

CLINICAL STUDY AND SURGICAL MANAGEMENT OF RENAL STONE BY PERCUTANEOUS NEPHROLITHOTOMY

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ABSTRACT

BACKGROUND

Although stone disease is one of the most common afflictions of modern society, it has been described since antiquity. Urinary stone disease has perplexed the physicians for many centuries. Even today in spite of sophisticated research techniques and expand understanding of disease process, urinary calculi are major problems.

OBJECTIVES

1. To study the mode of clinical presentation of renal stone.
2. To study the preoperative and postoperative haematological test.
3. To study the preoperative and postoperative renal function test.

METHODS

50 patients diagnosed as renal stone more than 2.5 cm in size above pelvi-ureteric junction and admitted for Percutaneous Nephrolithotomy (PCNL) surgery in KIMS, Karad, during period Dec. 2013 to June 2015.

RESULTS

Mean age of presentation was 43.56+13.98 years. Incidence more in males 34 (68%) than females 16 (32%); 24 (48%) patients diagnosed as left renal calculi, 24 (48%) patients as right renal calculi and 2 (4%) patients as bilateral renal calculi; 31 (62%) patients were Non-vegetarian and 19 (38%) were Vegetarian; 30 (60%) patients were using borewell water and 20 (40%) patients were using tap water. All the patients presented with pain abdomen; 80% had burning micturition and 28% had Haematuria. The fall in mean Haemoglobin (Hb) was 0.78 gm/dL and fall in Mean Packed Cell Volume (PCV) was 2.33%, which was statistically significant. Fall in mean serum creatinine was 0.21 mg%, which suggested improvement in creatinine clearance.

CONCLUSION

Renal stone show a peak incidence in the 5th decade accounting for 36% of cases. Post-operatively, Hb, PCV and Creatinine done after 48 hours which show drop in mean HB was 0.78 g/dL and drop in mean PCV was 2.34% suggested minimal blood loss during surgery. Fall in mean serum creatinine was 0.21 mg%, which suggested improvement in creatinine clearance after PCNL surgery.

KEYWORDS

Renal Stone, Haemoglobin, Creatinine, PCNL.

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INTRODUCTION

Stone formation is usually a result of urinary super saturation. Decreased fluid intake and consequent urine concentration are among the most important factors influencing stone formation. The hot arid areas, diet, physical activity and corporeal overweight could be other reasons.^{1,2} Percutaneous

approach to kidney was first described in 1955 by Goodwin and Colleague.³ Percutaneous Nephrolithotomy is an integral component of the management of large-volume renal calculus disease.

MATERIAL AND METHOD

This is clinical study of cases of renal stone who has been admitted for PCNL Surgery to Urology Unit of General Surgery in Krishna Hospital, KIMS, Karad, during the period of Dec. 2013 to June 2015 over a span of 18 months.

The Selection of Patients was done with the Following Criteria

Inclusion Criteria

All patients diagnosed as more than 2.5 cm in size of renal stone above pelvi-ureteric junction and admitted for PCNL surgery.

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Exclusion Criteria

Renal stone in immunocompromised patient.

The patients were asked details of history. A detailed general physical examination and systemic examination done. Investigation like preoperative and postoperative haemoglobin, packed cell volume and creatinine, ultrasonography abdomen, X-ray KUB and intravenous pyelography were obtained.

Ethical clearance has been obtained from Research and Dissertation Committee/Ethical Committee of the Institution for this study. Patients were prepared for PCNL under General anaesthesia or spinal anaesthesia depending upon general condition.

Postoperative care was meticulously followed; intake and output charts and vital signs charts were maintained. Patients were given antibiotics, analgesics and sedation. Most of the patients had uneventful recovery. Nephrostomy drains were removed between 3rd to 5th postoperative days. Patients were advised to come for follow-up in OPD after 5 days from discharge and follow-up period was 2 weeks. Patients were asked for symptoms like pain, haematuria and urinary tract infection.

