

ROLE OF URETERIC DJ STENTING FOLLOWING URETEROSCOPIC REMOVAL OF STONE WITH PNEUMATIC LITHOCLAST FOR MID AND LOWER URETER STONES

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ABSTRACT

It is traditional way to place DJ stent following ureteroscopic removal of stones (Ureterorenoscopy lithotripsy). DJ stenting prevents formation of stricture in ureter and has a protective function on kidney/ ureter. However use of DJ stent can result in pain and lower urinary tract symptoms (LUTS). There is no consensus on placing a ureteral catheter after uncomplicated ureteroscopy and it is still controversial. A cross sectional observational study was conducted in Urology Department of Nepal Medical College Teaching Hospital, Attarkhel, Kathmandu from 1st January 2024 to 31st July 2024. The purpose of this study was to see the role of DJ stenting in patients undergoing intra- corporeal pneumatic lithotripsy for mid and distal ureteric stone. Along with VAS SCORE (Pain) post-operative, need for analgesic, stone clearance and complications following pneumatic lithotripsy. A total 64 patients were included in our study. They were randomly allocated to two groups; A and B. Group A included all patients with DJ stent (6 FR) and group B include patients without DJ stents. Post-operative care was carried out for about 24 to 48 hours. Oral analgesic 50 mg Diclofenac was given as per need. All the patients were followed up at the interval of week 1st, 4th, 8th and 12 th week. The outcomes were measured on the basis of postoperative pain, analgesic dose and stone clearance at the end of the study. Mean of post-operative pain at 12th week was 5.93 in group A and 1.06 in group B. Stone clearance in group A was 81.3%, and group B was 75%. Use of additional analgesia in group A shows 34.4% and 18.8% in group B, P value was 0.157.

KEYWORDS

DJ stent, pneumatic lithotripsy, URSL, LUTs

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INTRODUCTION

Renal stone diseases have been a considerable challenge for any urologist. Ureteric stones are one of commonest medical attention in surgical emergency.¹ Regarding composition of stone, about 80% of stones are calcium stones, 10-15% struvite stones and 5-10% are uric acid stones. Other stones includes cysteine, xanthine, indinavir stones etc. and are usually linked to various metabolic disorders.^{2,3}

Stone obstructing the urinary passage is a serious condition and requires urgent medical attention. Obstruction can occur at different level e.g. renal pelvis, upper and lower ureter.^{3,4} Obstruction can lead to sudden onset of severe pain associated with nausea and vomiting. Treatment of ureteric and renal stone depends upon their size and location within the renal tract.⁴ Extra Shock Wave Lithotripsy (ESWL) is reserved for smaller renal stones and intracorporeal shock wave lithotripsy for ureteric stones.⁵ Ureteroscopy is the best treatment option for ureteric calculi especially if the stone is located in mid and lower ureter.⁶ It is safe easier and convenient method of stone removal with better optical visual technology.⁷

Ureteroscopy is generally followed by DJ stenting in anticipation to prevent ureteric stricture, mucosal injury, edema, stone fragments etc; however all the cases doesn't needs DJ stenting.⁸ No exact demarcation has been established, to keep a ureteral catheter after any uretroscopic surgery specially for uncomplicated URS surgery.^{9,10} Although DJ stenting minimizes postoperative pain and protects ureteric stricture formation its use is not free of complications.¹¹ DJ stent itself can bring LUTS (Irritative and obstructive symptoms), pain, infection and hematuria. Many studies have proven that DJ decreases the frequency of ureteric contraction. In animal model, DJ stenting ureteric stones decreased spontaneous passage of stone as well as reduced ureteric contractility.^{12,13} This is however controversial, as some authors have shown that DJ stenting facilitates passage of stone fragments. The ureter and ureteric orifice passively dilated after stenting that facilitates stone passage.¹⁴ Although DJ stenting affects peristalsis, dilatation facilitates stone passage.¹⁵

DJ stenting have significant impact on the quality of life. It causes significant symptoms like hematuria, flank pain, suprapubic pain, infection, stent encrustation and migration.¹⁶ As a result of this the use of DJ stent in routine has been minimized during ESWL OR Ureteroscopy. Joshi et al¹⁷ published paper

on DJ related symptoms and tried to quantify the morbidity. According to Joshi et al,¹⁷ 76% patients with DJ stent experienced symptoms with 70% requiring analgesia.

