



STONES/ENDOUROLOGY
ORIGINAL ARTICLE

Percutaneous nephrolithotomy in complete supine flank-free position in comparison to prone position: A single-centre experience



Nadeem Sohail*, Amjad Albodour, Khalid Mohammed Abdelrahman

Department of Urology, Alkhor Hospital, Hamad Medical Corporation, Doha, Qatar

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KEYWORDS

Renal stone;
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Prone position;
Tubeless PCNL

ABBREVIATIONS

BMI, body mass index;
GMSV, Galdakao-
modified supine Valdi-
via (position);
PCNL, percutaneous
nephrolithotomy;

Abstract Objectives: To assess the outcomes of performing percutaneous nephrolithotomy (PCNL) in a modified supine position, more feasible for surgeons, anaesthetists, and operating theatre staff, as well as for the patient himself, and evaluating it in comparison to the standard prone position.

Patient and methods: A retrospective, case-control study was conducted between January 2011 and December 2015. In all, 197 patient's records were reviewed. The initial 101 patients were operated upon in prone position. From mid-2013, 96 patients were operated upon in a complete supine, flank-free position. The groups were compared in terms of operation time, calculated from positioning the patient after anaesthesia induction, insertion of ureteric catheter, puncture of renal system, until the end of procedure; stone-free rate; hospital stay; and postoperative complications, such as transfusion rate, fever, and urinary leakage.

Results: There were two significant differences between the groups. Firstly, the operation time was a mean (SD) 32.3 (6.6) min shorter for the supine versus the prone position ($P < 0.001$). Secondly, hospital stay was a mean (SD) 1.2 (0.75) days shorter for the supine vs the prone position ($P < 0.001$). The complete stone clear-

* Corresponding author at: Department of Urology, Alkhor Hospital, Hamad Medical Corporation, P.O. Box 3050, Doha, Qatar. Fax: +974 44745691.

E-mail address: dr.nadeemsohail@gmail.com (N. Sohail).

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RIRS, retrograde intrarenal surgery

ance rate (85.4% for supine vs 79.2% for prone; $P = 0.2$) and postoperative complications (7.3% for supine vs 17.8% for prone; $P = 0.02$) were comparable in both groups.

Conclusion: Supine PCNL is a feasible procedure with similar outcomes in terms of stone-free rate as well as postoperative complications, to the standard prone PCNL. It reduces unnecessary delay that occurs during change of position resulting in significant shortening of the total operation time and surgeons can perform supine PCNL whilst sitting.

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Introduction

The first percutaneous nephrolithotomy (PCNL), described by Fernström and Johansson [1] in 1976, was performed in prone position and was adopted as the standard technique for renal stones of > 20 mm. Although there are various advantages of performing PCNL in a prone position there are also disadvantages. Classically the patient is initially placed in the lithotomy position for ureteric catheter insertion and then changed to a prone position for the rest of the procedure. This changing of position under anaesthesia causes unnecessary delay and also a risk of nerves, limbs, neck, and ophthalmic injuries to the patient. Furthermore, this position is less favourable in morbidly obese patients and patients with severe cardiopulmonary diseases [2] and this led urologists to propose alternative positions for PCNL.

Valdivia et al. [3] first described PCNL in a supine position. This position did not gain in popularity for many years until Ibarluzea et al. [4] improved it further by adding a modified lithotomy arrangement, giving origin to the Galdakao-modified supine Valdivia (GMSV) position. Many authors suggested this position as being more safe and feasible with many advantages over the prone position in terms of reducing operation time, avoiding injuries that may occur during repositioning the patient, anaesthesia-related complications, as well as reducing radiation exposure to the surgeon, and ability of the surgeon to perform the procedure whilst sitting [5]. The major disadvantage of this position is limited exposure of the flank for renal puncture. Kumar et al. [6] made a slight modification by keeping the flank free for better exposure. Falahatkar et al. [7] performed PCNL in a complete supine position without any rolled towel or any change in leg position describing it as a safer and feasible position.

In the present study, we aimed to compare the outcomes of our modified supine position 'complete supine flank-free position', suggested by our colleague A.A. (author), to the standard prone position in terms of operation time, stone-free rate, hospital stay, and postoperative complications, such as blood loss requiring

transfusion, fever, and urine leakage from the surgical tract.

Patients and methods

We reviewed the records of all patients who underwent PCNL for the stone disease from January 2011 until December 2015. We performed 101 cases of PCNL in the standard prone position until mid-2013, after which all cases were operated upon in the complete supine flank-free position, as suggested by A.A.

Preoperative preparation

Patients included had an age range of 18–69 years and a body mass index (BMI) range of 15–47 kg/m². Stone size was measured by the total size in the longest diameter, or the collective sum of the longest diameter in cases of multiple stones. All patients were assessed preoperatively with history, physical examination, routine laboratory tests, and a negative urine culture was obtained. All patients had non-contrast CT of the renal tract preoperatively for evaluating the stone size and location, and the renal tract and its relation to adjacent viscera.

Technique

Patients in the prone group were initially kept in a lithotomy position for ureteric catheter insertion. Then the position changed to prone for fluoroscopic-guided puncture of the renal system and the rest of the procedure. All patients operated upon in the prone position routinely had 24-F nephrostomy tube and either a ureteric catheter or JJ-stent insertion.

Since mid-2013, all PCNL cases have been operated upon in a supine position with a slight modification to achieve the complete supine flank-free position. We placed our patients completely supine with two silicone gel pads, one under the ipsilateral chest and another under the buttocks, thus tilting the patient to 15°. The flank at the site of surgery was brought to the edge of the operating table to avoid the overlapping of X-rays

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