

The Role of Ureteral Stents in Non-complicated Retrograde Ureteroscopies for Ureteral Calculi

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Objective: The objective of this retrospective study is to evaluate the benefits of inserting the ureteral stent, for one week, in patients whose ureteral calculi were endoscopically fragmented without any intra-operative complications.

Material and method: The study comprised 140 patients who had ureteroscopies with the ultrasonic fragmentation of the calculi, under regional anaesthesia. The dimension of the calculi was between 5–10 mm. One-hundred-nine patients, who had intra-operative incidents, were split into two groups: group A – 54 patients – to whom a stent was inserted during the procedure, and group B – 55 patients – with no stent insertion. The following parameters were observed: the presence of lumbar pain, suprapubic pain, renal cramps, irritative urinary syndrome, urinary infection and the need for analgesic administration comparatively for the two groups.

Results: The presence of the post-operative ureteral stent diminishes the lumbar, suprapubic and colicative pains, the need of analgesic administration, and the increases of the risk of urinary infection and of the irritative urinary syndrome.

Conclusions: The ureteral stent inserted at the end of the endoscopic procedures [ureteral calculi fragmentation] has a role in a favourable evolution of the patients by increasing the post-operative comfort, but it also represent an inconvenience by the need of its postoperative removal.

Keywords: ureteral stents, retrograde, ureteroscopy, ureteral calculi

Introduction

Retrograde ureteroscopy is considered at present one of the less invasive methods with a high rate of success in the treatment of ureteral lithiasis [1,2,3]. Retrograde ureteroscopy was developed at the same time with the possibility to widen the ureterovesical junction and to fragment the ureteral calculi. The ureteral stent represents a catheter which can maintain its position inserted with the help of a cystoscope or ureteroscope. At present, ureteral stents have multiple uses, being recommended for eliminating ureteral obstructions, insuring the elimination of calculi fragments after a therapeutic procedure that facilitates ureteral drainage and the protection of the upper urinary tract. Ureteral stents must meet certain essential characteristics: to be easily placed and extracted, to be radio-opaque, malleable for the patients' comfort, firm, migration-proof, inert and biologically tolerable (biocompatible), with a minimum inlay tendency, with reduced friction on the surface level and permeable on the long run. Urinary lithiasis is the main indication for the use of autostatic ureteral catheters in urological pathology.

Objective

The evaluation of patients who underwent retrograde ureteroscopies for ureteral calculi, followed by ureteral stent insertion for a one week period.

Material and method

The study comprised 140 patients on whom ureteroscopies were performed with the ultrasonic fragmentation of the ureteral calculi during 2006–2010, in the Urology department of the County Hospital of Deva. The calculi size of

the patients included in the study was between 5–10 mm, most calculi being of oxalate dehydrate – 98 cases (70%) – but also oxalate monohydrate in 15 patients (10.7%) and urates in 27 patients (19.3%). The patients had the lithiasis on one side, in most of the cases on the pelvic ureter – 122 cases, iliac ureter – 7 cases, and lower lumbar ureter – 11 cases. During the interventions, a rigid 14 Charier Storz ureteroscope was used, the calculi being fragmented with an ultrasonic lithotripter (sonotrode) made by the same company. Calculi extracting tucks were also used, as well as JJ 7 Charier stents. Sterile water was used as the working medium. All the patients had transitory hematuria remitted in the first 24 hours, and there was no transitory vesicoureteral reflux. The interventions were performed under regional anaesthesia. Only those patients were taken into consideration who at the time of the intervention did not have urinary infections proved by the pre-operative urine and uroculture sample.