MATERIALS AND METHODS

A cross sectional observational study was conducted from 1st January 2024 to 31st July 2024 in Urology Department of Nepal Medical College Teaching Hospital (NMCTH), Attarkhel, Gokarneshwor-8, Kathmandu, Nepal. Sixty-four patients fulfilling the inclusion criteria were included in our study after approval from NMC Institutional Review Committee and informed consent. Inclusion criteria were age group 15-55 years, either gender, stone size 6 mm to 20 mm (confirmed by CT-KUB). Exclusion criteria were solitary functioning kidney, previously operated case of B/L ureteric stones, multiple ureteric stones, procedure failure

Patients were randomly divided into 2 groups i.e group A and group B with 32 patients in each group. Preoperative investigations were done and surgical fitness was taken prior to surgery. Surgery was carried out using ureteroscope (9Fr) with pneumatic lithoclast to fragment the ureteric stone into pieces. Intraoperative and post operative findings were noted in separate Proforma. Group A included all patients with DJ stent (6FRs) and group B include patients without DJ stents. Post-operative care was carried out for about 24 to 48 hours. Oral analgesic Tab. Diclofenac sodium 50 mg was added as per the need. All the patients were followed up at the interval of week 1st, 4th, 8th and 12th week. Outcome was analyzed in terms of postsurgical pain, analgesic dosing and stone clearance at the end of the study. Confounding variables like age, gender was addressed by stratification of subjects in both groups. All the information was entered in a structured Proforma. Data was analyzed by SPSS-17.0. For the variables such as age, postsurgical pain VAS score at 12th week, stone clearance as well as the additional use of analgesia, mean and standard deviation was computed. Similarly, regarding the variables like sex, stone clearance and additional analgesic dosing frequency and percentage was calculated. Independent t test was done to compare the two groups for VAS for the mean post-operative score. Chi square test was done to analyze the frequency of stone clearance and for additional use of analgesia in both the groups. A p-value ≤ 0.05 was considered as significant. The data was stratified for age, gender, position of stone (mid/distal) and post stratification. An Independent t test was used for mean post-operative VAS score and chi-

square test was used for stone clearance and additional analgesia. $P \leq 0.05$ was taken as statistical significance. VAS score is graded from 0-10: 0- no pain, VAS 1-3 Mild pain, VAS 4-6 moderate pain, VAS 7-9 sever pain, VAS 10 very severe pain.

RESULTS

A total 64 patients (32 patients in each group i.e. A and B) fulfilling the inclusion/exclusion criteria were enrolled to compare the frequency of stone clearance, mean post-operative pain

Table: 1 Demographic and clinical profile of subjects

		GROUP				Chi-square p value
		Group A		Group B		
		n	%	n	%	
Age (years)	15-30	8	25.0	7	21.9	X2 = .087 P = .768
	31 - 55	24	75.0	25	78.1	
Sex	Male	19	59.4	17	53.1	X2 = .254 P = .614
	Female	13	40.6	15	46.9	
Stone location	Mid	11	34.4	13	40.6	X2 = .267 P = .606
	Distal	21	65.6	19	59.4	
Stone clearance	Yes	26	81.3	24	75.0	X2 = .366 P = .545
	No	6	18.8	8	25.0	
Need of analgesia	Yes	11	34.4	6	18.8	X2 = 2.003 P = .157
	No	21	65.6	26	81.3	

Table: 2 Descriptive statistics among groups for pain among age, gender and location of stone

	Age (years)	Mean	Std. deviation	T test p value
Group A	15-30	5.7500	0.46291	T=11.103 P =.001
	31 - 55	6.0000	1.35133	
	Total	5.9375	1.18967	
Group B	15-30	1.1429	1.06904	T=11.604 P =.000
	31 - 55	1.0400	1.61967	
	Total	1.0625	1.50134	
	Gender	Mean	Std. deviation	
Group A	Male	5.9444	1.10997	T=16.114 P =.000
	Female	5.9286	1.32806	
	Total	5.9375	1.18967	
Group B	Male	0.5000	0.81650	T=7.299 P =.000
	Female	1.6250	1.82117	
	Total	1.0625	1.50134	
	Stone location	Mean	Std. deviation	
Group A	Mid	5.6364	1.02691	T=11.647 P =.000
	Distal	6.0952	1.26114	
	Total	5.9375	1.18967	
Group B	Mid	0.9231	0.95407	T=10.114 P =.000
	Distal	1.1579	1.80318	
	Total	1.0625	1.50134	

Table: 3 Stone clearances among groups with age, gender and location stratification

	Age (years)	GROUP		Total	
		Group A	Group B		
Yes	15-30	6 46.2%	7 53.8%	13 100.0%	X ² =.241 P=.624
	31 - 55	20 54.1%	17 45.9%	37 100.0%	
No	15-30	2 100.0%	0 0.0%	2 100.0%	X ² =.087 P=.768
	31 - 55	4 33.3%	8 66.7%	12 100.0%	
	Gender	GROUP		Total	
Yes	Male	14 50.0%	14 50.0%	28 100.0%	X ² =.102 P=.749
	Female	12 54.5%	10 45.5%	22 100.0%	
No	Male	4 66.7%	2 33.3%	6 100.0%	X ² =.251 P=.616
	Female	2 25.0%	6 75.0%	8 100.0%	
	Location	GROUP		Total	
Yes	Mid	9 40.9%	13 59.1%	22 100.0%	X ² =1.936 P=.164
	Distal	17 60.7%	11 39.3%	28 100.0%	
No	Mid	2 100.0%	0 0.0%	2 100.0%	X ² =3.111 P=.078
	Distal	4 33.3%	8 66.7%	12 100.0%	

