

Randomized Controlled Trial

Mean Operative Time And Stay In Hospital Between Transurethral Removal Using Nephroscope And Percutaneous Cyst-Lithotripsy In The Treatment Of Large Bladder Calculi

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ABSTRACT

Background: urinary bladder stones comprise 5% of cases of urolithiasis¹, with single calculi being identified in most instances but numerous calculi in 25% of cases². With the development of end urological fiber optic equipment and extracorporeal shockwave lithotripsy (swl), there have been notable modifications to managing and treating vesicolithiasis³. Thanks to this Study, we shall know the local amount of hospital stay and operating time between the two operations. We will suggest the method that results in a shorter surgical time and a shorter hospital stay since both have been successfully documented in the literature.

Objective: to compare the length of hospital stay and average operating time for transurethral removal of big bladder calculi using a nephroscope with percutaneous cyst lithotripsy.

Study design: A Randomized Controlled Trial

Duration and place of Study: from January 1, 2022, to December 31, 2023, at the Department of Urology, Hayatabad Medical Complex, Peshawar

Methodology: Examining 60 individuals (30 in each group). The Study covered all patients aged 20 to 65 years, female or male, presenting with bladder stones larger than 3 cm and with any number of rocks. All of the individuals who presented with renal insufficiency (defined as creatinine more than 3 mg/dl), active renal tract infection (defined as a fever greater than 38.5°C and positive urine culture), and obesity (defined as BMI greater than 30) were not included in the Study. The included patients were split into two groups using permitted blocks and blocked randomization. Patients in group b had percutaneous cyst lithotripsy, whereas patients in group A underwent transurethral removal using a nephroscope. Following the operation, the length of hospital stay was calculated by tracking each patient until they decided to be discharged. After entering all of the data on the proforma into the statistical program SPSS version 23.0, a comparison analysis was carried out.

Results: according to our analysis, nine patients (30%) in group A were between the ages of 20 and 40, and 21 patients (70%) were between the ages of 41 and 65. In contrast, 15 (50%) patients in group b were between 20 and 40, and 15 (50%) were between 41 and

65. Seven patients (23%) and 23 patients (77%) in Group A were female, and in contrast, six patients (20%) and 24 patients (80%) in Group B were female. Group A had an average surgical duration of 35.06 minutes (sd ± 5) and an average hospital stay of 2.6 days (sd ± 0.9). In contrast, group b saw an average surgical duration of 44.06 minutes (sd ± 7) and an average hospital stay of 3.4 days (sd ± 1.02).

Conclusion: Our Study Indicate That, When Treating Big Bladder Calculi, Transurethral Removal With ANephroscope Had A Shorter Mean Operation Time And Hospital Stay Than Percutaneous Cyst lithotripsy.

Keywords: Mean Operative Time, Hospital Stay, Nephroscope, Percutaneous Cyst lithotripsy, Bladder Stones

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INTRODUCTION:

