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Surgery

The Fate of Double J Stent Used in Pyelolithotomy and Uretero Lithotomy

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Abstract **Original Research Article**

Background: In Bangladesh there is no complete data which would reflect the idea about the fate of double J stent used in pyelolithotomy and ureterolithotomy. ***Methods:*** This was a prospective observational study, conducted at the Department of Surgery, Comilla Medical College Hospital, Comilla, during the 6-month period of June 2013 to November 2013. Fifty patients diagnosed with Nephrolithiasis & ureterolithiasis admitted at the respective hospital were selected as the study sample. Proper informed consent was taken before the data collection from the concerns. Statistical analysis of the results was obtained by using window-based computer software devised with Statistical Packages for Social Sciences (SPSS-22). ***Result:*** Among the 50 patients studied, >50% of the patients were distributed among the age group of 31-40 years and next was 21-30 years. 35 patients of the series were male (70%) and 15 were female (30%). In this series, male to female ratio was 2.33:1. Among the 50 stented patients, stone was located in kidney in 30 pts (60%), in upper ureter in 10 pts (20%), in mid and lower ureter in 4(8%) and 6(12%) patients respectively. In this study, the commonest indications of D J stenting were after pyelolithotomy, following ureteroscopy for obstructive uropathy due to ureteric stone. In this study, irritative voiding symptoms like dysuria, frequency/urgency occurred in 20% and 24% respectively, and haematuria in 10% of patients. Stent encrustation in 1 (2%), stent migration in 3 (6%), stent fracture in 1 (2%), urinary infection in 2(4%) and stent colic in 1(2%) were the complications noted. ***Conclusion:*** Ureteral stents are a convenient means of drainage for the upper urinary tract. However, their use is not devoid of side effects. Stent placement results in considerable morbidity in the form of irritative lower urinary tract symptoms. The side effects associated with ureteral stents must be kept in mind when deciding on stent placement and dwell time. Unnecessary and prolonged use of ureteral stents should be avoided.

Keywords: Stent, Ureterolithotomy, Urinary tract, Stent placement, Stent migration.

1. INTRODUCTION

Obstructive uropathy due to renal and ureteric stones is now important reason of hospital admission. Renal and ureteric calculi are significant source of morbidity. Approximate 50% of patients present between the age of 30 and 50 years worldwide face this problem. But the prevalence of these problems leading to urinary tract stone disease is about 2%-3%. This is because in about 85% of cases, kidney stones are small enough to be passed during urination with little discomfort [1]. For the major part of treatments regarding calculus disease of urinary tract and kidney, surgery is the primary method. This is the same for both acute presentation cases and for interval treatment after subsiding acute episodes [1, 2]. Among the available surgery methods, the double j ureteral stent has become one of the most valuable and basic tools in the urological practice [3]. They are usually made of silicone or polyurethane. An ideal stent is expected to stay up and drain well. It should keep the biological passage open. Because of the various necessities of the stent, tremendous improvements have taken place in the field of stent biomaterials, design and texture. Thus, the goal of ureteral stenting is to have a stent that will slide up, stay there, drain well, be comfortable to the patient, be easily visible on fluoroscopy and provide cost

benefit to the patient and hospital [4]. Since the introduction of the Double-J ureteral stent in 1978, many improvements have been made in stent composition and design. Despite that, complications may arise that can lead to significant morbidity. Some of the common complications include those that migrate to nearby areas and those that are left indwelling longer than initially planned [5, 6]. Ureteral stenting is commonly indicated to relieve and prevent upper urinary obstruction and to manage ureteric injuries to minimize urinary extravasation and to expedite the ureteral healing, which otherwise could be prolonged and hazardous to the patient [7]. For such purposes, these endoprostheses have to be kept in place for periods ranging from a few days to several months [8]. The main advantages of routine stent placement are the prevention of ureteral obstruction from ureteral edema or the passage of retained stone fragments. Moreover, routine stenting can provide the relief of postoperative pain. D J stents may also provide urinary flow from the kidney to the bladder to improve hydronephrosis, to promote the healing of severe mucosal injury and ureteral perforation, and even to reduce the incidence of late complications such as ureteral stricture [9]. However, the placement of ureteral stents is associated with many potentially uncomfortable urinary symptoms or morbidity. There are also many complications related to ureteral stenting including migration, breakage, encrustation, stone formation and trauma to the kidney. Furthermore, secondary cystoscopy is required to remove the stent in most patients, which may adversely affect quality of life. As a result, the placement of ureteral stents involves additional medical costs.

