Original Article

Stenting in extracorporeal shockwave lithotripsy; may enhance the passage of the fragments!

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Abstract

Objectives: To prospectively evaluate the role of double J (DJ) stent in enhancing the passage of fragments in patients undergoing extracorporeal shockwave lithotripsy (SWL) for renal stones with diameters less than 2.5 cm.

Methods: Between November 2005 and January 2007, 38 patients with an average age of 47.05 years (range 16-73) were included and underwent SWL for renal stones. The inclusion criteria were radio-opaque renal stone not located in the lower pole, complete disintegeration of the stone, normal renal function, no metabolic abnormalities, no major renal abnormalities and no symptomatic urinary tract infection. The patients were randomized to either a stented (11 patients) or stentless (27 patients) group. The average stone diameters in stentless and stented groups were 1.54 cm and 1.77 cm, respectively ($p > 0.05$). Double J stent was removed when there was no further passage of the fragments for 6 weeks after stone disintegration. All patients were given non-steroidal anti-inflammatory drugs for one week after ESWL treatment. Stone passage and the data of DJ were determined with plain X-ray of the urinary tract (UTP). The severity of lower urinary tract symptoms, loin pain and the need for intravenous or intramuscular analgesics were recorded.

Results: The overall stone-free rate at 3 months was 92.1%. Two patients in the stented and one patient in the stentless group were partially free of stones. Steinstrasse were observed in two patients (5.3%); one patient in the stentless group and another one after the removal of DJ stent. Only one patient in the stented group had severe lower urinary tract symptoms which responded neither to oral nor to other forms of analgesics, and therefore DJ stent was removed. The remaining patients were in no need for analgesics other than the oral therapy.

Conclusion: Placement of DJ stent for the purpose of improving free stone rate or enhancing the passage of the fragments during SWL is unnecessary in renal stone with diameters less than 2.5 cm. However, further prospective trials should be designed to define the criteria for stented SWL (JPMA 59:141; 2009).

Introduction

The insertion of DJ stents during ESWL of renal calculi is controversial. The old rationale was; the use of ureteral stents reduce complications after extracorporeal shock wave lithotripsy (SWL) and contribute to successful stone passage. However, some reports noted complications that are attributed to indwelling ureteral stents and concluded that ureteral stents do not reduce post-SWL complications and they are clearly associated with morbidity and do not improve stone passage markedly.[1-3] Even in patients with stone burden of more than 200 mm treatment without stenting is recommended.[1] One of the main reason for this controversy is, whether the stents interfere or enhance the delivery of the stone fragments?

In this study we aimed to find to what extent the ureteral stent affected stone fragments passage in patients, with renal stone less than 2.5 cm in diameters, who underwent SWL.

Patients and Methods

Between November 2005 and January 2007, 38 patients (25 male, 13 females) with an average age of 47.05 years (range 16-73) were included into this study. These patients underwent ESWL for renal stones less than 2.5 cm which were not located in the lower pole and were sensitive to ESWL. Any patient who did not response to ESWL after the third session was excluded. All patients had no metabolic abnormalities, no major renal abnormalities and no symptomatic urinary tract infection. Treatment was started at 3 Kv and the energy was increased step by step to 17 Kv. Therapy was terminated when complete fragmentation of the stone was seen on fluoroscopy. Complete disintegeration was defined as a fragmentation of the stone to many small fragments which could pass spontaneously from the ureter. Treatment success was defined as complete stone clearance with no residual fragments at 3 months. The average numbers of sessions and shockwaves were 1.05 (1-2) and 2080 (1800-2400) respectively. The patients were randomized into stented and stentless groups. In 11 patients stents (DJ) (6 F, 28 cm DJS) were used while in the remaining 27 no stents were utilized.

Stents were inserted cystoscopically under general or local anaesthesia one day prior to stone disintegration. DJ stents were removed when there was no further passage of the

fragments for 6 weeks after ESWL treatment. The patients were treated with electrohydraulic lithotripter (PCK Lithotripter, Turkey) without general anaesthesia on an outpatient basis. All patients received oral anti-inflammatory drugs for a period of one week after ESWL. Antibiotic was given for those patients who had positive urine culture or symptoms of urinary tract infection after ESWL. The overall evaluation was done after three months of SWL. Complications, severity of lower urinary tract symptoms, colicky pain, and the requirement for additional intramuscular or intravenous analgesics were recorded. Stone passage and the data of DJ stents were determined with UTP. Weekly renal ultrasound was also done for the patients who had steinstrasse after stone disintegration.

