Original Article

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JJ Stent Removal under Ultrasound Guidance in Women: It is Simple and Safe

Surgery Section

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ABSTRACT

Introduction: With the increase in number of patients treated for urological problems with endoscopic procedures, the number of patients with JJ stent is also increasing. The amount of workload thus incurred multiplies, even to the point that, sometimes we waste more time in the operating room removing JJ stents than the actual endourological procedures. Here in our institute, we have devised a very simple and effective way of removing JJ stents in women and also determined the efficacy, safety and cost of JJ stent removal under ultrasound guidance in women in comparison to cystoscopic removal.

Materials and Methods: Two hundred women attending the Department of Urology from July 2012 to July 2013 at RIMS hospital were randomly divided into two arms. One hundred women had their JJ stent removed with cystoscope and another 100 women had their JJ stent removed under ultrasound guidance using simple surgical tools available at the hospital. The primary comparative points were waiting time for operating room appointment date, cost of the procedure, time taken for the procedure, discomfort or pain felt by the patient and urethral injuries.

Results: In all the parameters, stent removal under ultrasound guidance was significantly better except for urethral injuries where both the procedures had similar outcomes.

Conclusion: We concluded that JJ stent removal under ultrasound guidance in women was simple, effective and safe.

Keywords: Female, JJ stent removal, Ultrasound guidance

INTRODUCTION

Dr. Gustav Simon is said to be the first person to describe the insertion of a tube into a ureter in 1800s. This was done after an open surgery. This was followed by Dr. Paul Zimskind's insertion of a straight silicone tube endoscopically in 1967. In 1978, Finney introduced the "Double-J" ureteral stent otherwise called the "JJ stent" by some [1]. It is coiled at both ends in order to prevent migration. There are several ways of inserting a JJ stent. These may be done after an open surgery, following a laparoscopic surgery or after an endoscopic procedure. It may either be antegrade or retrograde. There are several indications for inserting a JJ stent into the ureter but basically all are done to temporarily relieve an obstruction. As JJ stent is a foreign body, it needs to be removed or at least changed after a certain period of time. As a urologist, we all know that JJ stent removal make up for bulk of our endourological procedures in our daily practice. There are several methods of removing JJ stent described in the literature. These are the blind method, stents with a stainless steel bead attached to its distal end and removal using rare earth magnet attached to a urethral catheter [2], Snail-headed catheter retrieval [3], and ultrasound guided JJ stent removal or endoscopic (cystoscopic) method. The most reliable and most popular method to date is the endoscopic removal. An extensive literature search using Pubmed/Medline revealed only two papers describing USG guided JJ stent removal that too performed by a radiologist. In this study, we describe a method of removing JJ stent using ultrasound guidance and also its prospective comparison with cystoscopic removal in terms of cost incurred, time consumed, and complications.

MATERIALS AND METHODS

Study design and setting

This was a prospective randomized study conducted in the Department of Urology, RIMS, Imphal from July 2012 to July 2013 after a proper permission from the Institutional Ethics Committee. A total number of 200 female patients requiring JJ stent removal were included in the study and divided into 2 groups (group A and B) each consisting of 100 patients. They were randomized using lottery method on the day of their discharge or on the day the stents were inserted in case of day-care patients. In group A, JJ stent was removed cystoscopically and in Group B, USG guidance was used.

Inclusion criteria

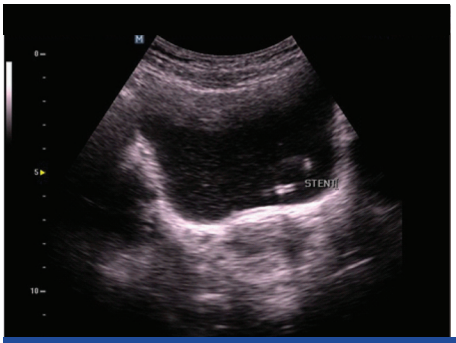
Female patients, Single or bilateral stents (when both stents needed to be removed in the same setting).

Exclusion criteria

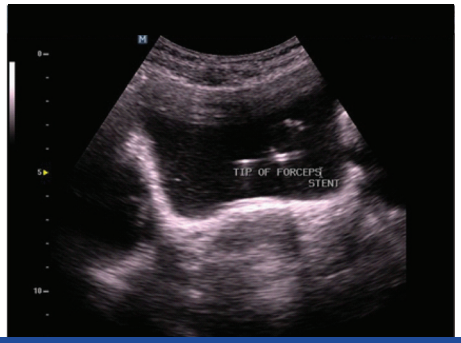
Male patients, patients with features of active UTI, Stents in-situ longer than 3 months and patients with bilateral stents requiring unilateral removal.

Procedural details

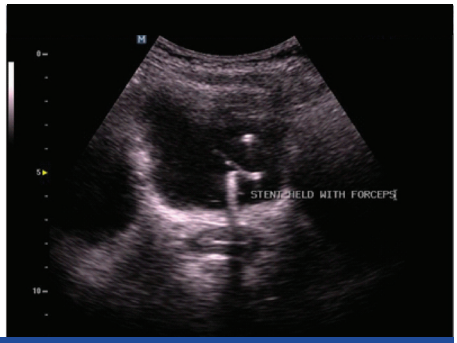
Cystoscopic removal was carried out using 20 Fr sheath, 30 scope, HD monitor and camera. Sonoace X6 (Samsung Medison) ultrasound was used for stent removal in group B. In both the groups, following aseptic preparations and draping urethra was lubricated and anaesthetized with 2% Xylocaine jelly. In group A, stents were removed using the usual JJ stent removal forceps where as in group B, only a straight artery forceps was used. In group B, patients were positioned in the supine position with their thighs and knees flexed at around 45^0. The surgeon stands on the right side of the patient and a straight artery forceps, held with the surgeon's right hand is gently inserted through the urethra. With the forceps held steady, the ultrasound probe is placed on the suprapubic area using the surgeon's left hand. At this moment, both the stent and the forceps are visible on the screen as hyperechoic areas. Now the forceps is withdrawn a centimetre and its blades are opened and then it is forwarded again towards the stent and gently closed without locking it. The forceps is then moved from side to side. If the forceps has caught the stent, they both will move from side to side. If this is achieved, they the forceps is withdrawn from the urethra, making sure that the pressure applied is kept constant [Table/Fig-1-3].