Urolithiasis affects 5% of people, with most having one calculus and 25% having many¹. End urological fiber optic technology and extracorporeal shockwave lithotripsy (SWL) have changed vesicolithiasis care and treatment². Open vesicolithotomy, PCCL, TUCL, and SWL are used to remove large bladder stones. However, the standard bladder calculi treatment is still debatable³. The suggested method should be successful, non-invasive, and offer multiple treatment options. Open vesicolithotomies are rare⁴. In many circumstances, urethral lithotripsy can treat adult bladder calculi. However, the tiny urethra makes these devices unsuitable for children⁵. SWL is less effective for treating huge bladder calculi since it requires many sessions and makes stone particles difficult to move in urine. Percutaneous accessing the bladder via the suprapubic route avoids a restricted urethra⁷. A transurethral cystoscopy approach to large bladder stone removal is faster and more effective⁸. The suprapubic percutaneous method can also remove bladder calculi stones rapidly and effectively, utilizing percutaneous nephrolithotomy (PCNL) or tract dilation⁹. Each method has pros and cons. The literature describes transurethral cyst lithotripsy (TUCL) employing cystoscopy and nephroscope directly or indirectly via the am Platz sheath. Fragment removal is the hardest and longest part of cystolithotripsy¹⁰. One Study found that transurethral removal with a nephroscope took 33.6 + 7 minutes and percutaneous cyst lithotripsy (PCCL) 47.8 + 17.6 minutes. The transurethral removal group using a nephroscope had a mean hospital stay of 1.3 + 0.7 days, while the PCCL group had 2.12 + 0.6 days¹¹. No stones were found in each group. In another study, transurethral removal with a nephroscope took 32.7 +/- 8.7 minutes, while percutaneous cyst lithotripsy (PCCL) took 34.3 +/- 7 minutes. In the same Study, the nephroscope-assisted transurethral removal group had a mean hospital stay of 1.2 + 0.5 days, while the PCCL group had 2.1 + 0.4 days¹². Another study found that nephroscope-assisted transurethral removal took 32.1 + 8.5 minutes. Percutaneous cyst lithotripsy (PCCL) took 46.3 + 7.3 minutes on average. In the same Study, the nephroscope-assisted transurethral removal group had a mean hospital stay of 1.4 + 0.6 days, while the PCCL group had 2.1 + 0.15 days¹³. The purpose of this Study is to compare PCCL versus nephroscope-assisted transurethral resection for adult bladder stones. This Study was conducted after a thorough literature search revealed many treatment methods, some of which were more effective in stone clearance rates. However, the length of each surgery and hospital stay is a big benefit because it influences patient and hospital costs. This Study¹⁴ will determine the local hospital stay and operating time between the two procedures. This procedure has been shown to save surgical time and hospital stay; thus, we recommend it. From January 1 to December 31, 2020, the Department of Urology HMC, Peshawar, conducted the present Study. It was

an RCT with 60 participants (30 per group). In nephroscope-based transurethral removal Group 6, the mean surgery time was 33.6 + 7 minutes, and in PCCL Group 6, 47.8 + 17.6 minutes. With 5% significance and 80% power, the WHO algorithm calculated the sample size from these numbers. Non-probabilistic (consecutive) sampling was used¹⁵. The Study included all male and female patients aged 20–65 with bladder stones greater than 3 cm and any number of rocks. Despite all patients having renal insufficiency, creatinine levels greater than 3 mg/dl, an active renal tract infection with a temperature of at least 38.5°C, and a positive urine culture, the Study excluded obese individuals with a BMI of 30 or more. Every patient underwent a full history, examination, and standard investigations¹⁶. Each patient's bladder stone was confirmed by ultrasound. The patients were divided into two groups using authorized blocks and blocked randomization. Group B had percutaneous cystolithotripsy, while Group A underwent nephroscope-assisted transurethral removal. A skilled consultant urologist¹⁷ oversaw every treatment. The surgery time comprised anesthesia and stone removal. Each patient was tracked until release to determine hospital stay after surgery. A comparison analysis was performed 18 after inputting all proforma data into SPSS version 23.0. The mean and standard deviation represented quantitative data such as age, weight, height, BMI, stone size, number of stones, operation time, and hospital stay. Category factors like gender were expressed as percentages and frequencies. The two groups' mean active times and hospital stays were compared. P values below 0.05 were considered significant in an independent T-test¹⁹.

METHODOLOGY:

The study enrolled 60 subjects and evenly distributed them across two groups with 30 patients per group to evaluate percutaneous cystolithotripsy (Group B) against transurethral stone extraction with a nephroscope (Group A). The study enrolled male and female patients between 20 to 65 years who had bladder stones exceeding 3 cm in diameter and any number of stones. Survey participants with renal impairment defined as creatinine higher than 3 mg/dL or active urinary tract infection with both body temperature above 38.5°C and positive urine microbiology and obesity characterized by Body Mass Index greater than 30 were excluded from the study. The block randomization method achieved equal distribution of patients to both treatment groups. Experienced urologists executed all procedures according to standardized practices. Medical staff tracked hospitalized patients until discharge requirements were achieved by monitoring vital stability alterations and controlled pain levels as well as independent performance of daily tasks. The researchers maintained a comprehensive record of all clinical end results along with all postoperative issues

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through an established proforma document. The investigators performed analyses through SPSS version 23.0 to evaluate procedural success rates together with complication frequencies and hospital stay durations between the two groups. All parameters for statistical significance analysis used proper assessment techniques and reported results with p-values below 0.05.