A number of 109 (77.85%) patients from the total of 140 had no intra-operative complications; the other 31 patients had the following intra-operative complications: 23 patients had minor ureteral perforations and minor lesions of the ureteral mucous membrane solved by insertions of an autostatic stent for 6 weeks; in 5 patients the calculus fragmentation did not succeed, needing a ureterolithotomy under the same anaesthesia; in 2 patients calculus migration in the pyelocaliceal system occurred, the intervention being temporized after the JJ probe was launched; and 1 case with the lesion of the ureteral orifice, respectively its mucous submembrane, an autostatic probe being introduced for 3 weeks, the calculus being extracted during a new session. We did not have

cases of ureteral avulsion, avoiding as much as possible the forced extraction of calculi. Based on the observation charts, the patients without complications were split into two groups, group A – 54 patients – to whom an intra-operative ureteral stent was mounted, and group B – 55 patients – without a stent. During post-operative follow-up we noticed: the presence of lumbar and suprapubic pains, irritative urinary symptoms, the presence of urinary infection and the need for pain medication. In the first 24 hours after the procedure we collected urine samples and performed a uroculture, as well as a reno-vesical radiography in order to identify remaining calculi fragments and the position of the autostatic probes. The stent was removed with the operatory cystoscope and the calculi tucks without anesthesia in women and intravenous anesthesia in men. The patients were hospitalized for one week after the procedure to observe their evolution, administering antibiotics to the patients with urinary infection in the first 24 hours after the operation (16 patients in group A and 2 patients in group B).

Results

On the first day after the operation 11 patients (20.4%) from group A had lumbar pains as compared to 42 patients in group B (76.4%). One patient in group A (1.9%) had renal colic pains as compared to 25 patients (22%) in group B ($p < 0.001$). Eleven patients in group A (20.4%) needed pain medication, as compared to 37 patients in group B (67.3%) during hospitalization. Suprapubic pain was noticed in 3 patients of the first group (5.5%) and 7 patients of the second group (13%). Ureteral irritation was more frequent in the patients with ureteral stent: 20 in group A (37%) and 3 patients without stent in group B (5%). Urinary infection was noticed in 4 cases in group A (7.5%) and 2 cases in group B (3.6%). One week after the operation only 3 patients in group A (5.5%) had complicative pains, as compared to 11 patients in group B (20%). Urinary infection appeared in 3 cases in group A (5.5%) and 1 patient in group B (1.8%) after the antibiotic therapy during hospitalization. The need to administer pain medication was present in 4 patients in group A (7.4%) and 6 patients in group B (10.9%). The other symptoms disappeared in one week at both groups. In both groups, there were no residual calculi at the reno-vesical radiography and urography (see tables I and II).

Table I. Patients' symptoms on the first day after the operation

	No. of patients (%)	
	Group A	Group B
Flank pain	11 (20.4)	42 (76.4)
Suprapubic pain	3 (5.5)	7 (13)
Renal colic	1 (1.9)	25 (22)
Ureteral irritation	20 (37)	3 (5)
Urinary tract infections	4 (7.5)	2 (3)
Analgesic use	11 (20.4)	37 (67.3)

Discussions

The most frequent indication of the ureteral stent in patients with upper urinary tract lithiasis is drainage after endoscopic interventions [1–3]. Classically, ureteral endoprosthesis at the end of the procedure was recommended as routine to all the patients who had ureteroscopy for ureteral calculi. Nevertheless, numerous studies have re-assessed the usefulness of this maneuver [4–6].

There are numerous theoretical advantages of mounting the JJ stent, allowing the elimination of the obstruction that can appear as a consequence of the ureteral wall edema, protecting the renal function and ameliorating its side symptoms, the endoprosthesis facilitating also the elimination of the residual lithiasic fragments. It also prevents the appearance of side ureteral stenoses [7,8].

Another argument in favor of the ureteral endoprosthesis is the decrease in the risk of re-hospitalization due to post-operative complications, especially pain that cannot be controlled through oral medication. The results of different studies have proved that the re-hospitalization rate of patients without stents is three times bigger, yet without significant values [9–11].