A statistical software package (SPSS) was used for all statistical analysis. Comparison between groups were done using Student's t test and Mann Whitney U test.

Results

The average stone diameters in stentless and stented groups were1.54 cm (range 1-2.5) and 1.77 cm (range 1-2.5), respectively (p = 0.16).

Thirty-five patients (92.1%) became stone free. Two patients in the stented and a third in the non-stented group were partially free of stone (Table). There was no statistically

Table: Comparison between the clinical variables of stentless and stented groups.

	Stentless patients	Stented patients	Total	P
Patients number	27	11	38	
Average stone diameter (cm)	1.54	1.77	1.61	0.16
Average patients' age (year)	45.93	49.82	47.05	0.47
Stone free rate (%)	96.29%	81.81%	92.1%	0.19

n; number of the patients.

significant difference between both groups in terms of stone free rate (p= 0.19). Steinstrasse developed in two patients, one in each group. In the stented group, steinstrasse was seen after removal of the DJ stent. Both patients were asymptomatic and managed conservatively without surgical intervention as spontaneous passage of the fragments occurred. Only one patient in the stented group had severe lower urinary tract symptoms which did not respond neither to oral nor to the intramuscular or intravenous analgesics, and therefore the stent was removed after 5 days of its placement (pain scale > 5). The remaining patients received no analgesics other than the oral therapy which was given after stone disintegration (pain scale < 2).

Discussion

Treatment of upper urinary tract calculi has recently changed dramatically due to introduction of ESWL into the urologic practice.[4] Double J stent is used to prevent complications after ESWL like ureteric obstruction, especially in the cases of large stone burden. However, DJ stents themselves can cause complications.[1-3] Loin pain and lower urinary tract symptoms like urgency, urge incontinence, frequency and haematuria are well known complications of DJ stents. Chandhoke et al reported that, although ureteral stents are associated with more irritative symptoms, their use resulted in fewer hospital readmissions and emergency room visits compared to when no stent was used to treat solitary kidney stones of 10 to 20 mm. or solitary proximal ureteral stones less than 20 mm.[5] However, El- Assmy et al concluded that, pretreatment stenting provides no advantage over in situ shock wave lithotripsy for ureteral calculi with diameters 2 cm or less that cause moderate or severe hydronephrosis.[6] Some authors limited the use of DJ stents to stones larger than 25 mm and others did not advocate their use even for stones larger than 30 mm in diameter.[1,7,8]

In our study, the main aim was to define whether the ureteral stent facilitate or interfere with the passage of the fragments. We therefore selected patients who had ESWL sensitive radio opaque stones, thus complete fragmentation could be observed on fluoroscopy. The patients with lower pole stones were excluded because, the anatomic radiologic features of lower calyces were reported to have an impact on stone clearance rate after SWL.[9,10] Some studies deny this claim.[11,12] Also patients with abnormal renal function were not included because the creatinine values have significant effect on stone clearance after ESWL.[13] Double-J stent was removed after 6 week of placement if there was no further passage of the fragments, because DJS related morbidity was reported to be minimal if stent indwelling time did not exceed 6 weeks.[3,14]

We found that the stone free rate in stented patients was not superior to that of stentless patients, and agree with the authors who reported that DJ stents do not enhance the passage of the stone fragments.[2]

Steinstrasse occurred in two patients without clinical symptoms along with spontaneous passage of the fragments. One of these patients was from stented group and the fragments were passed after the removal of DJS. This supports the claim that DJS may interfere with the delivery of the fragments, and the stent should removed.[2] Beirkens et al. did not find any difference in the occurrence rate of the steinstrasse with or without DJ stents.[1] Developing of steinstrasse after the removal of DJS should not be the reason for preferring stenting to nonstenting, because spontaneous stone clearance occurs in 60% of cases with steinstrasse and only 3.6% of these cases required intervention.[15]

We found that stents had no role in reducing loin pain after ESWL, as no patient was in need of intramuscular or intravenous analgesics in addition to oral medication.

In conclusion, DJ stents neither enhance the passage of stone fragments nor reduce the complications following SWL. Stenting is unnecessary during ESWL in renal stones with diameters less than 2.5 cm. Further prospective trials should be designed to define the criteria for stented ESWL treatment.

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