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A COMPARISON OF URETEROSCOPY WITH SUPINE-TRANS-GLUTEAL EXTRA-CORPOREAL SHOCK-WAVE LITHOTRIPSY FOR THE MANAGEMENT OF DISTAL URETERIC CALCULUS.

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Abstract

Background: Uro-lithiasis is one of the most frequent urological disorders seen on a daily basis. Ureterorenoscopic Lithotripsy has traditionally been used to treat distal ureteric calculus (URSL). Extra-corporeal Shock-wave Lithotripsy (ESWL) using a trans-gluteal route has recently been investigated.

Aims & objectives: The goal of this study is to see how supine trans-gluteal ESWL works on distal ureteric calculus and compare it to semi-rigid ureterorenoscopy in the management of distal ureteric calculus.

Material & methods: A total of 240 subjects were included in our trial, which lasted a year and was randomly separated into two categories by an independent observer. After collecting consents, taking a full history and doing clinical examinations as needed, and conducting the necessary biochemical and radiological studies, Category A was offered ESWL while Category B was offered URSL. After 15 days after the procedure, the subjects were followed up on.

Results: Many subjects, especially the elderly, obese, and those with physical disabilities or poor mobility, prefer the supine posture SWL. When the patient and calculus characteristics were compared, there was no discernible difference between the two categories. In both categories, males make up the bulk of the subjects (82 percent). The supine trans-gluteal SWL category had an 89 percent calculus-free rate.

Conclusion: We conclude that ESWL management has a low morbidity and high effectiveness, and that the results are comparable to those of uretero-scopy with intra-corporeal lithotripsy, with the added benefits of an outpatient operation, no need for anaesthesia, and the use of DJ stents.

Keywords: Distal Ureteric Calculus, URSL, Trans-gluteal ESWL, Calculus clearance.

Introduction

The most common symptom of ureteric calculus is acute colicky pain, and the goal of management is to remove the calculus completely with little morbidity for the patient. Surgical options for ureteric calculus management are now available[1]. Extra-corporeal shock wave lithotripsy (ESWL) is the least intrusive management for upper urinary tract calculi and is suggested as the first line of management. ESWL, on the other hand, has a mixed success record. The fragility of a calculus is determined by the density of calculus evaluated by NCCT, calculus Hounsfield Unit (HU), which changes with calculus composition and ultimately affects the clinical result in ESWL[2]. In the Western world, ESWL is used to treat the majority of urinary tract calculus. ESWL was first utilised to treat renal and upper ureteric calculus, but it soon became obvious that it could also be used to treat mid and distal ureteric calculi. The supine position, with the shock-wave head in contact with the patient's loin, was designed for the renal and upper ureteric calculus[3]. The prone position was modified for mid or distal ureteric calculus, with the shock-wave head in touch with the patient's anterior belly. There is yet to be discovered a safe and successful method of treating calculus in the distal ureter with results inferior to supine ESWL for renal and upper ureteric calculus[4,5]. The Dornier HM-3 was originally used to describe the use of a trans-gluteal approach to the distal ureter[6]. In the management of individuals with distal ureteric calculus, we used this method. The patient is in a supine position, and the shock-wave is administered to the distal ureter through the gluteus maximus

muscle, through the larger sciatic foramen, and without being obstructed by bony structures[7].

Material and Method

The duration of the programme is one year. Subjects' origins: Subjects who presented for the management of distal ureteric calculus were studied in the Department of Urology at a tertiary healthcare centre. The ethics committee's guidelines were followed. All of the subjects were informed about the study and completed a consent form. All pertinent information was gathered and recorded.

Method of Study: All of the subjects were informed about the management options for distal ureteric calculus, including medical expulsion therapy, uretero-scopy with intra-corporeal lithotripsy, extra-corporeal shock wave lithotripsy, and laparoscopic/open surgery, as well as the risks associated with each.

Patient Evaluation: In all subjects, a thorough history and clinical examination were conducted, followed by baseline investigations such as a complete blood count, blood sugar, urea, serum creatinine, and a urine routine including culture and sensitivity. In all of the subjects, a plain X-ray KUB and an ultrasound were performed. To determine the exact size and placement of the calculus, a simple CTKUB was performed. In the study, the biggest dimension was measured in plain X-ray KUB, ultrasonography, and plain CT KUB.

Inclusion Criteria: Subjects with radiopaque calculus are eligible to participate. Distal ureteric calculus that had not been treated previously. Solitary distal ureteric calculus in subjects. Renal parameters that are within normal limits. In the urinary tract, there are no anatomical abnormalities.

Exclusion criteria: Subjects with an in-situ percutaneous nephrostomy are excluded. Subjects with in-situ ureteric stents. Ureteric calculi on both sides. Subjects on anticoagulant medicines or with a coagulation problem. Pregnancy. Sepsis. Renal failure.