ETHICAL APPROVAL STATEMENT

This study was conducted in accordance with ethical guidelines and received ethical clearance from the Ethics Review Board (ERB HMC-1872/11/2021) under the supervision of 1st Author Zeeshan Akhter at the Department of Urology Hayatabad Medical Complex, Peshawar. Approval was obtained prior to the commencement of the study to ensure compliance with both institutional and international standards for human subject study. Informed consent was obtained from all participants before their inclusion in the study.

RESULTS:

The age distribution of the two groups was analyzed in this study. Of the patients in Group A, 9 (30%) were between 20 and 40, and 21 (70%) were between 41 and 65. With an SD ± 15.46 , the mean age was 48 years. In contrast, 15 (50%) of the patients in Group B were between 20 and 40, and 15 (50%) were between

41 and 65. At 45 years old, the mean age was 17.04 SD. Table No. 1 The distribution of genders between the two groups was examined; in Group A, 23 patients (or 77%) were male, and seven patients (or 23%) were female. Conversely, in Group B, six patients (20%) were female, and 24 patients (80%) were male (table 2). The two groups' BMIs were compared; in Group A, five patients (17%) had BMIs ≤ 25 kg/m², and 25 patients (83%) had BMIs > 25 kg/m². At 27 kg/m², the mean BMI had an SD of 4.12. In contrast, group B included 18 patients (60%) with a BMI > 25 kg/m² and 12 patients (40%) with a BMI ≤ 25 kg/m². 26 kg/m² was the mean BMI, with an SD ± 3.57 . (Table Number 3) Two groups' stone sizes were compared to Group A, 13 patients (43%) had stone sizes that measured less than 5 cm, and 17 patients (57%) had stone sizes that measured more than 5 cm. With an SD ± 1.33 , the average stone size was 5 cm. In contrast, 14 patients (47%) and 16 patients (53%) in Group B had stones larger than 5 cm. 5 cm was the average stone size, with an SD of 2.01. (table no 4) In Group A, 20 patients (67%) had ≤ 3 stones, while ten patients (33%) had stones larger than 3 cm. The number of stones in the two groups was compared. Three stones were the mean, with an SD of 2.77. In contrast, nine patients (30%) and 21 patients (70%) in Group B had stones larger than 3 cm. With an SD ± 1.94 , the mean number of stones was 2. (Table Number 5) The analysis focused on the mean operating time for the two groups. Group A had a mean surgical time of 35.06 minutes with SD ± 5 and a mean hospital stay of 2.6 days with SD ± 0.9 . In contrast, Group B saw an average surgical duration of 44.06 minutes (SD ± 7) and an average hospital stay of 3.4 days (SD ± 1.02). (Table Number 6)

Table no 1. Age distribution (n=60)

AGE	GROUP A	GROUP B
20-40 years	9(30%)	15(50%)
41-65 years	21(70%)	15(50%)
Total	30(100%)	30(100%)

Table 2: Gender Distribution (n=60)

Gender	Group A	Group B
Male	23 (77%)	24 (80%)
Female	7 (23%)	6 (20%)
Total	30 (100%)	30 (100%)

Table no3. Number of stones (n=60)

member of stones	GROUP A	GROUP B
< 3 stones	20(67%)	21(70%)
>3 stones	10(33%)	9(30%)
Total	30(100%)	30(100%)

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Table no 4. BMI of Group A,B (n=60)

BMI	GROUP A	GROUP B
< 25 Kg/m ²	5(17%)	12(40%)
>25 Kg/m ²	25(83%)	18(60%)
Total	30(100%)	30(100%)

TABLE NO 5. Out Come Size Of Stone (n=60)

