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Original Research Article

Reduction in Stent Related Symptoms Using the Ureteral Stent Symptom Questionnaire (USSQ) Following Endourological Procedures with the Use of Novel Triple J Dalela Stent. A Short Term Prospective Cohort Study

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Abstract:

Introduction: Stent related symptoms (SRS) are common after placement of DJ stent. Various tudies have shown decreased SRS with changes in stent length, stent diameter and stent material. Here we present a prospective cohort study on the effects of SRS using a novel Triple J Dalela stent with assessment of SRS using the Ureteral Stent Symptom Questionnaire (USSQ).

Methods: All first hundred consecutive patients being operated at our centre for renal/ ureteral stone disease from December 2024 to April 2025 were included in this study. Exclusion factors included bilateral stone disease deranged renal function, history of cancer urinary bladder, genitourinary tuberculosis, interstitial cystitis and patients with deranged coagulation parameters. Symptom assessment was done using USSQ questionnaire in the post-operative period at 1st week, 4th week and at the time of stent removal. Stent removal was done routinely at 6 weeks unless the patient complained of severe SRS.

Results: All of the 100 patients were followed up till stent removal. The median indwelling stent duration was 47 days. SRS were recorded based on the USSQ aspects of urinary symptoms, pain symptoms, sexual dysfunction and work performance. SRS were recorded after 1 week, 4 week of stent insertion and lastly at the time of stent removal. Urinary symptoms and pain symptoms were the major cause affliction with occurrence of urgency and dysuria at week 1 (21% & 17%), week 4 (24% &20%) and at time of stent removal (25% & 22%). Pain symptoms were most common in the loin area occurring in almost 30% patient while pain in supra pubic area was reported by 25%. Sexual side effects were less common and probably psychogenic. A majority of patients reported some sort of limitation while performing work.

Conclusion: SRS are a significant cause of morbidity for patients undergoing dj stenting following endourological procedures. New stent designs like this Triple J Dalela stent may help in alleviation of these symptoms.

Introduction

Double J stents are routinely placed following endourological procedures for ureteral drainage and is an effective method to ensure good renal function. The double pigtail loops at both ends (Double J) of the stent makes it self-retaining.

However the use of DJ stent is associated with severe lower urinary tract symptoms in the form of frequency (60%), urgency (40%), loin pain (80%), supra pubic pain, dysuria (40%), hematuria (54%), pain during ejaculation etc [1-3]. These stent related symptoms (SRS) cause significant patient morbidity and poor quality of life. These stent related symptoms have been incorporated in the Ureteral Stent Symptom Questionnaire (USSQ) which is currently the gold standard in assessment of SRS [4].

There have been various studies comparing the effects of SRS using different stent material, stent diameter and length, stent coating and stent position in the urinary bladder [5]. However not all of these studies have evaluated the SRS using the USSQ.

We present here a prospective cohort study using the novel Triple J Dalela stent [5] (fig 1), manufactured by Blueneem Surgicals Limited. This stent has a bend in the lower vesical portion of the stent about 6 cm from the lower end. This keeps the stent away from the trigone area of bladder and helps in preventing dysuria. We did a prospective cohort study on patients undergoing endourological procedures at our institute for assessment of SRS based on USSQ with the use of this Triple J Dalela stent.

Methodology

Ours is tertiary care institute in the northern part of India with a high burden of stone disease. All patients undergoing endourological procedures for stone disease were included in this study in the age group of 18-65 years, with radiological findings of renal/ureteral stone. Patients with deranged creatinine, coagulopathy, bilateral stone disease, history of tuberculosis, history of cancer urinary bladder, interstitial cystitis were excluded from the study. A sample size of 100 patients as per convenience was taken and all consecutive patients being operated during December 2024 to April 2025 were included in the study. Patients were taken up for surgery after adequate preoperative preparation and negative urine culture was ensured before each procedure. After stone clearance the Triple J stent was deployed and position confirmed under fluoroscopic guidance. The patients were evaluated for SRS using the USSQ (Appendix 1) in the post-operative period at intervals of 1 week, 4 weeks and at the time of stent removal.

