

# Frequency of Proximal Migration of Urinary Stone during Ureteroscopic Pneumonic Lithotripsy in KPK

Proximal  
Migration of  
Urinary Stone  
during  
Lithotripsy

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## ABSTRACT

**Objective:** To Study the Frequency of Proximal Migration of Urinary Stone During Ureteroscopic Pneumonic Lithotripsy.

**Study Design:** Descriptive Cross Sectional Experimental Study

**Place and Duration of Study:** This study was conducted at the department of Urology Lady Reading Hospital Peshawar, Nawaz Shareef kidney hospital swat, DHQ teaching hospital Sawabi, Women medical college Abbottabad from January, 2019 to May, 2020.

**Materials and Methods:** Sample size was calculated using WHO calculator and total 160 patients were enrolled with 5% margin of error and 95% confidence interval and consecutive nonprobability sampling technique was used. All patients having urinary stone of size less than or equal to fifteen millimeters, age thirty to seventy years and male and female were included in the study whereas all those who had previous history of Extracorporeal shock wave lithotripsy, DJ stent placement, age less than 30 and > 70 were excluded from the study.

After ethical committee permission from of the hospital, patients were admitted in the department and informed consent was taken. Data was recorded on a predesigned profarma and was analyzed using the statistical program SPSS version 20. Descriptive statistics like mean  $\pm$  standard deviation was calculated for numerical variable age and size of stone.

**Results:** During the study period 160 cases (83 males and 77 female) of ureteric stones were included in the study. In total 20 (12.5%) patients proximal stone migration was observed.

**Conclusion:** It was estimated from study that proximal stone migration during pneumatic lithotripsy was major complication.

**Key Words:** pneumatic lithotripsy, proximal migration of urteric stone, intra corporeal lithotripsy

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## INTRODUCTION

Urinary stone is a major clinical and economic burden for health care system. Prevalence of stone is increasing as suggested by International epidemiological data<sup>1</sup>. Worldwide 2 and 20% of population has stone disease, Prevalence of urolithiasis in Pakistan is from 4% to 20%, Ureteric stones most often present with acute flank pain and hematuria<sup>2</sup>. Patients can present with severe pain in emergency.

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Most common between 30 to 60 years. Most of the stones pass by itself without intervention. 77% of stones having size less than 5mm pass spontaneously, while more than 5 mm have a lesser than 46% chances of spontaneous passage. Distal and proximal ureteric stones have chances of spontaneous passage of 71% and 22% respectively. Intervention is required in patients having solitary obstructed kidney, unbearable pain, failure of conservative treatment, uro sepsis due to stones and sometimes on patient choice. Treatment options for ureteric stones include extracorporeal shock wave lithotripsy (ESWL), ureteroscopic lithotripsy, and ureterolithotomy (open and laparoscopic). Choice of Treatment is dependent upon stone size, location, patient's preference and end urological facilities availability.

Ureteroscopy (URS) with lithotripsy is most commonly performed procedure<sup>2</sup>. Transurethral lithotripsy (TUL) is the treatment of choice for lower and middle ureteral calculi. It has also been used for treatment of upper ureteral and renal stones. Based on recent studies, its use as a tary treatment modality for upper third ureteral stones has become popular; however, extracorporeal

shockwave lithotripsy (ESWL) is still the treatment of choice<sup>4</sup>. In early 1990 Pneumatic lithotripsy (PL) was introduced. Several reports indicate very high success rates.<sup>2</sup> It is less-costly and simple to manage as compared to laser, ultrasonic and electrohydraulic lithotripsy. Even for larger stones it is safe and highly efficacious procedure particularly in distal ureter<sup>5</sup>. Complication of Pneumatic Lithotripsy include ureteral perforation, mucosal trauma, avulsion, ureteric stricture, uropoiesis, stone migration, postoperative hematuria, fever, flank pain<sup>1,5</sup>. Proximal stone migration is a common problem during ureteroscopic lithotripsy, especially when the pneumatic lithotripter is used<sup>7</sup>. The documented incidence of stone migration is 11.36%<sup>6</sup>.

## MATERIALS AND METHODS

A descriptive cross sectional study was performed in the department of urology Lady Reading Hospital Peshawar, Nawaz shareef kidney hospital swat, DHQ teaching hospital Sawabi, Women medical college Abbottabad, Dadar General Hospital Mansehra from 1<sup>st</sup> Jan 2019 to 30<sup>th</sup> May 2020. Sample size was calculated using WHO calculator and total 160 patients were enrolled with 5% margin of error and 95% confidence interval and consecutive nonprobability sampling technique was used. All patients having urinary stone of size less than or equal to fifteen millimeters, age thirty to seventy years and male and female were included in the study whereas all those who had previous history of Extracorporeal shock wave lithotripsy, dj stent placement, age less than 30 and > 70 were excluded from the study.

After taking permission from ethical committee of the hospital, patients were admitted in the department and informed consent was taken. Data was recorded on a predesigned proforma and was analyzed using the statistical program SPSS version 20. Descriptive statistics like mean  $\pm$  standard deviation was calculated for numerical variable age and size of stone.

All results organized in the form of tab.

**Inclusion Criteria:** Proximal Migration of Urinary Stone During Ureteroscopic Pneumonic Lithotripsy

**Exclusion Criteria:** All the patients without stone of kidney were excluded from the study.

## RESULTS

Duration of my study was from 1<sup>st</sup> jan 2019 to 30<sup>th</sup> May 2020.

