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# Early experience in ureteroscopy and pneumatic lithoclast in AL Hilla City

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***Abstract*---**Introduction: Urological treatment of urinary calculi has changed much in the past 20 years [(1)]. Endoscopic intra Ureteral lithotripsy has developed as the result of advances in techniques for uretroscopy and lithotripsy Aim of the study to determine the utility and the efficacy of pneumatic lithoclast in the treatment of uretric stone as early experience in AL- HillA city. Method: cross sectional study of one hundred patients with uretric stone with size ranged from (0.5-1.5 cm) and different level (upper, middle, lower Ureter 15, 20, 65 respectively) treated with uretroscopy and pneumatic lithoclast under general and spinal anesthesia. Result: About 90 patients have cleared from uretric stone within 2 weeks. The other 10patient's not responding because Upward migration (6 patients), Ureteral perforation (4 patients). 50 patient's need's double j stenting at the end of the procedure because large number of fragments' and due to hematuria. The other 50 patients not need double j stenting because small stone and easy to pass spontaneous. Conclusion: By conclusion early intervention is advisable .mid or upper ureteric stone also can deal with.

***Keywords*---**early experience, uretroscopy, pneumatic lithoclast, AL Hilla City.

## Introduction

Urological treatment of urinary calculi has changed much in the past 20 years [1]. Endoscopic intra Ureteral lithotripsy has developed as the result of advances in techniques for uretroscopy and lithotripsy [2]. These advancements have accelerated the evaluation of modern techniques of calculus removal [3]. Various methods have been used for the removal of calculi [4]. Pneumatic lithotripsy has been the most widely used method of stone disintegration [5,6]. There is always the risk of fragment up-migration, however, in whatever mode of endoscopic lithotripsy is chosen for management of uretral stones [7]. Despite the liberal use of ESWL, ureteric lithotripsy is still the preferred treatment modality for managing ureteric stones in many hospitals and achieves an immediate stone free state in high percentage of patients [8]. Pneumatic lithotripsy is more popular among the urologists because of its low cost, easy step, and high success rate [9]. So we also share our experience of managing ureteric calculi by using lithoclast (Swiss) regarding the efficacy. A Longer uretroscopy that could reach all the way to the renal pelvis was developed by Enrique pérez- castro in collaboration with Karl storz endoscopy, and its use was reported in 1980 its 39 cm length allowed inspection of the renal pelvis for the first time. The other endoscope manufacturers quickly followed suit with rigid ureteroscopes [10]. The first pneumatically driven intracorporeal litho1ripter, the (Swiss) lithoclast, was developed through the collaborative efforts of the departments of urology and medical electronics at chur university medical school and electro medical system le sentier, respectively, both of Lausanne, Switzerland. This device uses a direct-contact, solid, rigid probe to fragment stones under direct vision using mechanics similar to those of a pneumatic jackhammer. The lithoclast consists of a generator, hand piece, and probe. Probes are available in a variety of sizes ranging from 0.8 to 3.0 mm and are connected to the hand piece, which contains a small metal projectile. The rigid nature of the probe limits the use of the lithoclast to rigid or semi rigid endoscopes. The hand piece is connected by flexible caliber tubing to the generator which, in turn, is also connected to a dry, clean air supply. Either the hospital central air supply or a compressed air tank is a suitable source of compressed air [10]. The entire unit is activated by a foot pedal. On activation of the device; compressed air propels the metal projectile [10]. Aim of the study to determine the utility and the efficacy of pneumatic lithoclast in the treatment of uretric stone as early experience in AL- HillA city.

