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Original Research Article

Preoperative Passive Ureteral Dilatation Using J Stent in Patients with Ureteric Stone (Benefits and Drawbacks)

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Abstract

More than 95% 0f ureteric stone are now managed by ureteroscopy or extracorporeal shockwave lithotripsy. Although preoperative double J stent insertion is frequently used, little is known about its indications and results.

During the period from November 2013 to October 2014, 38 patients with mid and lower ureteric stone were included in our study. All patients underwent ureteroscopy and laser lithotripsy using semi rigid 9 French ureteroscopy and holmium YAG LASER. The patients divided in to 2 groups the first group (1)includes 18 patients who underwent single session ureteroscopy this group compared to group (2) which included 20 patients who underwent 2 sessions procedure (ureteroscopy 2 to 4 week after ipsilateral double J stent insertion).

The tow group compared with regard to operative time, stone free rate, stone migration and ureteric injury.

The operative time was significantly shorter in group 2 (p value 0.001), ureteric mucosal injury was lower in group 2 (p value <0.05), while stone migration was higher in group 2 (p value <0.05), other results were comparable between both group.

The study concludes that preoperative passive ureteral dilatation has many benefits and drawbacks and is recommended in cases of: any difficulty in accessing the ureter; patients cannot tolerate long operative time and patients with single kidney to avoid ureteral trauma and possible stricture.

Key Words: Kidney, ureter, and bladder (KUB), Computed tomography (CT),YAGlaser.

مزايا وعيوب عملية توسيع الحالب بواسطة دعامة الحالب قبل اجراء عملية تفتيت حصاة الحالب

الخلاصة

أكثر من 95٪ من حالات حصى الحالب يمكن معالجتها الآن باستخدام ناظور الحالب أو باستخدام الموجات الصادمة من خارج الجسم. على الرغم من استخدام توسيع الحالب بواسطة دعامة الحالب في كثير من الأحيان الا انه لا يعرف إلا القليل حول دلالاته ونتائجه.

خلال الفترة من نوفمبر 2013 إلى أكتوبر عام 2014، 38 مريضا يعانون من حصاة (وسط او اسفل) الحالب تضمنتهم الدراسة. خضع جميع المرضى الى عملية تفتيت الحصوات باستخدام ناظور الحالب شبه الصلب ذو القياس 9 French و اشعة الليزر نوع YAG IASER.

تم تقسيم المرضى الى مجموعتين المجموعة الأولى (1) تضمنت 18 مريضا خضعوا مباشرة لناظور الحالب وبجلسة واحدة تم مقارنةهذه المجموعة مع المجموعة (2) والتي شملت 20 مريضا خضعوا لناظور الحالب بعد مرور 4-2أسابيع من عملية توسيع الحالب بواسطة دعامة الحالب.

تم مقارنة المجموعتين فيما يتعلق بطول وقت العملية ، المعدل تفتيت الحصى، والهجرة الحجرالحصى الى الكلية وإصابة الحالب.

طول وقت العملية كان أقصر بكثير في المجموعة 2 (قيمة احتمالية 0.001)، وكانت إصابة الحالب أقل في المجموعة 2 قيمة$P <0.05$ ، في حين كانت هجرة الحصى أعلى في المجموعة 2 قيمة$P <0.05$ ، وكانت النتائج الأخرى متقاربة بين كل من المجموعتين.

نخلص إلى أن عملية توسيع الحالب بواسطة دعامة الحالب له فوائد عديدة وعيوب وينصح في حالات: أي صعوبة في الدخول إلى الحالب. المرضى الذين لا يمكن أن يتحملوا وقت العملية الطويل والمرضى الكلية المنفردة لتجنب اصابة الحالب واحتمال حدوث تضيق في الحالب مستقبلا.

الكلمات المفتاحية:اشعة الكلية الحالب والمثانة ،المفراس الحلزوني، نوع من اشعة ليزر.

Introduction

The higher rate of urinary stone diseasesis associated with the well-publicized increment in the world's prevalence of obesity and its relationship to urinary stone diseases [1].

More than 95% 0f ureteric stone are now managed by ureteroscopy or extracorporeal shockwave lithotripsy[2].

Prior dilatation of the ureter using different types of dilator was routine, however, the development of the flexible instrument and downsizing of the instrument led to decrease the need of the prior dilatation[3].