RESULT

In our study, the age of patients ranged between 11 and 70 years. The maximum number of renal stone was found to be in the age group between 40 and 49 years, i.e. 18 (36%) cases. (Shown in the Tab 1) The average age of presentation is 43.56±13.98 year, majority of patients were male (34). The sex incidence in the present study is 2.15:1. There were 34 (68%) males and 16 (32%) females out of 50 patients. In this study 24 (48%) patients were diagnosed of left renal calculi, 24 (48%) patients of right renal calculi and 2 (4%) patients of bilateral renal calculi and 31 (62%) patients were Non-vegetarians and 19 (38%) patients were Vegetarians.

In our study, 30 (60%) of the 50 patients were using borewell water. The remaining 20 (40%) patients were using tap water for drinking and all the patients presented with pain abdomen; 80% of the patients had Burning micturition, 28% of the patients had Haematuria, vomiting (24%), Pyuria (4%) and Fever (2%) were other common symptoms. (Shown in Graph 1). USG detected renal stone in 100% of patients. KUB X-ray was positive in 100% of patients. In our study, IVP done in only 47 (94%) patients and there were 100% positive result.

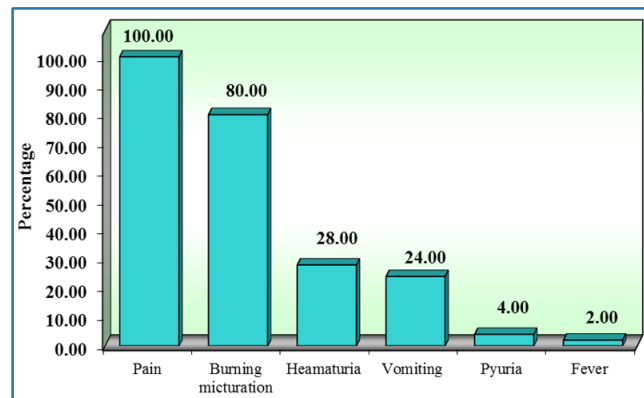
In this study, the mean pre-operative haemoglobin concentration was 11.98 gm/dL (Range: 7.50 gm/dL - 16 gm/dL) and post-operatively the mean haemoglobin concentration was 11.20 gm/dL (Range: 8.80 gm/dL - 13.50 gm/dL). The fall in mean haemoglobin concentration was 0.78 gm/dL, which was statistically significant (p=0.0031). (Shown in the Tab 2) and the mean pre-operatively packed cell volume was 36.45% (Range: 27.5%-50%) and post-operatively the mean packed cell volume was 34.11%. (Range: 27.3%-43%). The fall in mean packed cell volume was 2.33%, which was statistically significant (p=0.0001).

In our study, pre-operatively mean serum creatinine 1.35 mg% with range of 0.7 mg%-6.5 mg%. Post-operatively, the mean serum creatinine falls to 1.14 mg% with the range of 0.7 mg% - 2.4 mg%. The fall in mean serum creatinine was 0.21 mg%, which was statistically significant (p=0.0500). (Shown in the Tab 3) and 8 of 50 patients who had serum creatinine

values above 1.4 mg/dL before PCNL and were considered to have impaired renal function. After PCNL, only 3 patients had creatinine value remained above 1.4 mg/dL with range of 0.7 mg% - 2.4 mg%, which suggested renal function was improved after PCNL.

Age Groups	No. of Patients	% of Patients
<=29 yrs	9	18.00
30-39 yrs	11	22.00
40-49 yrs	18	36.00
>=50 yrs	12	24.00
Total	50	100.00

Table 1: Distribution of Patients by Age Groups



Graph 1: Distribution of Patients with Presence of Various Symptoms

Time	Mean	Std. Dv.	Mean Diff.	SD Diff.	Paired t	p-value
Pre-operative	11.98	1.69	0.78	1.76	3.1100	0.0031
Post-operative	11.20	1.08				

Table 2: Comparison of Pre- and Post-Operative Haemoglobin Scores by Paired 't' Test

Time	Mean	Std. Dv.	Mean Diff.	SD Diff.	Paired t	p-value
Pre-operative	1.35	0.91	0.21	0.76	1.9995	0.0500
Post-operative	1.14	0.33				

Table 3: Comparison of Pre- and Post-Operative Creatinine Scores by Paired 't' Test

DISCUSSION

Total 50 patients were studied in the present study. Their data has been analysed and discussed below.

