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PROSPECTIVE STUDY OF 200 CASES OF STAGHORN CALCULUS- A SINGLE CENTRE EXPERIENCE.

Urology

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ABSTRACT

Background: Staghorn stones are large branching stones that fill the renal pelvis and renal calyces and they can be complete or partial depending on the occupancy of the collecting system. . PCNL is a demanding procedure mainly for staghorn stones and may require multilple percutaneous tracts or multilple sessions of PCNL for complete clearance of stones. Hence ; we planned the present study to analyse patients undergoing PCNL for staghorn calculi.

Material and Methods: In present study 200 patients underwent PCNL for the treatment of staghorn kidney stones. After exclusion criteria patients were selected and underwent standard PCNL . Preoperative , Intraoperative and Postoperative data was collected.

Results: Out of 200 patients 95 (47.5%) were males and 105 (52.5%) patients were females. 120 patients (60%) were diagnosed with partial staghorn calculi whereas 80(40%) patients were diagnosed as complete staghorn Calculi. 37.5% patients were rendered stone free through single access port whereas 62.5% required multiple access port for PCNL in which 57.5% needed 2 access ports, 3% needed 3 access ports and only 2% needed 4 access ports for PCNL. 24 (12%) patients required 2nd stage procedure for residual stones and 1 (0.5%) patient become stone free after 3rd stage PCNL. Bleeding requiring blood transfusion was the most common complication in 21% patients. Whereas fever, hemothorax, hydrothorax, paralytic ileus were encountered in 12%,0.5%,0.5% and 4% patients respectively.

Conclusion: For staghorn calculus PCNL is safe and effective procedure with acceptable morbidity and without mortality. Now PCNL has almost replaced the open surgeries like pyelolithotomy , nephrolithotomy . with experience staghorn calculus can now be managed by minimum invasive technique like PCNL with no scar , no risk of incisional hernia , lesser hospital stay and minimum morbidity compared to open procedures.

KEYWORDS

PCNL, Staghorn Calculi

INTRODUCTION

Staghorn stones are large branching stones that fill the renal pelvis and renal calyces and they can be complete or partial depending on the occupancy of the collecting system[1]. Earlier open surgery was treatment of choice for staghorn calculi with its inherent morbidity but now AUA recommends percutaneous nephrolithotomy (PCNL) as gold standard treatment for staghorn stones as a single or staged procedure. PCNL is a demanding procedure mainly for staghorn stones and may require multilple percutaneous tracts or multilple sessions of PCNL for complete clearance of stones. Primary goal of treatment is complete removal of stone to relieve obstruction, remove infection, preserve renal function (2). Reducing complications and morbidity are secondary objectives.

In this study, we prospectively analyzed the outcomes and complications in patients undergoing PCNL operation for the treatment of staghorn kidney stones at tertiary level hospital in Jaipur.

PATIENTS SELECTION

Between 2015 and 2018, 200 patients underwent PCNL for the treatment of staghorn kidney stones in Urology department of Mahatma Gandhi Medical College and Hospital. Diagnosis of kidney stones were made by X-Ray KUB, Ultrasonography, Intravenous Pyelography (IVU) and/or computerized tomography (CT). Stones filling the renal pelvis and upto two calyx were assigned as partial staghorn and stones filling renal pelvis and extending into all major calyceal groups, filling at least 80% of the collecting system were designated as complete staghorn calculi. Associated comorbid diseases were also recorded.

Patients having urinary tract infection were treated by culture-specific antibiotic before surgery.

Exclusion criteria for patient selection was as follows:

a) morbid Obesity
b) Patient unable to lie in prone position for prologed period
c) Derranged coagulation profile
d) Gross pyonephrosis
e) Non-functioning kidney

Technique of PCNL for staghorn stones

General or spinal anaesthesia was used; a ureteric catheter was placed with the patient in the lithotomy position. Percutaneous renal access was then made using fluoroscopy . Most favourable posterior calyx was punctured. Guidewire secured inside the calyceal system and tract dilated upto 24-28 Fr depending upon palvicalyceal dilatation with Alken coaxial telescopic dilators . Rigid nephroscope of 20 Fr was used through Amplatz sheath . In some cases, secondary tracts were dilated to 24-28 Fr .The stone was fragmented with pneumatic lithotripter. Intraoperative fluoroscopy and nephroscopy were used for the detection and retrieval of stones. In some cases, remote calyces were irrigated with a percutaneous needle to force small fragments to the renal pelvis. DJ stent was placed at the end of the procedure and single or multiple nephrostomy tube were placed in the tracts.

Data collection

Data was collected prospectively preoperatively including patient demographics, stone location, and whether it was an incomplete or complete staghorn calculus from radiographs of each patient and entered into a database. Intraoperative data included the procedure duration, number of tracts used and intraoperative complications. Postoperative data included length of hospitalization, postoperative complications, need for secondary procedures, blood transfusion requirements, and stone-free rates.

Follow-up

Initial postoperative stone-free status were determined by patient at

time of hospital discharge with KUB radiography. Follow-up stone-free rates were determined in an outpatient clinic setting at 3 weeks (at the time of DJ stent removal) postoperatively with KUB radiography and ultrasonography.

