + 14.13 with range 23-90. 8 (11.76%) of the patient were in the age category of 23 to 34. 16 (23.54%) belong to 35-44 and 44(64.70%) were above and equal 45 years of age. 52(76.5%%) of the patients were male and 16(23.5%) were females with ratio of 3:1. Regarding associated comorbidities 6(8.8%) were diabetes, 8(11.8%) hypertensive, while 6(8.8%) were both diabetic as well as hypertensive. More of the patients' characteristics were given in Table-I.

46(67.6%) of the patients were with Lumber Pain, 36(52.9%) with Nausea and vomiting and 42(61.8%) were with anorexia complaints. Among all patients 28(41.2%) were having oliguria, 14(20.6%) were with anuria and only 4(5.9%) with fever. The average presence of the symptoms was 17.70 days. 18(26.5%) of the patients possess past history of stone disease. More on the stone location, kidney obstructed and various biomarkers levels were given in Table-II.

Characteristics	Number (%)
Total number of Patients	68
Mean Age ± SD	48.8 ± 14.13
Gender	
Male	52 (76.5%)
Female	16 (23.5%)
Area of Living	
Urban	22 (32.6%)
Rural	46 (67.6%)
Mode of Admission	
A & E Department	28 (41.2%)
Outpatient Department	40 (58.9%)
Mean duration of symptoms	17.70 days (IQR 15-25)

Table-I. Demographic & clinical characteristic of patients

Variables	Numbers (%)
Location of Obstructive Stone	
Bilateral Kidney Stones	12 (17.6%)
Bilateral Ureteric stone	18 (26.5%)
One side Kidney stones & other ureteric stone	14 (20.6%)
Kidney stone in solitary functioning kidney	06 (8.80%)
Ureteric stone in solitary functioning kidney	16 (26.5%)
Number of Functioning Kidney Units	
Solitary functioning kidney	42 (61.8%)
Bilateral functioning kidney	18 (26.5%)
Bilateral non-functioning kidneys	08 (11.8%)
Biomarkers of Renal Function	
Serum creatinine (at presentation)	10.0 ± 5.50
Total Glomerular Filtration Rate (GFR)	32.0 ± 13.8

Table-II. Details of obstructive kidney and stone location

Regarding management plan, initial treatment followed by definite treatment strategy is shown in Table-III. After definite treatment 5(80.88%) of the patients were recovered fully with no further treatment whereas 13(19.11%) went for renal replacement therapy dialysis/transplant at 01 year of follow up.

Initial Treatment	
Peritoneal or Hemodialysis	16 (23.5%)
PCN Unilateral	10 (14.7%)
PCN Bilateral	16 (23.5%)
JJ Stent Unilateral	08 (11.8%)
JJ Stent Bilateral	07 (10.2%)
URS / Lithoclast	11 (16.1%)
Definite Treatment	
URS / Lithoclast (Unilateral)	22 (32.4%)
URS / Lithoclast (Bilateral)	14 (20.6%)
URS / Lithoclast one side & Pyelolithotomy other side	04 (5.90%)
URS / Lithoclast one side & Nephrectomy otherside	14 (20.6%)
Pyelolithotomy one side & Nephrectomy other side	06 (8.80%)
Maintenance Dialysis	08 (11.8%)

Table-III. Initial and definite management of calculus renal failure
PCN=Percutaneous Nephrostomy, URS=Ureterorenoscopy

DISCUSSION

The delayed presentation of renal stone with complications is not uncommon in developing countries like Pakistan. This not only reported in past literature but also present urology literature.[11] The delayed reporting may be due to the silent painless condition of stone. The other reason for this delayed presentation in our country is patient's preference to present non allopathic healthcare providers i.e. Homeopathic, spiritual healers, Hakeems. Another reason behind also the general physicians, instead of investigate the symptoms; they just prescribe the medicine for symptomatic relief. The living area have also impact the late presentation.[12] In our study 67.6% of patients were from rural area .Due to poverty, logistic problems and unavailability of urological services in rural areas, the presentation was late and hence significant delay in definite treatment that ultimately deteriorate renal function in these patients.[13] We also observed in our findings that calculus renal failure patients with underlying comorbid like Diabetes, hypertension showed more deterioration of renal function. Available international literature also confirms this finding.[14]

Treatment of calculus renal failure is multidisciplinary involving nephrologist, urologist and anesthetist.[15] Initial treatment of calculus

renal failure depends upon the patient's clinical condition and severity of electrolyte imbalance, stone burden and functional status of kidney. Initial treatment ranges from emergency hemodialysis or urinary diversion with delayed definite treatment to upfront definite urological intervention in the form of Ureterorenoscopy (URS) & stone clearance. Amanullah et al, has reported that 93.3% patients were first managed with relief of obstruction by ureteric stents and percutaneous nephrostomy followed by definite treatment.[16] In our cohort, we also performed urinary diversion in 41 960.29%) patients before definite treatment and 14.7% dialyzed first as an emergency procedure followed by definite treatment. Urinary diversion in the form of percutaneous nephrostomy is easy to perform and no specialized equipment or operation room required.[17] Elsheemy MS et al, recommended JJ stent over percutaneous nephrostomy in patients of calculus renal failure as it may facilitate subsequent URS and ESWL.[18] But preferred Urinary diversion by JJs stents or percutaneous nephrostomy, is still controversial.

Advancement of modern endourological techniques has led to a decline in the indications for primary urinary diversion before definite treatment. Upfront urological intervention had shown promising results.[19] Yang S et al reported that emergency URS and laser fragmentation is effective and safe in calculus renal failure patients with stone free rate of 91.8%.[20] Similar results are also reported from Pakistan .Shahzad Anwar et al concluded that definite treatment without temporary diversion, not only deceases the morbidity associated with PCN but also had advantage of short hospital stay and cost effectiveness.[21] In our cohort we also successfully managed only 14.7% patients with upfront definite URS / lithoclast.

Definite treatment depends upon stone location, stone burden, functional status of kidney that ranges from minimal invasive surgery (PCNL) to open stone surgery.[22] Non function kidneys units ended up with nephrectomy. Kumar S et al reported his experience of managing renal stone by PCNL in calculus renal failure. He reported that 27 patients out of 30, achieved complete clearance with also improvement in renal function.[23] Most of our patient with renal stones were managed with open stone surgery as equipment for percutaneous nephrolithotomy was not available in out department. Prolonged obstruction and comorbidity like hypertension will lead to non-functioning kidney units that ultimately ended up with nephrectomy.[24] In our study, 20(29.41%) Patients with non-functioning kidneys, underwent nephrectomy.

The limitations of this study are small sample size; single centre & short follow up.

Timely presentation and prompt treatment can save the renal function. People should be educated about renal stone disease and regular awareness campaign should be launched in stone belt area. General physicians should be educated about diagnostic investigation of renal stone disease and early referral to urologist. Government should established stone clinic with all possible facilities and expertise in remote areas of stone belt. Specialized stone centres like SIUT and Kidney centre Karachi should also play a role in training the urologist who will serve at remote areas of stone belt.

CONCLUSION

Early presentation, in time diagnosis and proper treatment preserve the renal function and improves outcome.

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Do not give up,
The beginning is always the hardest.

– Unknown –

AUTHORSHIP AND CONTRIBUTION DECLARATION

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