## Method

From January\ 2009 to march\ 2011, hundred (100) patients of both sexes (75 males & 25 females pie chart 1) and (65 patients with left ureteric stone and 35 patients with right ureteric stone pie chart 2). Were treated with Ureteral lithotripsy using pneumatic lithoclast (Swiss). These stones failed to pass spontaneously over a minimum period of two weeks [3]. The age ranged from 20 to 60 years. All patients were evaluated with history, clinical examination and laboratory investigations. Antibiotics were given prophylactically. Ultrasound and Excretory urography was done in all patients to confirm the diagnosis and determine the location and size of stone. Exclusion criteria were, stones less than 5mm and greater than 1.5cm, abnormal anatomy, multiple stones, active kidney infection and previous failed pneumatic lithotripsy, bleeding tendency or

anticoagulant therapy unless stopped [3]. Patients were divided into three groups according to location of stones Group-I Consisted of stones located above the pelvic brim (upper Ureter), group-II consisted of stone over the pelvic brim (middle Ureter) and group-III consisted of stones below the pelvic brim (lower Ureter). The number of cases in each group was 15 in Group-I, 20 in group-II and 65 in group-III. There were no significant differences including age, gender and stone diameter between three groups. The parameters used for comparison between three groups were success rate, stone up-migration stent indwelling and complications. Procedure was performed under general or spinal anesthesia as decided by anesthetist. All patients positioned in lithotomy position and examined first with urothrocystoscopy with 0-degree angle lens for urethra and 30-degree angle lens for the bladder, then stenting of the intended Ureter with ureteric stent for the easy passage of the uretroscopy which is 10French karl-storz uretroscopy, some time we did use fogartti catheter to dilate the ureteral orifice and distal Ureter. After the insertion of uretroscopy and visual identification of the stone, fragmentation of the stone with pneumatic lithotripsy done. Double j stent was placed in those patients, whom the fragments were migrated, edema at the site of stone impaction and Ureteral perforation. Plain X ray (K.U.B.) was performed two weeks after surgery to assess residual stone fragmentations. Double j stent was removed after one month. Urethral catheter was removed on 1st post-operative day. Success was defined as symptom free and no evidence of residual stone greater than 2mm in diameter, which would usually pass spontaneously [1,3]. Excretory urography was performed at three months later to assess the anatomy of kidney and Ureter post operatively. Statistical analysis done by SPSS 22, frequency and percentage used for categorical data, mean, median and SD for continuous data.

**Results**

Hundred (100) patients were managed with pneumatic lithotripsy. Over all stones clearance rate at 2 weeks' postoperative day was 90% (Table 1). The success rates were different according to the location and size of stones. The success rate of Group-I, group- II, & group-III, were 60%, 90% and 96.92% respectively. The stone clearance rate of Group-I was significantly lower than the other two groups, while group-II and group- III were not significantly different. Ten (10) cases of failure were due to upward migration of stones during lithotripsy and submitted for ESWL (6 patients), and Ureteral perforation which leads to abortion of the procedure (4 patients). The overall rate of stent indwelling was 50% (table 2) Ureteral stent was left for 4-8 weeks according to post-operative condition of Ureter. Ureteral perforation occurred in 4 patients (4%) and the incidence was (20%) in Group-I and (5%) in group-II (table 2). Ureteral perforation occurred mostly in those patients, who has impacted Ureteral stone with kinking of the Ureter. Ureteral perforation was managed by stopping the procedure as soon as possible with double j stenting. All patients of Ureteral perforation underwent excretory urography after 2 weeks of removal of stent to evaluate incidence of Ureteral stricture and extravasations of contrast. The most common complications were pain; hematuria (table 2). Male patients were 75 and female patients was 25 (male to female ratio 3:1) and 65 of cases was on left Ureter and 35 on right Ureter (fig 1, 2). Thirty patient was between (20-30) years old, thirty-five patients between (31-40) years old, ten patients between (41-50) years old and

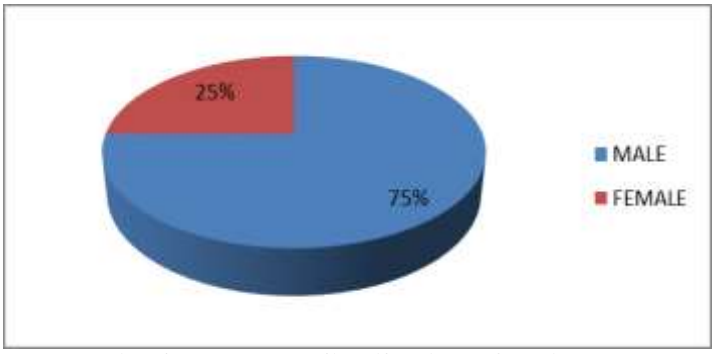
twenty-five patients between (51-60) years old (fig 3). ESWL was done failed cases (six patients with upper Ureter, two in middle and two lower Ureter (fig 4)