Prior dilation of the ureter is not essential in allureteroscopic intervention and should be performed only ifthe ureteric entry is difficult or impossible[4].

If the ureteroscope does not pass easily, an indwelling double J stent can be inserted and left for 2 weeks allowing for passive ureteral dilation[4].

Although preoperative double J stent insertion is frequently used, little is known about its indications and results.

Many factors can make ureteric entry for endoscopic management of stone difficult from these factor, the most common are, narrowing of ureteric lumen, abnormal anatomy, tortuous ureter, and bladder or prostatic diseases. In such cases an active ureteric dilatation can be done, however this is associated withrisk of trauma and the potential long-term stricture formation [5].

Patients and Methods

During the period from November 2013 to October 2014,38 patients with mid and lower ureteric stone were included in our study, their age range from 8 to 42 years. All patients underwent the following preoperative investigations: urinalysis, abdominal ultrasound, KUB X-rays, native abdominal CT scan, in addition to the routine preoperative investigation.

All patients underwent uretroscopy and laser lithotripsy using semi rigid 9 Frenchuretroscopy and holmium YAG IASER. The patients divided in to 2 groups the first group (1)includes18 patients who underwent single session uretroscopy this group compared to group (2) which included20 patients who underwent 2 sessions procedure (uretroscopy 2 to 4 week after ipsilateral double J stent insertion).

Operative procedure:

All patients underwent the procedure under general anesthesia in uretroscopy position, using Karl storz 18 French cystoscopy and 30 degree lens; also we use 7.5 – 9 French Karl storzsemirigiduretroscopy.

In group (I) uretroscopy and lithotripsy done directly after doing cystoscopy for evaluation of the urethra urinary bladder and insertion of guide wire, then the uretroscopy is inserted over the guide wire until the stone is reached we remove the guide wire and insert the laser fiber and we start lithotripsy under direct vision. At the end of the procedure the patient may or may not need double J stent insertion depending on the results of the lithotripsy. Folly's catheter inserted in all patients and left for 24 – 48 hours.

In group (II) after doing cystoscopy for evaluation of the urethra urinary bladder we insert a double J stent under fluoroscopic control as a method of passive ureteral dilatation and the uretroscopy done 2-4 weeks later.

All patients receive antibiotics per operatively in the form of cefotaxim 1 gm. in adult and 50 mg/kg in children.KUB

Results

Group (1) include 18 patients with mid or lower ureteric stone, 12 male and 6 female, their age were between 8 to 40 years (mean 31.56 years),while group (2) include 20 patients with mid- or lower ureteric stone, 13 male and 7 female, their age between 8 to 42 years (mean 27.15 years). Table No. (1)

Table 1: Age and sex distribution of patients

Group	No.	Age (mean±SD)	Gender			
			Male		Female	
1	18	31.56±11.02	12	66,6%	6	33.3%
2	20	27.15±12.45	13	65%	7	35%
P value		0.2	0.3			

The mean size of the stone as measured by CT scan in group (1) was(9.5 mm), 10 patients (55.5%) had right sided stone whereas8 patients (44.5 %) had left sided stone. The stone was in the lower part of the ureter in 11 (61.1%) patients and in the mid ureter in 7 (38.9 %) patients.

In group 2,mean stone size as measured by CT scan was (10.3 mm), 11(55%) patients had right sided stone whereas 9 (45%) patients had left sided stone. The stone was in the lower part of the ureter in 12 (60%) patients and it was in the mid ureter in 8 (40%) patients. Table No. 2.

Table 2: Stone distribution according to site, side, and size

Group		Group 1		Group 2	
		No.	%	No.	%
Stone site	Mid-ureter	7	38.9	8	40
	Lower-ureter	11	61.1	12	60
Stone side	Rt.	10	55.5	11	55
	Lt.	8	44.5	9	45
Stone size		9.5		10.3	

In group 1successful stone fragmentation occursin 15 patients, no reported cases of stone migration. In group 2 successful stone fragmentations occur in 16 patients, stone migration in 4 patients. Table No. 3

Table 3: Comparing stone fragmentation and migration between the groups

Group	Group				
	1		2		P value
Stone migration	0	0%	4	20%	0.04
Stone fragmentation	15	83.3%	16	80%	0.5

In group 1 ureteral mucosal injury occurs in 5 patients in whom double J stent inserted at the end of procedure, post-operative fever occur in 3 patients. In group 2 double J stent inserted in 6 patients, 2 patients due to mucosal injury and 4 patients due to failure of litho last. Post-operative fever occurs in 3 patients.