2. OBJECTIVES

General Objective

- To Observe the management of renal and ureteric stones by indwelling D J stents

Specific Objective

- To observe the fate of Double J stent used in pyelolithotomy and ureterolithotomy.
- To reduce the complications of D-J stenting used in pyelolithotomy & ureterolithotomy.

METHODOLOGY

This was a prospective observational study, conducted at the Department of Surgery, Comilla Medical College Hospital, Comilla, during the 6-month period of June 2013 to November 2013. 50 patients diagnosed with Nephrolithiasis & ureterolithiasis admitted at the respective hospital were selected as the study sample. Data were collected by structured questionnaire containing all the variables of interest. Informed consent was obtained from the legal guardians of the patient. Data were collected on variables of interest. All collected raw data were examined to detect any error or any omission and corrected so that the raw data become accurate.

Inclusion Criteria

- Diagnosed and operated cases of Nephrolithiasis & ureterolithiasis.
- Patients aged between 20-70 years
- Participants willing to share necessary information

Exclusion Criteria

- Patients suffering from comorbid medical illness.
- Immunocompromised patients
- Patients younger than 20 years

3. RESULTS

Among the participants, majority (70%) were male. The male: female ratio was 7:3. Majority (56%) were aged between 31-40 years. 20% were aged between 21-30 years, 16% were from the age group of 41-50 years, 6% from 51-60 years and 2% from 61-70 years. The mean age of the participants was 36.9 years. Only 36% of the participants had single stone, and 64% had multiple stones present in their body. 60% of the patients had stones in their renal region. 20% had stones in the upper ureter, 8% had stones in mid ureter and 6% had stones in their lower ureter region. Almost half (48%) of the cases had their stones removed after the 6th week of surgery. 32% had their stones removed after 3 months. 8% of the participants had their stents removed after 6 months, and 4% had their stents removed after 1 year. The shortest amount of time before stent removal was 3 weeks, applicable for 8% of the participants. 30% of the patients had complete recovery, and 70% of the cases had some form of complications. 24% had irritation related symptoms, 20% had dysuria, 10% had Haematuria, 4% had infection, 6% had stent migration, and stent encrustation, stent fracture and stent colic were present in 2% of the cases each.

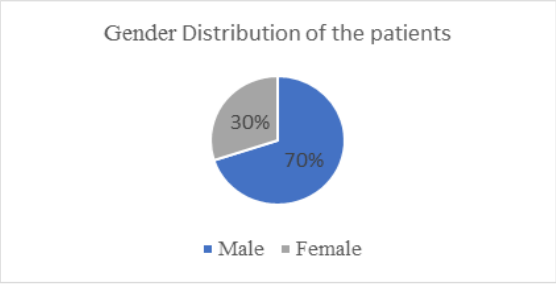

Fig-1: Gender Distribution of the participants (n=50)

Among the participants, majority (70%) were male. The male: female ratio was 7:3

Table-1: Age Distribution of the participants (n=50)

Age	No. of patients (n-50)	Percentage (%)
21-30	10	20%
31-40	28	56%
41-50	8	16%
51-60	3	6%
61-70	1	2%
Total	**50**	**100%**

Among the participants, majority (56%) were aged between 31-40 years. 20% were aged between 21-30 years, 16% were from the age group of 41-50 years, 6% from 51-60 years and 2% from 61-70 years. The mean age of the participants was 36.9 years.

