

Comparative study upper ureteric stone management by ESWL v/s endoscopy v/s open surgery



Medical Science

KEYWORDS: Upper ureteric stone, URS, PCNL, ESWL, open surgery

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ABSTRACT

Background: Within a relatively short time span, the treatment of renal stone has moved from traumatic open surgery through minimally invasive method of percutaneous endoscopic stone removal to totally noninvasive technique of ESWL. The rational approach to management of upper ureteric calculi requires – assessment of efficacy, morbidity and cost associated with various treatment options, which will vary depending upon the location of stone. By using a combination of PCNL and ESWL, 98% of all stones can be treated noninvasively. In only 2% of stones require open surgery. *Material and methods:* 90 cases of solitary upper ureteric stone were treated with different methods like ESWL, URS, PCNL and open surgery. Patients were selected randomly for any kind of surgical method. All patients were undergone specific investigations like X-ray KUB, USG KUB and intravenous pyelography to diagnose size and location of stones. These different surgical modalities were compared in relation to different factors like- Pain relief after intervention, Stone free state achieved, Hospital stay, Cost effectiveness, Need for 2nd intervention after use of any one treatment modality. (Number of procedures performed), Causes of significant acute complications and Causes of long term complications. *Results:* For complete removal of upper ureteric calculi, auxiliary measures required in 9 patients and 18 patients were successfully treated with ESWL. 3 patients required second sitting of ESWL. Out of 27 patients, 3 patients developed complications in form of hematuria and colicky pain. No other major complications noted after this procedure. In URS, 22 patients required pneumatic energy for breaking stone, except 2 patients who were having soft 8 mm stone. Stone fragments were removed with flexible forceps. Average hospital stay was 1 day at initial visit for DJ stenting and then for 2-3 days for URS procedure in follow up visit. 7 patients were treated as a primary push back PCNL procedure and did not require DJ stenting. In another group of patients, DJ stenting was done at initial visit and after 2-3 weeks upper ureteric stone was manipulated. Open ureterolithotomy was done in large impacted upper ureteric stone with moderate to gross hydronephrosis and/or altered Renal Function Test or as a part of difficult URS or PCNL procedure. *Conclusion:* From our experience we conclude that: For stone, ≤10mm – ESWL or URS, 11-15mm – URS or PCNL, 16-20mm – PCNL or Open surgery, 20mm – Open surgery

Introduction

It is no exaggeration to say that there has been a revolution in surgical treatment of urolithiasis. Few events have altered the milieu of urology as dramatically and as precipitously as the introduction of Extra Corporeal Shock Wave Lithotripsy.^[1] Clinical evidence of the successful destruction of renal stones by externally administered shock waves was introduced to American Urologic Association (AUA) meeting in Boston in 1981 by Chaussy. Within a relatively short time span, the treatment of renal stone has moved from traumatic open surgery through minimally invasive method of percutaneous endoscopic stone removal to totally noninvasive technique of ESWL. The rational approach to management of upper ureteric calculi requires – assessment of efficacy, morbidity and cost associated with various treatment options, which will vary depending upon the location of stone. By using a combination of PCNL^[2] and ESWL, 98% of all stones can be treated noninvasively. In only 2% of stones require open surgery.

Material and methods

90 cases of solitary upper ureteric stone were treated with different methods like ESWL, URS^[3], PCNL and open surgery. Patients were selected randomly for any kind of surgical method. All patients were undergone specific investigations like X-ray KUB, USG KUB and intravenous pyelography^[4] to diagnose size and location of stones. These different surgical modalities were compared in relation to different factors like- Pain relief after intervention, Stone free state achieved, Hospital stay, Cost effectiveness, Need for 2nd intervention after use of any one treatment modality. (Number of procedures performed), Causes of significant acute complications and Causes of long term complications.

Results

Table 1 Solitary upper ureteric stone were treated with different methods

Procedure	No. of patients
ESWL	27
URS	24
PCNL	27
Open	12

In ESWL, hospital stay on an average was 1 day, which was required for DJ stenting. In one patient it was 3 days, who developed colicky pain after first sitting of ESWL. For complete removal of upper ureteric calculi, auxiliary measures required in 9 patients and 18 patients were successfully treated with ESWL. 3 patients required second sitting of ESWL. Out of 27 patients, 3 patients developed complications in form of hematuria and colicky pain. No other major complications noted after this procedure. In URS, DJ stent^[5] was placed either in surface analgesia with lignocain or under spinal anaesthesia and patients were followed up after 2 to 3 weeks for ureterorenoscopy. At that time DJ stent was removed, if not specifically indicated.