A total of 160 patients (51.8%) males and (48.2%) female) were included (table 1)

Proximal migration of stone noted in twenty sick persons (twelve point five percent). (TABLE 2)

Among the male patient 11(13.25%), and in female 11.6 % were noted with stone migration. P value > 0.05(0.924). (Table 3)

Patients further categorized on basis of stone size.

Group 1 (stone size from 8-10mm), including 46 patients. Stone migrated in 5(10.86%) patients.

Group 2 (stone size from eleven to fifteen millimeters, including one hundred fourteen sick persons. Stone migration occurred in 15(13.15%). P-value 0.846 (>0.05). (Table 4)

Age limit was 31 -70 years. Further distributed in 4 groups.

Group A age limit (31-40 years) include 62 patients. Stone migration was noted in 8(13.33%) patients.

Group B age limit (41 -50 years) included 56 patients. Stone migration was noted in 6(10.7%) patients.

Group C age limit (51 - 60 years) included 26 patients and stone migration reported in 3 (11.5%).

Group D age limit (61 -70 years) including 16 patients with incidence of stone migration in 2 patients (12.5%). P value was <0.05(0.867) non-significant. (table 5)

Mean age of the patient is 45 years and standard deviation of 10.1. Mean of stone size is 11.9 mm and standard deviation 2.1(table 6).

**Table No.1: Frequency distribution of gender (n=160)**

Gender	Frequency	Percent
Male	83	51.8
Female	77	48.2
Total	160	100.0

**Table No.2: Frequency distribution of upward stone migration (n=160)**

Stone Migration	Frequency	Percent
Yes	20	12.5
No	140	87.5
Total	155	100.0

**Table No.3: Cross table of gender with upward stone migration (n=160)**

Gender	No. of patients	Stone Migration	%age	p-value
Male	83	11	13.25%	0.912
Female	77	9	11.6%	
Total	160	20	12.5%	

**Table No.4: Cross table of upward stone migration with stone size (n=160)**

Stone size	No of Patients	Frequency of stone migration	%age	P-value
8 to 10 mm	46	5	10.86%	0.814
11mm to 15mm	114	15	13.15%	
Total	160	20	12.5%	

**Table No.5: Cross Table of age with Upward Stone Migration (n=160)**

Age Groups (years)	No of patients	Frequency of stone migration	%age	p-value
31 - 40	62	9	14.51%	0.867
41 - 50	56	6	10.7%	
51 - 60	26	3	11.5%	
61 - 70	16	2	12.5%	
Total	160	20	12.5%	

**Table No.6: Mean and Standard deviation of stone size and age (n=160)**

	n	Minimum	Maximum	Mean	Std. Deviation
Stone Size	160	8mm	15mm	11.919	2.1656
Age of Patient	160	31years	70	44.20	10.149

## DISCUSSION

Urolithiasis has a high incidence in the countries of Afro-Asian stone belt having urological workload of 40-50%.

In hospitals. Management of ureteric calculi depends upon the size and location, stone of <5 mm in distal ureter has chances of spontaneous passage up to 98%, for stone of size upto 1cm in proximal ureter ESWL should be the first option, ESWL and ureteroscopy are the available options for ureteric stones. ESWL is minimally invasive and needs no anesthesia but the retreatment rate is high, URS gives higher stone clearance, but need anesthesia. In our experience Pneumatic lithoclast was found cost effective and more users friendly<sup>8</sup>.

In a study reported the comparison of ESWL and ureteroscopy both has an excellent stone-free rate (86% to 90%) for stones smaller than 1cm, whereas ureteroscopy have better result for larger stones i.e. Ureteroscopy vs shock wave lithotripsy (67% vs 73%). In bleeding diathesis and pregnancy preference was given to ureteroscopy over ESWL.<sup>9</sup>

SWL is noninvasive and due to this generally accepted as the prior treatment option for ureteral stones, but PL with ureteroscopy has the advantage of higher and quick stone clearance rate and is good alternative. Pneumatic lithotripsy is preferred over ESWL in cases where quick stone removal is desired like for larger ureteric stones with more chances of obstruction, impaction and infection apart from this, PL may be chosen as the first line treatment rather than SWL for stones larger than 1cm. Main complications observed were migration of a complete stone or its fragments (7.1%), urosepsis (4.5%) and perforation of ureter (1.3%)<sup>10</sup>.

Some Perioperative complications associated with PL includes proximal stone migration into the kidney

7.2%, Damage to ureteric mucosa in (3.5%), ureteral perforation (1.7%), avulsion of ureter in (0.4%), and in (0.2%). cases it is converted to open surgery. Early postoperative complications included, Loin pain (18.4%), pelvic discomfort (5.5%), hematuria (7.3%), and urinary tract infection (5%)<sup>11</sup>. Proximal stone fragments migration during pneumatic ureteroscopic lithotripsy is a common issue<sup>7</sup>. A study has documented this incidence of stone migration about 11.36%<sup>6</sup>. Another study has reported 3.1 % in lower and 7.6% in upper ureteric stone.<sup>12-16</sup>

## CONCLUSION

It was estimated from study that proximal stone migration during pneumatic lithotripsy was major complication.

### Author's Contribution:

Concept & Design of Study: Shaukat Fiaz  
 Drafting: Noorul Hayat, Muhammad Shahab  
 Data Analysis: Hamza Ashraf, Tanveer Khan, Kafeel Azhar  
 Revisiting Critically: Shaukat Fiaz, Noorul Hayat  
 Final Approval of version: Shaukat Fiaz

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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