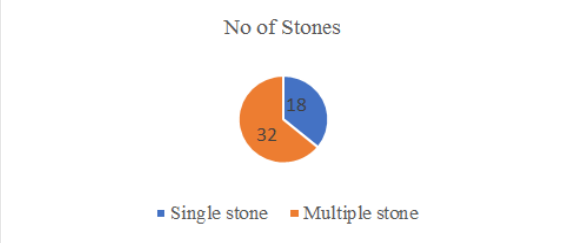

Fig-2: Patient Distribution by number of stones present (n=50)

Only 36% of the participants had single stone, and 64% had multiple stones present in their body.

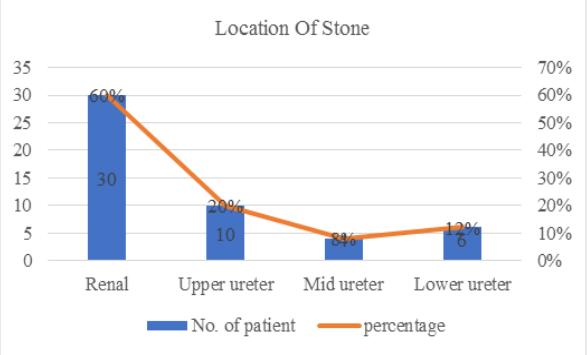

Fig-3: Patient Distribution by location of stones (n=50)

60% of the patients had stones in their renal region. 20% had stones in the upper ureter, 8% had stones in mid ureter and 6% had stones in their lower ureter region.

Table-2: Time elapsed before removal of stent (n=50)

Time elapsed before removal	No. of Patient	Percentage
3 weeks	4	8%
6 weeks	24	48%
3 months	16	32%
6 months	4	8%
Above 1 year	2	4%
Total	**50**	**100%**

Almost half (48%) of the cases had their stones removed after the 6th week of surgery. 32% had their stones removed after 3 months. 8% of the participants had their stents removed after 6 months, and 4% had their stents removed after 1 year. The shortest amount of time before stent removal was 3 weeks, applicable for 8% of the participants.

Table-3: Status of Patients after double J stent (n=50)

Outcome	Number of cases (n=50)	Percentage (%)
Complete recovery	15	30%
Irritative symptoms	12	24%
Dysuria	10	20%
Haematuria	5	10%
Infection	2	4%
Stent migration	3	6%
Stent encrustation	1	2%
Stent fracture	1	2%
Stent colic	1	2%

30% of the patients had complete recovery, and 70% of the cases had some form of complications. 24% had irritation related symptoms, 20% had dysuria, 10% had Haematuria, 4% had infection, 6% had stent migration, and stent encrustation, stent fracture and stent colic were present in 2% of the cases each.

4. DISCUSSION

Ureteral stent placement after uncomplicated ureteroscopy, pyelolithotomy, nephrolithotomy, ureterolithotomy, pyeloplasty, ureteric re-implantation or in association with shock wave lithotripsy is a common practice today. Stents offer the benefit of preventing postoperative colic due to ureteral edema, and may facilitate passage of residual stone fragments and can reduce postoperative ureteral stricture formation. However, ureteral stenting is not without potential significant patient morbidity. Stents have been associated with significant urinary symptoms, such as suprapubic pain, flank pain, frequency, urgency, dysuria and haematuria. In addition, calcific encrustation of indwelling ureteral stents can develop in approximately 15% of patients as early as 3 to 4 weeks after placement with the probability increasing to almost 75% after 3 months. Furthermore, stents may be forgotten, occasionally remaining in suture for many months,