Table 1: Results according to stone location

| parameter | group i(upper Ureter) | group ii(middle Ureter) | group iii(lower Ureter) | total % |
|---|---|---|---|---|
| number of cases | 15 | 20 | 65 | 100% |
| success | 9 (60%) | 18 (90%) | 63 (96.9%) | 90(90%) |
| failure | 6 (40%) | 2 (10%) | 2(3.1%) | 10(10%) |

Table –II Complications according to stone location

| parameter | group I(upper Ureter) | group II (middle Ureter) | group III (lower Ureter) | total % |
|---|---|---|---|---|
| Ureteral perforation | 3 | 1 | 0 | 4% |
| hematuria | 3 | 2 | 1 | 6% |
| fever | 1 | 0 | 0 | 1% |
| post-operative pain | 9 | 8 | 7 | 24% |
| stent indwelling | 15 | 20 | 15 | 50% |




Pie chart 1: Sex distribution of patients

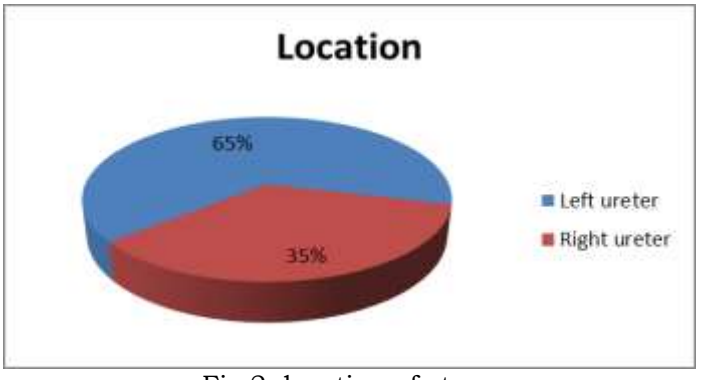



Fig 2: location of stone

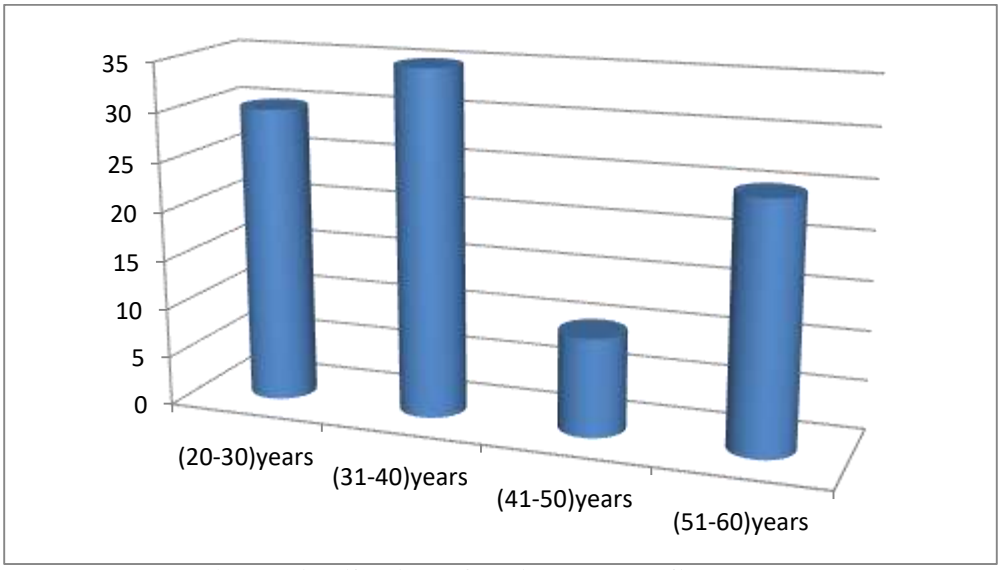



Fig 3: Distribution of patients according to age

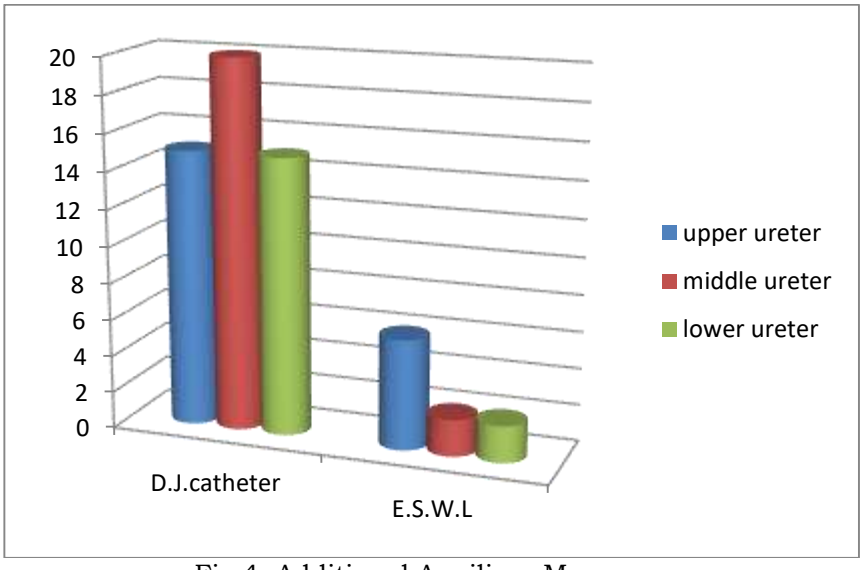



Fig 4: Additional Auxiliary Measures

**Discussion**

The management of Ureteral calculi represent one of the complex problem in urological practice. Several factors are to be considered simultaneously, including the size, nature and location of the stone, the symptoms and morbidity caused by the stone, the medical conditions of the patients and other socio-economic factors. These considerations make the management of Ureteral calculi uniquely challenging. During the past two decades a variety of new therapeutic modalities have been developed with the aim of providing effective treatment and at the same time minimizing the untoward effects of therapy [11]. Means of uretroscopy

lithotripsy include ultrasonic, electro hydraulic, pneumatic and laser [12]. Every device has its advantages and limitations [13]. Pneumatic lithoclast is the only available tool for uretroscopic lithotripsy in our setup. It is well established that pneumatic lithotripter is very effective on every stone composition