Table: 4 Additional Analgesia use among groups with age, gender and location stratification

	Age (years)	GROUP		Total	
		Group A	Group B		
Yes	15-30	1 50.0%	1 50.0%	2 100.0%	X ² =.215 P=.643
	31 - 55	10 66.7%	5 33.3%	15 100.0%	
No	15-30	7 53.8%	6 46.2%	13 100.0%	X ² =.017 P=.768
	31 - 55	14 41.2%	20 58.8%	34 100.0%	
	Gender	GROUP		Total	
Yes	Male	7 77.8%	2 22.2%	9 100.0%	X ² =1.431 P=.232
	Female	4 50.0%	4 50.0%	8 100.0%	
No	Male	11 44.0%	14 56.0%	25 100.0%	X ² =.251 P=.616
	Female	10 45.5%	12 54.5%	22 100.0%	
	Location	GROUP		Total	
Yes	Mid	4 80.0%	1 20.0%	5 100.0%	X ² =.726 P=.394
	Distal	7 58.3%	5 41.7%	12 100.0%	
No	Mid	7 36.8%	12 63.2%	19 100.0%	X ² =.683 P=.409
	Distal	14 36.8%	14 63.2%	28 100.0%	

and frequency of additional analgesia used in stented v/s non-stented patients after URS and pneumatic lithotripsy for mid and distal ureteric Stone. Age distribution of the patients was done and it shows 15-30 years 25%, 31-55 years 75% in Group-A and 21.9%, 78% in Group-B simultaneously. Coming to sex distribution male and female were 59.4%, 40.6% in group A, 53.1%, 46.9% in group B respectively. Stone clearance was 81.3% in Group A and 75% in Group B. Similarly need of analgesia was 34.4% in Group A and 18.8 % in group B (Table 1). Mean of pain score at 12th week was 5.93 in Group A and 1.06 in Group B. (Table 2) Stone clearance for age group 15-30 years was 46.2% in Group A and 53.8% in Group B, for age group 31-55 years Group A have 54.1% and Group B have 45.9% stone clearance (Table 3). Use of additional analgesia in Group A shows 34.4% and 18.8% in Group B, P value was 0.157 (Table 1). Need for analgesia for age group 15-30 years was 50%, and for age Group 31-55 was also 50%. Use of analgesia for group A male 77.8%, female 50%, group B male 22.2%, female 50% (Table 4).

DISCUSSION

Using a ureteral stent post ureteroscopy with lithotripsy for ureteric calculi is a routine surgical practice, however there is no need of DJ catheterization post ureteroscopy in most cases and an absolute need of catheterization, the question which post ureteroscopic cases must be catheterized is still unaddressed.¹⁸ There is no evidence of need of placing a DJ catheter after uncomplicated ureteroscopy.¹⁹ It is usually practiced because use of DJ stent post ureteroscopy is believed to reduce ureteral strictures, protects the kidney and even decreases post operative pain. Having said that post procedural stenting leads to morbidity like pain, infection and irritative voiding symptoms.²⁰

The purpose of this study was to find out whether it is compulsory to stent the ureter post uncomplicated URS and pneumatic lithotripsy for mid and distal ureteric stones and also to know the drawbacks of stenting on patient's outcome. Similar study was conducted by Saddam *et al*²¹ in 2020 and this was a RCT over 105 patients divided into two group, one with DJ stenting following URSL, second group without DJ stenting. They also found significant VAS for first group ($p \leq 0.001$). And concluded about no need for DJ stenting for uncomplicated URSL.

Segalen *et al* in 2019 conducted a retrospective study from 2014-2017 with primary objective

to evaluate postoperative pain following DJ stenting after URSL. A total of 366 patients were included and were grouped in two groups. A total of 259 (70.8%) with and 107 (29.2%) without DJ stent. The postoperative pain was not significant in difference (22% vs 17.5% $P=0.398$). Their conclusion was DJ stenting after URSL don't increases pain however stenting should not be used after uncomplicated interventions for smaller stones.²² Another study done by Suraj *et al* in India Karnataka also discourage the use of DJ stent as stented patients had more complications than the non-stented ones.

Looking at the result of our study, there is no significant difference between the post-operative pain score and stone clearance, use of additional analgesics in stented ones as compared to non-stented ones. Stone clearance was slightly more in stented group, but post-operative pain and use of analgesia was slightly higher. There was no statically significant difference among gender, age and stone location in terms of stone clearance, pain and use of analgesia in both groups ($P > 0.05$).

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