

MODIFIED SUPINE VERSUS PRONE POSITION IN PERCUTANEOUS NEPHROLITHOTOMY

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ABSTRACT

Objective: To compare the technical aspects, operative time, safety, and effectiveness of percutaneous nephrolithotomy (PNL) in the modified supine position versus the standard prone position.

Patients and methods: The present study was conducted at urology department Zagazig University hospitals, from October, 2008 to March, 2010. Seventy seven patients (47 men, 30 women) with renal stones were enrolled and systematically randomized into 2 groups: group A, 39 patients, modified supine position and group B, 38 patients, prone position. Preoperative evaluation included; medical history, physical examination, standard laboratory investigations, and radiologic investigations. Procedures; for group A, the patients were placed in modified supine position by putting a suitable cushion (3L water bag or less) under the ipsilateral shoulder, fixed ipsilateral arm over the thorax, and extended ipsilateral leg over flexed contralateral leg. For group B, the patients were turned to the standard prone position. The procedure was accomplished in both groups as consuetude. The patient outcome was considered cure (successful procedure) if he became stone free or had residual fragments smaller than 5 mm in diameter. The operative time (from the induction of anesthesia to removal of endotracheal tube) was estimated and any operative complications or conflicts were recorded. Comparative analysis of different variables between both groups was done.

Results: Patients in both groups have comparable preoperative clinical data and there was no significant difference in preoperative clinical characteristics. Successful procedure was reported in 82% and 81.5% for group A and group B respectively. The operative time was significantly longer in the group B (prone position) than group A (modified supine position). There was no significant difference between both groups in fluoroscopy time and patient's outcome.

Conclusions: The modified supine position with a cushion under the ipsilateral shoulder assimilates efficacy and safety as prone position in cases of PNL and offers significantly less operative time.

Key words: percutaneous nephrolithotomy, prone position, supine position

INTRODUCTION

The treatment of renal stone has been revolutionized dramatically. In 1981, Alken and colleagues [1] popularized the PNL procedure with a high success rate. Since this date, PNL has wide acceptance. PNL is usually performed while the patient in prone position [2]. Many drawbacks of this arduous position have been described by several authors [3-6] like; it prolongs the operative time due to position changes, adverse effect on ventilation and blood circulation especially in obese patients, and radiation exposure to surgical team relatively more in prone than supine position. These difficulties encourage us and other urologists [7-10] to try other positions. The supine position was popularized in 1998 by Valdivia -Uria and associates [9]. They found that the colon buoys up away from the kidney when the

patient is in the supine rather than in prone position, this makes the colon less likely to be injured. They suggested many merits of supine position including, ease of patient positioning, more comfortable to the patient, Amplatz sheath is dependent, and easy to control the air ways. The present study aimed to compare the technical aspects, operative time, safety, and patient's outcome in PNL in the modified supine position and prone position.

PATIENTS AND METHODS

This prospective randomized comparative study was conducted in Urology Department Zagazig University hospitals, from October, 2008 to March, 2010. Seventy seven patients (47 men, 30 women) with renal stones were enrolled and systematically randomized into 2 groups; one patient was allocated to one treatment arm and the next one to

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the other. Group A, included 39 patients, modified supine position and group B, prone position, included 38 patients. Inclusion criteria included patients with an indication for PNL and have no contraindications to perform the operation in the prone position. Exclusion criteria: intrarenal anomalies, uncorrectable bleeding disorders, BMI over 40 Kg/m², and pregnancy.

Preoperative evaluation included; A thorough medical history taking, physical examination, laboratory investigations (urine analysis, urine culture/sensitivity, CBC, coagulation profile, BUN, and serum creatinine), radiologic investigations (KUB, abdominal ultrasonography, IVP and non contrast spiral CT for radiolucent stone). In cases of positive urine culture, an appropriate antibiotic was prescribed for one week and urine culture was repeated to document urine sterility before intervention. Informed consent was signed by all enrolled patients. Operative technique: while the patients in the supine position, cystoscopy was performed and a six French open tip ureteral catheter was introduced, and fixed with plaster tape to the indwelled Foley's catheter. For group A, modified supine position: patients were placed in modified supine position by putting a suitable cushion (three liters water bag or less according to body mass) under the ipsilateral shoulder, ipsilateral arm over the thorax, and extending and crossing the patient ipsilateral leg over the flexed contralateral leg (Figure 1). For group B, prone position: The patients were turned to the prone position. Renal access was achieved under fluoroscopic guidance through the posterior axillary line skin. Coaxial dilators of the Alken type were used for tract dilation. A 30 F Amplatz sheath were positioned, allowing the introduction of a 26 F nephroscope. Pneumatic lithotripsy device was used to fragment the stone. Fragments were retrieved through the Amplatz sheath. At the end of the procedure, an 18–22 Fr nephrostomy catheter was inserted.