The study enlisted the participation of 240 subjects. During the course of a year, they were randomly divided into two categories: category A (140 subjects) and category B (100 subjects) by an independent observer. Subjects in category A were treated with supine trans-gluteal ESWL, while those in category B were treated with tracorporeal pneumatic lithotripsy and semi-rigid uretero-scopy.

ESWL Patient Position: Supine with a 40-degree inclination to focus shock-waves across the larger sciatic notch. Supine lithotomy posture (URS).

Post Procedure ESWL: Subjects were allowed to go home after each therapy session after being observed for 2 to 3 hours. Subjects were informed about hematuria, dysuria, and the passing of calculus fragments in the urine after management. Subjects are encouraged to drink plenty of water. For 5 days, subjects were prescribed an oral antibiotic, analgesic, and H2blocker.

URS: The patient was put on a regular diet the next day. To determine the position of the stent, use X-ray KUB. The Foley catheter was taken out. From the day of operation, subjects were given an intravenous antibiotic, an oral analgesic, and an H2 blocker. On the second surgical day, subjects were discharged with oral antibiotics, analgesics, and H2 blockers for a 5-day period. Subjects in either category who developed complications were treated properly, either with or without admission, depending on the severity.

Follow-up

ESWL: Subjects were followed up on after the surgery at 15 days, 30 days, and 90 days, or whenever they experienced atypical urinary problems. A second session of SWL is performed if the patient's fragmentation was insufficient during the 15-day appointment, as evidenced by X-ray/ultrasound.

URS: Subjects were followed up on after the surgery at 15 days, 30 days, and 90 days, or whenever they experienced atypical urinary problems. If the calculus was entirely cleared on X-ray / ultrasound at the 15-day visit, the stent was removed via cystoscopy under local anaesthetic using a 19Fr sheath. If the patient's bigger fragment was still present at the 15-day visit, as evidenced by X-ray/ultrasound, a second URS surgery was performed. Twelve subjects, eight from the ESWL category and four from the URS category, did not show up for follow-up and were thus removed from the trial. The presence of fragments of any size in the follow-up video 3 months after the final ESWL session was regarded as failure.

If the patient cleared the calculus with the procedure or a secondary management was chosen for the

failure, the patient's follow-up was ended. Hematuria, fever, ureteric colic that required hospitalisation, lower urinary tract symptoms, calculus clearance, number of ESWL sessions, and secondary procedures were also reported for each category. The DJ stent was removed when the calculus vanished or three months had passed, whichever came first.

SPSS software was used to analyse the data in this study.

Observations and Results

The study included 228 subjects with distal ureteric calculus who were split into two categories: 132 in the ESWL category and 96 in the URS category. The subjects' ages ranged from 18 to 64, with the majority being between the ages of 21 and 40.

Table 1: Age distribution in both the categories

AGE (YRS)	NO. OF SUBJECTS	
	ESWL	URSL
<20	4	2
21-40	64	56
41-60	50	30
>60	14	8
TOTAL	132	96

In our study, there were 108 males and 24 females in category A, and 80 males and 16 females in category B.

Table 2: Sex distribution in both the categories

Gender	NO. OF SUBJECTS		TOTAL
	ESWL	URSL	
Male	108	80	188 (82 %)
Female	24	16	40 (18 %)
Total	132	96	228

In both categories A and B, left-side calculus outnumbered right-side calculus.

Table 3: Side distribution in both the categories

Side	NO. OF SUBJECTS		TOTAL
	ESWL	ESWL	
RIGHT	64	42	106 (47 %)
LEFT	68	54	122 (53 %)

The size of the distal ureteric calculus in our study ranged from 6 mm to 20 mm. The calculus sizes of Category A and Category B were matched.

Table 4: Showing calculus size in both age categories

Size	NO. OF SUBJECTS		TOTAL
	ESWL	ESWL	
6 – 10 mm	76	52	128 (56 %)
11 – 15 mm	38	30	68 (30 %)
16 – 20 mm	18	14	32 (14 %)

The overall calculus-free rate at three months in our study was 94 percent (214/228). The ESWL category had a clearance rate of 89 percent (118/ 132) and the URS category had a clearance rate of 100 percent (96/96).

Table 5: Number of procedures in both the categories

NO. OF SITTINGS	NO. OF SUBJECTS		TOTAL
	ESWL	ESWL	
ONE	104 (79 %)	90 (94 %)	194 (85 %)
TWO	14 (11 %)	6 (6 %)	20 (9 %)
TOTAL	118 (89 %)	96 (100 %)	214/228 (94 %)

According to size, clearance was 100% for 6 mm to 10 mm, 88 percent for 11 mm to 15 mm, and 81 percent for 16 mm to 20 mm. A total of 6% of subjects did not have a positive outcome. In the ESWL category, 11% of subjects did not achieve a successful outcome due to incomplete fragmentation. Four cases required URS with calculus extraction due to efficient fragmentation but insufficient clearing.