4 patients did not require DJ stenting even during initial procedure. 22 patients required pneumatic energy for breaking stone, except 2 patients who were having soft 8 mm stone. Stone fragments were removed with flexible forceps. Average hospital stay was 1 day at initial visit for DJ stenting and then for 2-3 days for URS procedure in follow up visit. 7 patients were treated as a primary push back PCNL procedure and did not require DJ stenting. In another group of patients, DJ stenting was done at initial visit and after 2-3 weeks upper ureteric stone was manipulated. Pneumatic energy was required to break stone of > 11 mm size, which cannot pass through Amplatz. In this study 7 patients out

of 27 did not require pneumatic energy to break the stone. Average hospital stay was 1 day at initial visit for DJ stenting and 2-3 days in follow up visit for PCNL procedure. Open ureterolithotomy was done in large impacted upper ureteric stone with moderate to gross hydronephrosis and/or altered Renal Function Test or as a part of difficult URS or PCNL procedure. All the patients were operated with classical kidney incision. DJ stent was placed in 11 patients, which was removed cystoscopically after 2-3 weeks. Drain was kept for 2-3 days post operatively. Average hospital stay was 6-8 days.

Table 2 Stone size vs procedure

Stone size	ESWL	URS	PCNL	Open
≤10mm	14	15	5	0
11-15mm	13	8	17	1
16-20mm	0	1	4	4
21-30mm	0	0	1	6
>30mm	0	0	0	1

Table 3 Stone free rate

Procedure	No. of pts. stone free	%
ESWL(27)	18	67
URS(24)	22	92
PCNL(27)	27	100
Open(12)	12	100

Table 4 Complications

Procedure	No. of pts. stone free	%
ESWL(27)	18	67
URS(24)	22	92
PCNL(27)	27	100
Open(12)	12	100

Discussion

The management of upper ureteric stones has changed greatly over past several years. Associated with the development and refinement of percutaneous technique, Extracorporeal Shock Wave Lithotripsy, Ureterorenoscopy and Percutaneous Nephrolithotomy, is the emergence of a variety of proven approaches for removing upper ureteric calculi. In evaluating a treatment modality, we must consider whether it is simpler, less invasive and more cost-effective as well as whether it causes less complications and early rehabilitation. ESWL, URS and PCNL can be

said to be better than conventional open surgery in all points.^[6] In present study most of the patients were treated with DJ stenting followed by ESWL, to reduce complications like steinstrasse, stricture, ureteral injury etc.^[7] But AUA guidelines suggests that though it has become common practice to place a ureteral stent for more efficient fragmentation of ureteral stones using ESWL. The data analyzed by the panel did not support the routine use of such stents when the goal is to improve the stone free results of ESWL.^[8] the data showed no improved fragmentation with stenting. Routine stenting may be justifiable for other purposes such as management of symptoms associated with the passage of stones. According to AUA guideline, success rates are 83% in < 1 cm and 76% in >1 cm stone size which are comparable to our study.^[9] With the advent of rigid and flexible ureteroscopes, various types of grasping forceps, baskets and lithotripsy, the indication for and ways to use URS have been expanded.^[10] According to AUA guideline, success rates are 56% in < 1 cm and 44% in >1 cm stone size which are comparable to our study.^[11] Large stones or complex, impacted stones in the proximal ureter are often best managed by PCNL. PCNL has unquestioned advantages:^[12] If stone can be seen, it can almost always be destroyed, The ureter may be directly inspected so that small fragments may be identified and removed, The process is rapid, with success or failure being obvious immediately. One disadvantage is that the expertise required for this operation is not as widely available because a greater number of urology training programs are focusing less on PCN and more on ESWL and URS. According to AUA guideline, success rates are 76% in < 1 cm and 74% in >1 cm stone size which are comparable to our study.^[13] Open ureterolithotomy is done where facilities for ESWL or URS or PCNL are not available and is generally indicated for failed endourological procedures and in patients with larger stones. Children are also candidates for open surgery, if specifically designed endourological equipment is not available. Open surgery, despite the excellent stone free results, should not be the first line treatment in most patients with large stones. The reasons are the same as for patient with small stones: relatively greater postoperative morbidity and longer hospitalization.

Conclusion

From our experience we conclude that:

For stone

- ≤10mm – ESWL or URS
- 11 -15mm –URS or PCNL
- 16-20mm – PCNL or Open surgery
- >20mm – Open surgery

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