including calcium, oxalate monohydrate and cysteine stones [14] and it is rarely traumatic to tissue and has low complication rates [15, 16]. The rate of successful fragmentation of Ureteral calculi has wide spectrum from70.7% to 96.8% showing a trend of high success rate as the number of patients increases in each study and as the follow up time increases from the day of operation [16,17]. Our study in compares with those of others studies about pneumatic lithotripsy. The only appreciable disadvantages of pneumatic lithotripsy are the limitation of probe rigidity and the potential for proximal stone migration during treatment overall success rate was 90% in our study while Hong YK and Park DS reported 93.5%. This result is comparable with other studies [18-21]. We have achieved 60%, 90% and96.92% complete fragmentation of stones in upper, mid and lower Ureter respectively this result is comparable with other studies [1, 11]. In our study the rate of stone migration was 6% while in the study of Hong YK et al was 16.4%. The reported rate of Ureteral perforation during uretroscopy was 0-4% and Hong YK reported the rate of Ureteral perforation 3.2%. In our study the rate of ureteral perforation was 4%. Ureteral stenting after uretroscopy lithotripsy is a common practice to prevent postoperative complications such as Ureteral obstruction some investigator noted that uncomplicated uretroscopy can be performed without routine stenting with minimal patient discomfort and low incidence of post-operative complications [22].

## Conclusion

Pneumatic lithotripsy is reliable option of treatment, effective as minimal invasive technique with a good response in a short period of time with a little complication as compared with other modalities of treatment. This is mainly for lower and middle Ureteral stones, while upper ureteral stone it may need other option as ESWL.

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