Size of stone	GROUP A	GROUP B
< 5 cm	13(43%)	16(53%)
>5 cm	17(57%)	14(47%)
Total	30(100%)	30(100%)

DISCUSSION:

Urinary bladder stones comprise 5% of cases of urolithiasis, with single calculi being identified in most instances but numerous calculi in 25% of cases²⁰. With the development of endourological fiberoptic equipment and extracorporeal shockwave lithotripsy (SWL), there have been notable modifications to managing and treating vesicolithiasis²¹. Large bladder stones are being removed using various methods, including open vesicolithotomy, percutaneous cystolitholapaxy (PCCL), transurethral cystolitholapaxy (TUCL), and SWL. Despite this, the conventional approach to treating bladder calculi is still debatable²². According to our analysis, nine patients (30%) in Group A were between 20 and 40, and 21 patients (70%) were between 41 and 65. In contrast, 15 (50%) of the patients in Group B were between 20 and 40, and 15 (50%) were between 41 and 65. Seven patients (23%) and 23 patients (77%) were female in Group A. In contrast, six patients (20%) and 24 (80%) in Group B were female. Group A had an average surgical duration of 35.06 minutes (SD $\pm$ 5) and an average hospital stay of 2.6 days (SD $\pm$ 0.9)²³. In contrast, the average operative duration for the transurethral lithotripsy group using high-energy laser lithotriptor technology was 37.19 minutes (SD $\pm$ 8.48), and the mean hospital stay was 1.2 days (SD $\pm$ 0.8 days). Comparing our findings to those of another Study by Bansal A. The transurethral removal group utilizing a rigid nephroscope had a mean surgical time of 33.6 minutes compared to 34.1 $\pm$ 7 minutes from our report. et al. (2013), we found that, In contrast, the percutaneous cystolithotripsy (PCCL) group had a mean operative time of 47.8 $\pm$ 17.6 minutes. et al²⁴. (2013), the endoscope for transurethral operation and bladder neck incision was switched from a rigid endoscope to a flexible one. In the same Study, the transurethral removal group utilizing a rigid nephroscope had a mean hospital stay of 1.3 days, whereas the PCCL group had an average time of 2.12 weeks using a high-energy laser dissolution and sheath-based fragmentation technique (figure 4). Comparing our findings to those of another Study by Gupta R et al. (2014), we found that The transurethral removal group utilizing a

nephroscope had a mean surgical time of 32.7 $\pm$ 8.7 minutes. Diaphragmatic respiration helps to lower the body temperature accordingly. In contrast, the minimum operative time in the PCCL group was 34.3 minutes. In the same Study, the transurethral removal group utilizing a nephroscope had a mean hospital stay of only 1.2 days; PCCL group needs 2.1 $\pm$ 0.4 days out there after surgery, incumbent on room conditions. Seven at-home therapy payoffs are allocated to the first patients in each traditional medical procedure outpatient department after this survey begins²⁵. The same procedure was done at home for thirty-nine days on average with normal experimental material like Madecasi. In February of 2009, olanzapine and clozapine were used as intramuscular injections. As the control group in the fast recovery ward at that time, we found among them: comparing our findings to those of another Study by Singh KJ et al. (2015), we found that the transurethral removal group utilizing a nephroscope had a mean surgical time of 32.1 $\pm$ 8.5 minutes. In contrast, the percutaneous cystolithotripsy (PCCL) group had a mean operative time of 46.3 $\pm$ 7.3 minutes. The transurethral removal group utilizing a nephroscope had a mean hospital stay of 1.4 $\pm$ 0.6 days in the same Study, while the PCCL group had an average of 2.1 $\pm$ 0.15 days.

Conclusions:

Our Study suggests that when dealing with large bladder calculi, transurethral removal with a nephroscope means not only less mean operating times per case but also shorter hospital stays.

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Authors Contribution

Concept & Design of Study: Hossam Allahyani1

Drafting: Zeeshan Akhtar2

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Critical Review: Seema Rahman3

Final Approval of version: All Mentioned Above.

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