[Table/Fig-1]: Pig-tail coil of stent in the urinary bladder



[Table/Fig-2]: Tip of forceps entering the bladder



[Table/Fig-3]: Stent held by the forceps

Characteristic	Value	
	Group A	Group B
Mean Age (Years)	44.8+6	46.2+8
Co-Morbidities		
Diabetes Mellitus	08	06
Hypertension	12	15
Reason for JJ Stenting		
PCNL	12	09
URSL	42	49
Pyelolithotomy	26	31
Ureterolithotomy	16	11
Ureteroneocystostomy	04	00
Laterality of JJ Stent		
Unilateral	92	95
Bilateral	08	05

[Table/Fig-4]: Characteristics of the patients

In our experience, it was easier for us to reach or visualize the stent when the amount of urine in the urinary bladder was kept at around 50 cc. We calculated the amount of urine by the software incorporated in the ultrasound machine (Length* Breadth* Depth). If it was more it became more difficult to reach the stent but when it was less, visualization of the stent became difficult.

In both the procedures, the parameters evaluated and compared were as follows: Waiting period for stent removal which was calculated from the day the stent was supposed to be removed to the day the stent was actually removed Procedural duration which was calculated from the time the patient entered the room to the time she left, discomfort or pain felt by the patient which was recorded using the Visual Analogue Score (VAS), complications like bleeding, UTI and finally the overall cost incurred by the patient. All statistical analysis was performed using SPSS 16.0 for windows. Independent-t test was used to evaluate the group differences and p-value less than 0.05 was regarded as significant.

RESULTS

In our study, we included 200 female patients who needed JJ stent removal. One hundred of them were in group A, whose stents were removed cystoscopically and another 100 female patients in group B, whose stents were removed using ultrasound guidance.

[Table/Fig-4] shows the characteristics of the patients in both the groups. The mean age was comparable i.e. 44.8±6 and 46.2±8 years in the two groups. Few of the patients in both the groups had co-morbidities like diabetes mellitus and hypertensions (8 DM and 12 HTN in group A and 6 DM and 15 HTN in group B) but these did not alter their outcomes. The reason for JJ stent insertion for group A were Percunteous Nephrolithotomy (PCNL) in 12, Ureteroscopic Lithotripsy (URSL) in 42, Pyelolithotomy in 26, Ureterolithotomy in 16 and Uretero-neocystostomy in 4 patients. In group B, the reasons for JJ stent insertion were PCNL in 9, URSL in 49, Pyelolithotomy in 31, and Ureterolithotomy in 11 patients. Eight patients in group A had bilateral stents whereas it was 5 patients in group B. As discussed earlier, we calculated the waiting period for the stent removal from the day the patient was supposed to remove the stent to the day it was actually removed and it was 0 to 7 days in group A with a mean of 4.2±3 days. In group B, it ranged from 0 to 2 days with a mean 0.3±2 days; this was significant with a p-value of 0.032. The procedural time in group A ranged from 24 minutes to 7 minutes and in group B, it ranged from 5 minutes to 2 minutes with a mean 10.61±2.2 minutes and 4.16±1.3 minutes respectively, which was significant with a p-value of 0.006 [Table/Fig-5]. Mean pain score as calculated by VAS was 4.4±1.9 and 3.6±1.2 in groups A and B respectively but it was not statistically significant. In group A, patients spent around Rs. 520 per procedure whereas in group B it was Rs. 200 per procedure. This was also significant with a p-value of 0.041. In both the groups we did not encounter any significant complications.

Parameters	Group A	Group B	p -value
Waiting period in days (Mean ± SD)	4.2±3	0.3±2	.032
Procedure time in mins (Mean ±SD)	10.61±2.2	4.16±1.3	0.006
VAS Pain score(Mean ± SD)	4.4±1.9	3.6±1.2	0.7

[Table/Fig-5]: Shows the various parameters compared and the outcomes

DISCUSSION

With the increase in number of patient treated for urological problems with endoscopic procedures, the number of patients with JJ stent is also increasing. The amount of workload thus incurred multiplies, even to the point that, sometimes we waste more time in the operating room removing JJ stents than the actual endourological procedures. Many investigators have tried different techniques namely the blind method, magnet retriever, threaded stents, snail-headed catheter retriever and cystoscopic method [1-4]. None of these methods became popular except the cystoscopic method which was probably due to its precision and safety. JJ stent removal under USG guidance in women was described by Nguyen HN et al., but it was not a comparative study. Yasumoto R et al., also described a similar procedure [4]. In our study we prospectively compared various parameters between cystoscopic method of JJ stent removal and USG guided method of JJ stent removal and found that the waiting time and procedural time in cystoscopic method was significantly longer and also the cost incurred by the patient was much more. We conclude that JJ stent removal under USG guidance in women is simple, cost-effective and safe.

CONCLUSION

From this study we conclude that JJ stent removal under ultrasound guidance in females can be performed safely as an office procedure which could save plenty of time for the urologist as well as the patients. Also the cost incurred by the patients is much less when compared to the cystoscopic method of JJ removal.

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