

Prospective study of Percutaneous Nephrolithotripsy as monotherapy in treatment of renal calculi

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Abstract

Objectives

To evaluate the efficacy, cost effectiveness & stone clearance of Percutaneous nephrolithotomy(PCNL) as monotherapy in renal calculi.

Materials and Methods

Sixty patients with mean age of 39.45 years referred from emergency department with acute renal calculi between January 2003 and August 2004 were evaluated and subjected to PCNL. Patients were followed for one year for recurrence of symptoms.

Results:

In our study the complete stone free rate was seen in 95% of patients following PCNL. With pelvis and upper calyx clearance was 100%, middle and lower calyx clearance was 92 & 93% respectively. Residual calculi was seen in 5% of patients. Total complication rate was 6% with mean hospital stay of 6.9 days.

Conclusion:

PCNL as the primary treatment and monotherapy for renal calculi offers the twin advantage of minimally invasive therapy and complete stone clearance. This also helps in shortening the overall treatment duration and significant saving in cost as compared to other modalities, minimize the number of other less successful attempts of stone removal and optimize the chance that the problem will be managed safely, expeditiously and economically.

INTRODUCTION

Percutaneous nephrolithotomy (PCNL) began to be a routine procedure in developed countries in the early 1980s [1,2] and has become a standard, well established procedure for the treatment of renal stones. Percutaneous nephrolithotomy (PCNL) is currently the procedure of choice for removing large and complex renal calculi. Even after the introduction of ESWL it is still the method of choice in patients with large, dense or staghorn stones, frequently as monotherapy [3].

MATERIALS AND METHODS

Sixty patients with mean age of 39.45 years referred from emergency department with acute renal calculi between January 2003 & August 2004 were evaluated & subjected to PCNL. Out of these 60 patients 42 were male and 18 were female (M:F=2.3:1) with median age of 39 years. These patients came to emergency department with acute loin pain

ranging in duration from few hours to maximum of 24 hours. After clinical evaluation they were investigated with basic blood and urine examination and with ultrasonography(USG). Once they were found to have renal stones they were informed about percutaneous nephrolithotomy, its complication, probable hospital stay, the cost of treatment were explained and then subjected to PCNL and data were recorded in the proforma The operative time, estimated blood loss, stone burden, procedure success rate, stone-free rate, length of hospitalization, total procedural cost, and complications were recorded. Patients were followed up and repeat USG was done after 6 months to rule out the presence of stones and enquired about recurrence of symptoms over phone after twelve months.

RESULTS

In our study population renal calculi constitute 4% of all acute abdominal cases coming to emergency department with mean age of 39 years and male to female ratio of

2.3:1. Right side disease was seen in 33 patients (55%) and left side disease in 27 patients (45%). Calculi mostly seen in the lower calyx with mean stone size of 16.42mm. In our study PCNL was also done in patients with failure of other modalities like post ESWL failure in 3 patients (5%) and post URS failure in 7 patients (11.6%) with successful results. PCNL was also successfully done in horse shoe kidney, a non-rotated kidney, an upper calyceal diverticula and an adult polycystic kidney disease patient. 3 patients (5%) were operated under spinal anesthesia. Stones were approached through upper, middle, lower calyx and multiple as well in some patients. The complete stone free rate was seen in 95% of patients following PCNL with pelvis and upper calyx clearance of 100%, middle and lower calyx clearance of 92 and 93% respectively. Mean duration of surgery was 2.16 hours. Residual calculi was seen in 5% of patients. Total complication rate was 6% with minor complications in the form of fever, PCNL leak, suture granuloma were seen in 7 patients (11%) and major complication in 4 patients. Mean hospital stay was 6.9 days. Blood transfusion was done in 1 patient (1.6%) with mean blood loss of 179.5ml in rest of the patients. Conversion to other modality was done in 2 patients one to open nephrolithotomy and another patient a case of cryptogenic cirrhosis to nephrectomy. Percutaneous nephrostomy tube removed on second post operative day in most of the patients.

DISCUSSION

With advances in modern medicine, extracorporeal shock wave lithotripsy and per cutaneous nephrolithotomy have become the treatments of choice for all cases of renal calculus disease. [4]. Percutaneous nephrolithotomy (PCNL) is the preferred modality for the management of stones more than 3cm in size or for stones with surface area of more than 500mm. The introduction of minimally invasive methods of treating stone disease has caused a dramatic change in treatment patterns over the past three decades. As compared to open surgical procedures, ESWL and PCNL are less invasive, have lower complication rates and a significantly shorter convalescent phase [5,6,7]. In addition there is a significant reduction in the cost of treatment [6]. Economics are an important consideration in developing countries with a high burden of stone disease.

PNL is much less invasive than open surgery and the clearance rate is in the range of 71-78% [1,8]. Our results of a 95% stone-free rate and 5% with clinically insignificant fragments following PCNL monotherapy compares

favorably with the results of others [9,10,11]. Our complication rate of 8.2% was in the range of 3.2 to 13.2% [12,13], which has been reported in the literature. The success of PCNL depends on meticulous technique and experience. Inevitably, experience and time are required, with improving results over time [14,15]. As experience is gained in percutaneous stone surgery there is continuous improvement in the success rate and a decrease in operating time, complication rate and hospital stay after treatment.

In our study Percutaneous nephrostomy tube removed on second post operative day in most of the patients. Nephrostomy tube provides adequate renal drainage, allowing renal healing and avoiding urinary extravasation. It may also tamponade bleeding and allow the nephrostomy tract to mature and make second-look nephroscopy easier. PCNL has been used successfully in patients with renal failure secondary to stone disease [15] with little deleterious effect on the renal function. Indeed, a significant improvement was documented for impaired renal function with the removal of stones and clearance of infection [16,17,18,19]. Percutaneous nephrolithotomy is a safe and effective method of stone removal in patients with calculi in horseshoe kidneys [20]. In our study a case of horse shoe kidney was also included where the stone was removed with posteriorly placed upper or middle pole puncture and successful stone removal was achieved

CONCLUSION

PCNL as the primary treatment and monotherapy for renal calculi offers the twin advantage of minimally invasive therapy and complete stone clearance. In addition, the hypothesized decrease in renal and body wall trauma may result in less pain, reduced severity or risk of complications, and shorter hospital stays including smaller total procedural cost compared with the other techniques. Thus PCNL as a monotherapy is associated with the least amount of morbidity and the greatest cost efficiency compared with the other techniques.

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