Results

A total of 100 patients were included in the study, we routinely maintain a stent register and have a strict follow up of these patients, and hence there was no attrition to follow up. The baseline and demographic details are outlined in Table 1. Our normal policy is to remove the stent after 6 -8 weeks, however 15% patients required stent removal before 6 weeks due to severe SRS. The mean stone size was 14.6mm and patients underwent either percutaneous nephrolithotripsy (PCNL) or ureteroscopic lithotripsy (URSL) or retrograde intra renal surgery (RIRS) depending upon the stone size and location. USSQ based assessment of urinary, pain, sexual symptoms and effects on work performance was evaluated. Urinary part assessment (Table 2) based on USSQ analysis showed that urgency dysuria and hematuria were the most common symptoms reported. Pain symptom assessment (Table 3) showed almost similar rates between loin and supra pubic pain and was more frequent complaint than urinary symptoms. The effect on quality of life was assessed as frequency of bother based on symptoms. No bother reflected perfect health, while bother during less than 50% of voiding times constituted as moderate effect on quality of life. SRS occurring more than 50% of the times voided classified as severe effect on quality of life. Most of the patients had some limitation in work performance (table 4) and with most reporting limited work capacity with reduced working hours. However very few missed work due to SRS. Around one third patients had sexual dysfunction (Table 5) with most patients complaining of pain during ejaculation and erectile dysfunction.

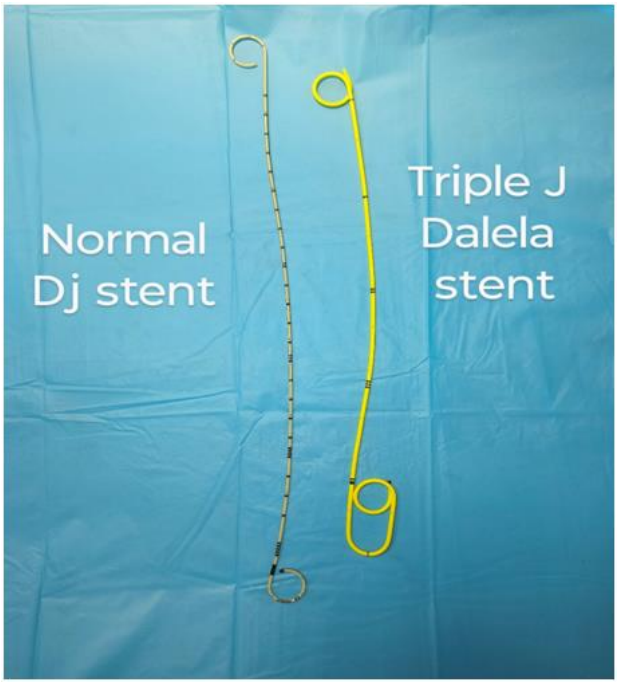

Figure 1: Normal 6/26 DJ stent on left and Triple J Dalela stent on right

Table 1: Demographic and baseline characteristics

Demographic Details	
Total number of patients recruited	100
Lost to follow up	0
Median age	43.2 years
Male: Female	63:37:00
Mean stone size	14.6mm
Procedure	
PCNL	43
URSL	15
RIRS	42
Median Follow up	47 days
Mean hospital stay	3 days
Number of patients undergoing stent removal before 6 weeks	15%

Table 2: Assessment of urinary symptoms based on USSQ

Urinary symptoms USSQ			
Symtom	**Week 1**	**Week 4**	**At time of stent removal**
Weak stream	21%	19%	15%
Intermittency	12%	10%	10%
Incomplete emptying	18%	18%	15%
Straining to start	10%	10%	9%
Frequency of spasm	19%	19%	15%
Urgency	21%	24%	25%
Nocturia (> 3 times)	5%	5%	5%
Dysuria	17%	20%	22%
Urge incontinence	3%	4%	4%
Hematuria	21%	25%	25%
Effect on Quality of life	Perfect Health: 0/100	Perfect Health: 0/100	Perfect Health: 0/100
	Symptoms occurring <50% of time: 63%	Symptoms occurring <50% of time: 57%%	Symptoms occurring <50% of time: 60%
	Symptoms occurring >50% of time: 37%	Symptoms occurring >50% of time: 43%	Symptoms occurring >50% of time: 40%