In the present study, renal stone show peak incidence in the 5th decade according to 36% of the cases. The average of presentation is 43.56±13.98 years with a range of 11-70 years. In a study by Mahmoud M Shalaby et al⁴, mean age was 42±13.2 years and range 18-67 years and Hyder et al⁵ study showed mean age was 42.43±13.17 years and range 20-75 years.

Renal stone occurred predominantly in males compared to female. As compared with other studies, Sarhad Khan et al⁶ series showed 70% males and 30% females were affected. In

another study by Hyder et al, males 71.75% and female 28.24% were affected. Renal stone occurred predominantly in males and was almost twice more common than females in our study; 68% of patients in our study were males and 32% were females. This is similar to study by Sarhad Khan et al, where males affected were 70% and female affected were 30%. The male preponderance is probably due to increased testosterone levels, which results in increased endogenous oxalate formation. Males are engaged more in the outdoor occupation, which may result in dehydration and urinary concentration. Increased urinary citrate in females may aid in protecting females against urolithiasis.⁷

In our study, 62% patients were non-vegetarian and 38% patients were vegetarian. Some reports have described that vegetarians are at lower risk for stone formation in contrast to non-vegetarians (Robertson et al 1982). The role of animal protein and potassium intake in the aetiology of calcium stone formation is paradoxical. Some studies have shown a positive association between animal protein intake and stones (Curhan et al 2004). The consumption of a diet rich in animal protein (from meat, dairy, poultry or fish), sodium (Muldowney et al 1982, Silver et al 1983, Sabto et al 1984) and refined sugars increases urinary calcium and uric acid concentrations and lowers urinary citrate concentration. Kidney stones formers have been reported to process sugar abnormally (Rao et al 1982) by increasing urinary oxalate (Li et al 1986) and urinary calcium as well (Lemann et al 1969).⁸

In our study, pain was the most common complaint noticed in 100% patients of renal stone; 80% of the patients had burning micturition and 28% of the patients had haematuria. A similar study by Gaurav Rai Sharma et al⁹ showed main presenting symptom was pain (96.3%); 85% of the patients had burning micturition and 30% of patients had haematuria.

Plain X-ray KUB was able to demonstrate calculi in 100% of cases, which is similar to the study by KK Malhotra et al.¹⁰ Ultrasound (US) was a cheap, non-invasive, safe technique, which can detect acute urinary tract obstruction with a sensitivity of 91-92% and a specificity of 90%. Intravenous Urography (IVU) is the gold standard investigation providing information regarding the site and degree of obstruction, size of stone and the effect of obstruction on the renal excretion.¹¹

In our study, 52% patient operated as right PCNL and 48% operated for left PCNL. These results are similar to those reported by Sarhad Khan et al⁶, as right PCNL 55% and left PCNL 45%.

In our study, mean Hb and PCV drop were 0.78 g/dL and 2.33% respectively following PCNL. Compared with Rajesh Kukreja et al¹² showed mean Hb and PCV drop was 1.01 g/dL and 2.8% respectively. Compared with other study, which signifies least Hb and PCV drop during our procedure means blood loss very less. Significant falls in mean serum creatinine

(0.21 mg%) was demonstrated following the stone removal. This shows improvement in renal function with fall in creatinine in all patients. None of the patients showed deterioration of renal function. S. Gupta et al¹³ had shown significant fall in mean serum creatinine (0.33 mg%) after stone removal.

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