Table 4:post-operative complications

Group	Group				
	1		2		P value
Post-operative double J stent	8	44.4%	4	20%	0.04
Ureteric injury	5	27.7%	2	10%	0.03
fever	3	16.6%	3	15%	0.8

Operative time was significantly higher in group 1 than in group 2 (p. value 0.00). Figure No. (1)

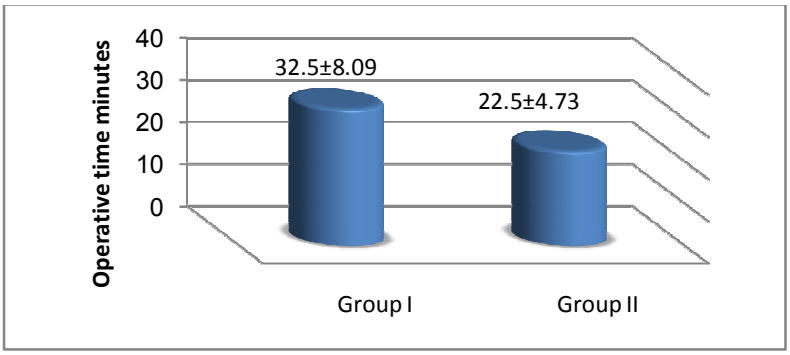

Figure 1: Operative time P value =0.001**

Discussion

Urinary stone diseases are one of the most common urological problems in the world. Although adults and children are equally affected, however some authors recorded higher incidence of urolithiasis in in children in the last decade from0.1% to 5 %[6].

Ureteral stents are one of the most important urologicalinstrumentsbecause they can be used for both diagnostic and therapeutic purposes, however most frequently they use as adjacent to endoscopic manipulation of ureter.Post urererorenoscopy double Jstent insertionwas routinelyused fortreatment of any ureteral trauma during the procedure, even minimal, as a result of the pre-procedure active dilatation, insertion of the ureteroscope with big diameter and stone extraction or disintegration [7,8].

There are special situations in which postoperative double J stent insertionis indicated. From these indications the most important are single kidney, renal impairment, ureteral injury, stricture, or a large residual stone[5].

Direct insertion of ureteroscope or using active ureteric dilatation is associated with many drawbacks like access failure, ureteric trauma, long operative time, etc[9- 11]

On the opposite side it is clear that doing passive ureteric dilatation by double J stent insertion will expose the patients to double operative and anesthetic sessions, in addition double J stent insertion is associated with many complications such as irritative symptoms, hematuria, urinary tractinfection, incrustation and even stone formation [9,12,13].

Our prospective study tried to solve this controversy by showing the advantages and disadvantages of preoperative passive ureteral dilatation.

The ages and stone size were matched between both groups. Both groups were compared from points of operative time, post-operative fever, stone clearance, stone migration, ureteric injury, and the need for post-operative JJ stent insertion.

In our study the rate of ureteric mucosal injury was significantly higher in group 1 (27.7 %) in group 2 (10%), this is because that the entry to a wider lumen of dilated ureter is easier, also stone manipulation is less traumatic within wider lumen.

The need for post-operative insertion of J stent was significantly higher in group 1 (44.4%) than in group 2 (20%) with p value 0.04, and this can be explained that wide lumen ureter facilitate extraction of gravels and it is also less liable for trauma.

The significantly longer operative time in group 1 (32.5 minute) compared with (22.5 minute) in group 2 is related to the easier access to, and easier stone manipulation in, a dilated ureter.

Stone mobile freely in side wide lumen ureter and this led to higher incidence of stone migration in group 2.

Other results like stone fragmentation, fever and infection were comparable in both groups.

Conclusions

Passive ureteral dilatation using double J stent insertion (in non-urgent situation) is associated with many benefits and drawbacks and is not recommended as routine works however it is recommended in cases of:

1. Any difficulty in accessing the ureter.
2. Patients cannot tolerate long operative time.
3. Patients with single kidney to avoid ureteral trauma and possible stricture.

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