Table 3: Assessment of Pain symptoms based on USSQ

Pain symptoms of USSQ			
Symptom	**Week 1**	**Week 4**	**At time of stent removal**
Loin pain	31%	33%	34%
Supra pubic pain	23%	24%	28%
Groin pain	10%	10%	9%

Table 4: Assessment of work performance symptoms based on USSQ

Work Performance USSQ			
Symptom	**Week 1**	**Week 4**	**At time of stent removal**
Failure to go to work	10%	12%	8%
Reduced work hours	25%	25%	20%
Functional limitation	43%	43%	35%

Table 5: Assessment of sexual symptoms based on USSQ

Sexual symptoms of USSQ			
Symptom	**Week 1**	**Week 4**	**At time of stent removal**
Pain during ejaculation	12%	10%	9%%
Overall dysfunction	13%	10%	10%

Discussion

The results of our study indicated that urinary symptoms and stent related pain were predominant domains affected by stents, which in turn had a marked impact on general health. The side effects of stents had a negative impact on physical and psychosocial health, which was worse than symptoms and quality of life in patients with lower urinary tract symptoms or urinary calculi without stents. Evaluation of urinary symptoms revealed that storage problems, incontinence, dysuria and hematuria interfered with social life and resulted in a reduced quality of life. These results help to characterize urinary symptoms associated with stents. Although the incidence of dysuria was higher at week 4 and that of urge incontinence at week 4 with the stent, the overall differences in the urinary symptoms at these 2 times were not significantly different. Pain associated with stents was unpredictable in terms of location, severity and frequency. Our results revealed that such pain could be present at multiple sites and diverse in its site as it was experienced in the groin and external genitalia. This pain had an impact on physical health, sleep, daily activities and general health. Patients with stents had a higher intensity of pain, pain during voiding and a greater interference with daily life due to pain. A high proportion of patients required analgesia, which demonstrates the high morbidity of ureteral stents. Presence of pain in the kidney region while voiding, which appeared to be a symptom peculiar to the stents, may indicate reflux as observed in other studies [7] Assessment of these aspects of stent related pain would help to evaluate new stent designs. It appeared that the impact of stent related pain on quality of life worsened as the stent indwelling time increased. Sexual health, although affected by stents, might have been perceived as a less important problem. It was not a major problem with short stent indwelling time (week 1) but it became important as the stent indwelling time increased. The impact of stents was not only related to the pain during sexual activity, but also appeared to be more widespread affecting overall sexual satisfaction with sex. Stents had a wide ranging impact on general health. The most important domains affected were physical health, normal activities and pain. Stents also affected social life and vitality. The results confirmed the assumption that urinary symptoms had an impact on social life and that pain added to limitations in physical activities. With the use of this novel Triple J Dalela stent there was some reduction in the urinary symptoms as compared to the published literature. While urgency and hematuria have been reported in upto 60% and 40% of cases worldwide [1], our study showed significantly lesser incidence of these symptoms. The incidence of sexual symptoms and pain symptoms were however similar to other published data. This may be because of the inherent design of the triple J Dalela stent, which keeps it away from the trigone area. It is to be noted that the Triple J Dalela stent is slightly shorter in length as compared to the normal dj stent (Fig 1), even though both have the same length of 26 cm. The lower end of the Triple J Dalela stent resides slightly higher in the bladder and this intra vesical position may also be a contributing factor in prevention of urinary symptoms. Our was a pilot study and the major limitation was that there was no comparison with control patients undergoing endourological procedures with normal DJ stent.

Conclusion

SRS are a significant cause of morbidity for patients undergoing dj stenting following endourological procedures. New stent designs like this Triple J Dalela stent may help in alleviation of these symptoms

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