Table 6: Calculus free rate according to calculus size

Size	NO. OF SUBJECTS		TOTAL
	ESWL	ESWL	
6-10 mm	76/76 (100 %)	52/52 (100%)	128/128 (100%)
11-15 mm	0/38 (79 %)	30/30 (100%)	60/68 (88 %)
16-20 mm	12/18 (67 %)	14/14 (100%)	26/32 (81 %)
TOTAL	118/132 (89 %)	96/96 (100%)	214/228 (94%)

Table 7: Showing the complications in both age categories.

Complications	NO. OF SUBJECTS		TOTAL
	ESWL	ESWL	
HEMATURIA	12 (9 %)	16 (17 %)	28 (12 %)
FEVER	6 (5 %)	16 (17 %)	22 (10 %)
STEINSTRASSE	14 (11 %)	4 (4 %)	18 (8 %)
URETERIC COLIC	8 (6 %)	2 (2 %)	10 (4 %)

Frequency was noted in 150 (25 percent) instances, urgency in 168 (28 percent), dysuria in 218 (36 percent), and nocturia in 42 (7 percent) cases among the lower urinary tract symptoms (LUTS). The stented (category A) subjects had the most lower urinary tract discomfort.

Table 8: Showing the incidence of LUTS in both age categories.

LUTS	NO. OF SUBJECTS		TOTAL
	ESWL	ESWL	
FREQUENCY	6 (5 %)	18 (19 %)	24 (11 %)
URGENCY	2 (2 %)	8 (8 %)	10 (4 %)
DYSURIA	16 (12 %)	10 (10 %)	26 (11 %)
NOCTURIA	4 (3 %)	12 (13 %)	16 (7 %)

Discussion

SWL has changed the way Uro-lithiasis is treated all over the world. SWL has quickly gained widespread appeal due to its non-invasive nature and excellent efficacy. SWL and uretero-scopy are the usual managements for distal ureteric calculus that are not responsive to conservative management. Previously, SWL treated distal ureteric calculus in the prone position, which was uncomfortable for many subjects[8,9]. Because the pelvic bone prevents the shock-wave from reaching the distal ureter in the supine posture, SWL was not explored. Shock-waves must travel through the abdominal wall, intestines, and/or bladder in the prone posture before reaching the target calculus. As a result, the shock-waves'

distance travelled, defined as the skin-to-calculus distance (SSD), is much greater. In the case of SWL, SSD is an independent predictor of outcome[10]. Furthermore, bowel gas dampens the shock-wave as it passes through them on its way to the target calculus. 6 The trans-gluteal supine SWL is appropriate for reaching the distal ureter via the larger sciatic notch, bypassing the pelvis' bone impedance. The shock-wave may occasionally touch the sciatic nerve near the focal point, causing pain that can be easily alleviated by modest adjustments in patient positioning and management angle. The success of management in this role is mostly determined by the operators. Many subjects, especially the elderly, obese, and those with physical disabilities or poor mobility, prefer the supine posture SWL. When the patient and calculus characteristics were compared, there was no discernible difference between the two categories[11]. In both categories, males make up the bulk of the subjects (82 percent). The calculus-free rates for the supine trans-gluteal SWL category were 89 percent and 100 percent, respectively, compared to a reported success rate of 69 percent for distal ureteric calculus with prone position SWL. The following are the benefits of supine trans-gluteal SWL in adults: Because regional anaesthesia is not required, fitness for anaesthesia and its risks are ruled out. URS and ICL procedure-related problems are avoided with this non-invasive solution. Stents are not required, thus there are no stent-related LUTS issues and no need for a second management to remove them. Can be considered satisfactorily in obese people who have difficulty situating themselves and undergoing the management. The procedure is done as an outpatient procedure. In our study, 14 (11%) of the subjects failed supine trans-gluteal SWL, and they were treated with uretero-scopy and lithotripsy. The calculi of four of these individuals were fractured, but they were not successfully removed. Other failures to SWL are unknown, however they could be caused by SSD, pain during management, or the calculus's hardness. Other studies around the world have lately reported the effectiveness of trans-gluteal ESWL for distal ureteric calculus[12]. The procedure has been used to treat distal ureteric calculus in both children and adults, according to Lu et al. and Sun et al. However, they did not compare the results to those of the prone technique. However, Istanbulluoglu et al. compared the supine and prone techniques retrospectively and found that the supine strategy was superior, as in the present series. The results of ESWL via the transguteal approach to the distal ureter were nearly equal to Uretero-scopy and superior in terms of post-procedure problems, particularly lower urinary tract symptoms, according to the current study.

Conclusion

SWL management has a low morbidity rate and a high efficacy rate. The results of supine trans-gluteal SWL for distal ureteric calculus are equivalent to those of uretero-scopy within transcorporeal lithotripsy, with the following benefits: Non-invasive intervention; outpatient procedure Analgesia is adequate; anaesthesia is not required. There is no need for stents, which means there are no stent-related LUTS issues and no need for a second management to remove them.

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