Postoperative care: Patients were assessed with ultrasonography, KUB, and antegrade pyelography on day 2 postoperatively to evaluate residual fragments and ureteral patency. The nephrostomy tube removed 2–3 days postoperatively. Prophylactic parenteral broad spectrum antibiotics were continued postoperatively until all tubes were removed. The patient outcome was considered cure

(successful procedure) if he became stone free or had residual fragments smaller than 5 mm in diameter. Patients with residual stones were scheduled for second look 7 days after the initial procedure or ESWL. The operative time, from the induction of anesthesia to removal of endotracheal tube was estimated and any operative complications or conflicts were recorded.

Statistical analysis:

The sample size for the present randomized study was calculated using Epi Info 6 version 6.04d program software (WHO Geneva) and difference in operative time of 25% between the two groups was considered as clinical equivalence with confidence of 95%, power of 80%, and Odds Ratio 4.5 depending on Sio et al. [6] study. It yelled that, at least 36 patients are required for each group. Data were analyzed and the student t-test was used to compare means (software SPSS for windows version 10, Chicago, IL, USA was used). A p value below 0.05 was considered significant.

RESULTS

Seventy seven patients fulfilled the inclusion and exclusion criteria and enrolled in the study. Patients in both modified supine and prone position groups have comparable preoperative clinical data. There was no significant difference in preoperative clinical characteristics between the two groups as regard; patient gender, age, BMI, history of previous ipsilateral renal operation, ESWL for ipsilateral renal stone, stone location, and stone burden (Table 1).

The procedure was successfully accomplished for all the patients in both groups except for one patient in each group, as we were obliged to convert to open surgery due to bleeding. The second look was demanded in 4 cases of group A, similarly, in group B, second look was necessary in 5 cases. Postoperatively, ESWL was demanded for 2 patients in group A and 1 patient in group B. The operative time was significantly longer in the group B; prone position than group A ($p = 0.001$). There was no significant difference between both groups in fluoroscopy time and patient outcome (Table 2).

One case of urine leakage (for more than one week) in group A necessitates JJ fixation, likewise two cases in group B, table 3 summarized the postoperative complications in both groups.

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Table (1); Patients demographics and clinical characteristics

	Group A	Group B	P value
Patient NO.	39	38	
Gender: Male/Female	24/15	23/15	0.92
Age in yr.: Mean ±SD	40.8 ± 10.5	44.2 ± 10.4	0.16
BMI: Mean ± SD	28.8 ±4.7	29.2 ± 3.8	0.73
History of ipsilateral renal operation	19	15	0.29
History of ipsilateral ESWL for renal stone	5	6	0.75
Stone side (Rt/Lt)	17/22	20/18	0.43
Stone location			0.79
Pelvis	15	12	
Calyces	7	10	
Both	17	16	
Stone diameter, Cm: Mean (± SD)	3.4± 0.7	3.4 ± 0.8	0.9
Stone opacity			
Radio-opaque/Radio-lucent	29/10	31/7	0.71

Table (2); Operative data and patient outcome

	Group A	Group B	P value
Fluoroscopy time; Mean± SD ,minutes	6.5 ± 1.7	6.5 ± 2	0.88
Operative time; Mean ± SD ,minutes	88 ± 16	104 ± 25	0.001
Successful procedure (%)	32 (82)	31 (81.5)	0.74
Conversion to open surgery	1	1	
Second look	4	5	
Postoperative ESWL	2	1	

Table (3); Post operative complications in both groups

	Group A	Group B	P value
Blood transfusion	3	4	0.67
Urine leakage	1	2	0.98
Fever: temp > 38°	5	4	0.59
Colonic injury	None	None	

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In the present study, successful procedure was high in both groups (82% and 81.5% for group A and group B respectively with P value 0.74). Sio and associate [6], and Shoma and colleague [12] reported on stone free rate gets near to 90% with on statistical difference between prone and supine positions. Manohar and associates [14] reported stone free rate 95% by initial PNL with or without ureteroscopy. Neto and associates [13] reported a stone free rate of 70.5% in their series of 88 patients. So in the present study the stone-free rate is amidst among that reported by others and there was no significant difference between both groups as regard; patient outcome, complications, and stone free rate. Only operative time was statistically different ($p < 0.001$). This in accordance with the findings of many investigators [6, 9, 11, 12], and it reflects the time lost to turn the patient at the beginning and at the end of the procedure in group B.

CONCLUSION

The modified supine position with a suitable cushion under the ipsilateral shoulder assimilates efficacy and safety as prone position in cases of PNL and offers significantly less operative time. Further studies are demanded to prove anesthesiologic advantages of modified supine position.

Conflicts of interest

None

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