RESULTS

Table 1

Male	Female	Total
95(47.5%)	105(52.5%)	200

There were total 200 patients in the study in which 47.5% were male and 52.5% were females, mean age was 44 years and range was 8-70years.

Table 2: Types of Staghorn Calculi

Type of Staghorn Calculi	Number
Partial	120(60%)
Complete	80(40%)

120 patients (60%) were diagnosed with Partial Staghorn calculi whereas 80(40%) were Complete Staghorn Calculi.

Table 3: Medical comoborbidities

Medical comorbidity	Number
Diabetes	20(10%)
Hypertension	40(20%)
Pulmonary (COPD)	20(10%)

20 patients were diabetic, 40 patients were hypertensive and 20 patients were of COPD. All these patients were medically optimised before surgery.

Table 4

Single access port	Multiple access port
75(37.5%)	125(62.5%)

Table 5: Multiple access port

Access ports	Number
2	115(57.5%)
3	6(3%)
4	4(2%)

37.5% patients were rendered stone free through single access port whereas 62.5% required multiple access port for PCNL in which 57.5% (115) needed 2 access ports, 3%(6) needed 3 access ports and only 2% (4) needed 4 access ports for PCNL. 24 (12%) patients required 2nd stage procedure for residual stones and 1 (0.5%) patient become stone free after 3rd stage PCNL. The primary procedure was abondended because of bleeding and prolonged operative time (anesthesia point of view).

Table 6: Complications

Complications	Number
Bleeding (requiring transfusion)	42(21%)
Fever	24(12%)
Hemothorax	1(0.5%)
Hydrothrorax	1(0.5%)
Colonic /visceral injury	0%
Paralytic ileus	8(4%)

Bleeding requiring blood transfusion was the most common complication in 42 patients(21%). 1 patient was considered for selective angioembolization for intractable bleeding postoperatively. Fever, hemothorax, hydrothorax, paralytic ileus were encountered in 12%,0.5%,0.5% and 4% patients respectively. Hemothorax and hydrothoprax were managed by intercostal chest tube drainage. Fever and Paralytic ileus were managed conservatively.

DISCUSSION

In 1983 Clayman et al. [3] reported the feasibility and safety of PCNL for treating staghorn stones. Currently it is the treatment of choice for patients with large, complex and staghorn renal stones [1]. The goals of treatment of a staghorn stone by PCNL are complete stone clearance with minimal morbidity[1]. American Urological Association guideline on staghorn calculi suggests PCNL as the treatment of choice[2]. PCNL for management of large-volume renal stones and staghorn calculi is challenging urological procedure because surgeon have to strive for balance between complete stone clearance with acceptable patient morbidity.

One of the most common and worrisome complications following percutaneous renal surgery is renal hemorrhage[6]. Bleeding may occur at any point intraoperatively to the immediate or late postoperative period . The AUA nephrolithiasis guidelines panel on staghorn calculi reported bleeding complication rates of 7–27% and a transfusion rate of up to 18% [2].The bleeding complication rate and transfusion rate of 21% in the present study were comparable with these results. In our study 37.5% patients were operated through single access port whereas 62.5% patient needed multiple access ports for PCNL maximum number of access ports needed were 4 ports(2% cases).A staghorn stone was identified as a risk factor for severe bleeding after PCNL[4]and multiple tracts were detected as a risk factor for blood loss during PCNL[5].

Supracostal approach above 11th rib is associated with 23.1% intrathoracic complications compared with 1.5 to 12% for above 12th rib approach and 0.5% for subcostal approach to access the collecting system[8]. In our study hemothorax and hydrothorax developed in 0.5% each which is comparable with other studies. Hemothorax and Hydrothorax were managed with chest tube drainage.

There are several studies reported on post PCNL fever, all with different results ranged incidence between 10%–32%, in our study 24 patients (12%) developed post PCNL fever (axillary temperature above 38°C). The impact of number of tracts created, number and size of stones were highly significant risk factors for post PCNL fever is clear and confirmed by several studies [10].

CONCLUSION:

For staghorn calculus PCNL is safe and effective procedure with acceptable morbidity and without mortality. Now PCNL has almost replaced the open surgeries like pyelolithotomy, nephrolithotomy . with experience staghorn calculus can now be managed by minimum invasive technique like PCNL with no scar , no risk of incisional hernia , lesser hospital stay and minimum morbidity compared to open procedures.

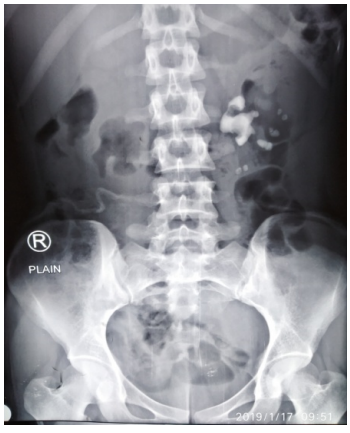

Figure 1:- LEFT STAGHORN CALCULI

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