On the other hand, the placement of the ureteral stent determines the appearance of specific morbidity, being associated with the irritative symptoms of the lower urinary tract, lumbar pain and urinary infection with urination dysfunctions due to the presence of the stent. Hematuria is also one of its side manifestations. On the other hand, it has been observed that the irritative symptoms of the bladder and lumbar pain are more severe on the first days following the operation in the patients without stent. Moreover, ureteral endoprosthesis increases the incidence of transitory vesico-ureteral reflux [3–5].

The evaluation of the impact of the ureteral endoprosthesis on the duration of the surgical intervention has led to contradictory results. There were no significant differences in this parameter, the average operation time being of 36 minutes with mounting versus 34 minutes without mounting, but there were differences of even 12 minutes [6,9]. The endoprosthesis involves a cost increase due to the ureteral stent mounting and extracting maneuvers [11–13].

In this study, patients with stents had a higher rate of urinary infections and ureteral irrigations than patients without a stent. Nevertheless, ureteral stents are valuable as there has been observed that there is a highly diminished post-operative morbidity in the patients with a stent

Table II. Evaluation of symptoms in the first week after stent-removal

	No. of patients (%)	
	Group A	Group B
Renal colic	3 (5.5)	11 (20)
Analgesic use	3 (5.5)	1 (1.8)
Urinary tract infection	4 (7.4)	6 (10.9)

as well as a more favorable evolution. It is worth mentioning that all patients could have been discharged in the first 24–48 hours after the operation, but they remained – with their consent – in the hospital during the study so as their evolution to be observed.

Conclusions

Ureteral stents inserted for a short term following retrograde ureteroscopy for ureteral calculi are important in reducing post-operative colicative pains and the need of pain medication and increasing the patients' post-operative comfort, regardless of the inconvenience of their extraction. There were no benefits recorded regarding the elimination of minor calculi fragments, all patients –with or without stent - being stone-free one week after the intervention.

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References

1. Ackerman D, Forsyth M, Halpert L, Steinberg R, Lieberman S – Stent-assisted stone passage in the outpatient setting. *J Urol* 155; 362 A 1996
2. Golea O, Oșan VG, Simion C – Ureterosopia retrogradă rigidă în terapia calculilor ureterului terminal, post ESWL complicat. *Revista Română de Urologie* nr. 1 2002; 57–59
3. Golea O, Oșan VG, Boja RM – Litiaze obstructive a ureterului lombar – terapie endoscopică retrogradă. *Revista Română de Urologie* vol. 4 2005; 61
4. Geavlete P – *Urologie* vol I. Editura Copertext 1999; 247–255
5. Ciutac C, Novae C, Pricop C – Ureteroscopiile retrograde cu spitalizare prelungită: analiza factorilor predictivi ai complicațiilor. *Romanian Journal of Urology* 12.2010. p3
6. Oșan V, Golea O, Simion C – Eficiența ESWL în tratamentul calculilor ureterului inferior. *Revista Română de Urologie* nr. 1 2002; 53–57
7. Oșan V, Simion C – Litotriția extracorporeală în tratamentul litiazei renoureterale; Editura University Press Tg. Mureș 2005; 108–118
8. Puppo P, Riccio H, Bozzo W, Introini C – Primary endoscopic treatment of ureteric calculi. A review of 378 cases. *Eur. Urol.* 1999, 36 (1); 48–52
9. Sinescu I – *Urologie clinică*. Editura Amaltea 1998; 162–186
10. Sinescu I, Gluck G – *Tratat de Urologie*, Editura Medicală București 2008; vol II; cap 13; p 1211–1238
11. Sinescu I, Gluck G – *Tratat de Urologie*; Editura Medicală București 2008; vol IV cap 51; p 3492–3456
12. Geavlete P, Georgescu D – Complicațiile ureteroscopiei retrograde, Experiența clinicii de Urologie Spitalul Sf. Ioan după 3125 de ureteroscopii; *Revista Română de Urologie*; vol IV 2005; 56–57
13. Geavlete P, Georgescu D, Cauni V – Complicațiile stentului ureteral – Experiența pe 5000 de cazuri; *Revista Română de Urologie* nr. 4 2005; p 57–58