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ROLE OF PNEUMATIC LITHOCLAST IN THE MANAGEMENT OF URETERIC STONE

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ABSTRACT:

OBJECTIVE: *To determine the utility and efficacy of pneumatic lithotripsy in the treatment of ureteric calculi.*
DESIGN: *Retrospective study*
DURATION: *From 2006 to 2009*
SETTING:*Department of Urology Peoples Medical College Nawabshah*
PATIENTS & METHODS:
Over a period of three (03) years hundred (100) patients of ureteric stones were treated with pneumatic lithoclast. Fifteen (15) Stones were located in upper ureter, Twenty (20) stones were located in middle ureter and sixty five (65) stones were located in lower ureter. Success rate was defined as symptom free, no residual stones larger than 2mm. Spinal anesthesia with intravenous sedation was given to all patients.
RESULTS:
Over all success rate was 90%. Success rate in upper, middle and lower ureteric stones were 60%, 90% and 96.92% respectively. Completely fragmented stones cleared spontaneously within two weeks in 95% of cases and all patients were free of stones one month after the procedure. In ten (10) patients stone was migrated, later on submitted for ESWL and successful. Complications were encountered in 11% of cases and were managed conservatively. Hospital stay was 24 to 36 hours.
CONCLUSION:
Pneumatic lithotripsy is reliable, highly effective rapid, safe and cost effective treatment modality for ureteric stones with negliable incidence of complications.

KEY WORDS: Ureteric Stone, Lithoclast, Spinal Anaesthesia

INTRODUCTION:

Urological treatment of urinary calculi has changed much in the post 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 calculai.[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 what ever mode of endoscopic lithotripsy is chosen for management of urethral stones. [7,8]. Despite the liberal use of SWL, 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.[9,10.] Pneumatic lithotripsy is more popular among the Urologists because of its low cast, easy step, and high success rate.[11]. So we also share our experience of managing ureteric calculi by using lithoclast (Swiss) regarding the efficacy.

MATERIAL & METHODS:

From 2006 to 2009, hundred (100) patients of both sexes (75 males & 25 females) were treated with ureteric lithotripsy using pneumatic lithoclast (SWISS). These stones failed to pass spontaneously over a minimum period of two weeks. The age ranged from 20 to 70 Years. All patients were evaluated with history, clinical examination and laboratory investigations. Prophylactic antibiotics were given according to the urine culture and sensitivity. Ultrasound and intravenous pyelogram was done in all patients to confirm the diagnosis and determine the location and size of stone. Exclusion criteria were radiolucent stones, stones less then 5mm and greater than 1.5cm, abnormal anatomy, associated renal stones, multiple stones, active kidney infection and previous failed pneumatic lithotripsy.

TABLE-I
RESULTS ACCORDING TO STONE LOCATION

Parameters	Group-I Upper Ureter	Group-II Middle Ureter	Group-III Lower Ureter	Total %age
Number of Cases	15	20	65	100%
Utereral Perforation	03 (20%)	01 (05%)	0 (—)	04 (04%)
Haemituria	02 (13.33%)	01 (5%)	0 (—)	03 (03%)
Fever	01 (6.6%)	0 (—)	0 (—)	01 (01%)
Postoperative Tenderness / pain	02 (13.33%)	01 (05%)	0 (—)	03 (03%)
Stend indewelling	15 (100%)	20 (100%)	15 (23.08%)	50 (50%)

TABLE-II
COMPLICATIONS ACCORDING TO STONE LOCATION

Parameters	Group-I Upper Ureter	Group-II Middle Ureter	Group-III Lower Ureter	Total %age
Number of Cases	15	20	65	100%
Success	09 (60%)	18 (90%)	63 (96.92%)	90 (90%)
Failure	06 (40%)	02 (10%)	02 (3.08%)	10 (10%)

Patients were devided into three groups according to location of stones. Group-I consisted of stones located above the pelvic birm (upper Ureter), group-II consisted of stone over the pelvic brain (middle Ureter) and group-III consisted of stones below the pelvic birm (lower ureter). The number of cases in each group was 15 in group-I, 20 in group-II and 65 in group-II. There was 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 (table-I). Procedure was performed under spinal anesthesia with intravenous sedation as decided by Aneasthetist. JJ stent was placed in those patients whom the fragments were migrated, oedema at the site of stone impaction and ureteral perforation. Plain x ray KUB was performed 2 weeks after surgery to assess residual stone fragmentations. JJ stent was removed after I month. Urethral catheter was removed on 1st operative day. Success was defined as symptom free and no evidence of residual stone greater than 2mm in diameter, which would usually pass spontaneously. Intravenous urography was performed at 3 months to assess functional status and also to delineate the ureteral anatomy.

RESULTS:

Hundred (100) patients were treated with pneumatic lithotripsy. Over all stones clearance rate at 2 weeks postoperative day was 95% (table-I). The success rates were different according 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, got stone free. The overall rate of stent indwelling was 50% (table-I). Ureteral stent was left for 2-8 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 No. II). Ureteral perforation occurred mostly in those patients, who has impacted ureteral stone with kinking of ureter. Ureteral perforation was managed by stopping the procedure as soon as possible with indwelling of stent. All patients of ureteral perforation under went intravenous pyelography after 2 weeks of removal of stent to evaluate incidence of ureteral stricture and extravacation of contrast. The most complications were pain, haemituria and dysuria (Table No II).

DISCUSSION:

The management of ureteral calculi represents 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-economical 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.[12]

Means of ureteroscopic lithotripsy include, ultrasonic, electrohydraulic, pneumatic and laser[13.] Every device has its advantages and limitations.[14]. Pneumatic lithoclast (Swiss Lithoclast) is the only available tool of ureteroscopic lithotripsy in our setup. It is well established that pneumatic lithotripter is very effective on every stone composition including calcium, exalate monohydrate and cystine stones [15], and it is rarely traumatic to tissue and has low complication rates [16,17]. The rate of successful fragmentation of ureteral calculi has wide spectrum from 70.7% to 96.8% showing a trend of higher success rate as the number of patients increases in each study and as the follow up time increases from the day of operation [17,18.]

Our study is comparable 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.

Over all success rate was 90% in our study while Hong YK and Park DS reported 93.5%. This result is comparable with other studies, [12,19,20,21,22.] We have achieved 60%, 90% and 96.92% complete fragmentation of stones in upper, mid and lower ureter respectively this result is comparable with other studies [1, 12]. In our study the rate of stone migration was 10% while in the study of Hong YH et al was 16.4%. The reported rate of ureteral perforation and avulsion during ureteroscope was 0-4% and ureteral stricture was 0.5%. Hong YH reported the rate of ureteral perforation 3.2% and stricture formation 0.0%. In our study the rate of ureteral perforation was 4%. Ureteral stenting after ureteroscopic lithotripsy is a common practice to prevent postoperative complications such as ureteral obstruction. Some investigator noted that uncomplicated ureteroscopy can be performed without routine stenting with minimal patient discomfort and low incidence of post operative complications. [23, 24.] In our study JJ stent indewelling was 50% while Hong YH et al reported 62.2%. The complications other than the above encountered were, haemituria 3%, fever 1% and tenderness 3% while M.S Akhtar reports haemituria 1.6% fever 2.6% and tenderness 1.8%. We have found lithoclasty to be a very safe procedure.

CONCLUSION:

Pneumatic lithotripsy is reliable, highly effective,,rapid, safe and cost effective treatment modality for middle and lower ureteric stones with negligible incidence of complications. Achieving excellent results, in upper ureter, it should be combined with ESWL.

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