providing a nidus for stone formation. And recurrent infections can further add to patient morbidity ratio. Stenting improves patient care by preventing or relieving the complications associated with ureteral obstruction and injury. Although urologists are becoming increasingly aware of the importance of diligent stent management for the prophylaxis of complications, such as fragmentation and encrustation, little information is available to help clinicians decrease the risk of proximal stent migration and remigration. However, stents that migrate, fragment or are forgotten pose a management and legal dilemma. Stents placed in patients with known urinary calculus disease may be at a higher risk for encrustation. Ureteral reactive changes are found to be considerably milder in the ureters intubated with silicone stents than in the others. Lower Urinary Tract Symptoms (LUTS) have long been thought to be related to indwelling ureteral stents. Breakage of stents is attributed to the hostility of the urine solution and to prolonged indwelling time of more than 1 year. Ureteral stents for long-term application should have an indwelling time of at least 6 months. However, due to encrustation tendencies and potential occlusion, they must normally be removed as early as 6 to 8 weeks. Forcible extraction may be dangerous to the ureter. Not surprisingly, greater numbers of newly onset transient pyuria are also noted commonly in the stented patients which subsides soon after stent removal. A severely encrusted ureteral stent is a difficult management problem for endourologists. Encrustation and the associated stone burden often involve the bladder, ureter and kidney, necessitating a multimodal endoscopic approach that may be performed at single or multiple sessions. It is important to examine the reasons why stent encrustation occurs. The first reason is communication gap between doctor and patient regarding stent removal. Such problem can be addressed by obtaining true consent as well as having a letter mailed to the patient stressing the importance of follow up. Among the 50 patients of the present study, over half (50%) of the patients were distributed among the age group of 31-40 years and next was 21-30 years, with 20% of the participants belonging to this group. 35 patients of this study were male, which was 70% of the total participants. This high prevalence of male was similar to some other studies [5]. the male to female ratio was 2.33:1, which was almost identical to findings of another study [10]. In this study, among the 50 stented patients, stone was located in kidney in 30 patients (60%), in upper ureter in 10 patients (20%), in mid and lower ureter in 4(8%) and 6(12%) patients respectively. The number of patients with stone in upper ureter was similar to another study, but the rest were different [5]. This study provides evidence that a higher proportion of stented patients have bothersome symptoms and side effects, most of which persist during the entire stenting dwell time. Lower urinary tract symptoms and hematuria are frequent and are clearly attributed to bladder irritation by a foreign body. Less frequently, stents increase the risk of infection, encrustation or migration, all of which may necessitate further invasive manipulations and hospitalization. In this study, the indications of ureteral stenting were statistically not different from other studies. A study bay Nawaz reported that the commonest indication was prophylactic stenting followed by relief of obstructive uropathy [11], while another study by Saltzman described obstructive uropathy as the most common indication [6]. A study by Mudassar reported that commonest indication of D J stenting was obstructive uropathy due to stone disease. In this study, the most common indications were pyelolithotomy, following ureteroscopy for obstructive uropathy due to ureteric stone. The frequency of adverse effects of stents in this study slightly differed from previous reports. Damiano reported a 37% rate of irritative voiding symptoms, 18% haematuria and 9.5% risk of stent migration in his study.[12] Joshi and colleague reported similar complaints in stented patients [13]. Another study by Pensota reported complications like painful trigone irritation, septicemia, haematuria and stent encrustation in 13%, 8%, 11% and 5% patients respectively [14]. In our study irritative voiding symptoms like dysuria, frequency/urgency occurred in 20% and 24% respectively, and haematuria in 10% of patients. Common complications observed in a study by Nawaz were stent encrustation (10.5%), stent migration (3.5%) and stent breakage (4.5%) [11]. On other hand, the study by Damiano described stent migration (9.5%) and stent breakage (1.3%) as the common complications [12]. In the present study, stent encrustation occurred in 1 (2%), stent migration in 3 (6%), stent fracture in 1 (2%), urinary infection in 2(4%) and stent colic in 1(2%) were the complications noted. The precise risk factors for stent displacement remains to defined, but it appears that accurate determination of the appropriate stent length may prevent stent displacement, while the use of distal suture may help relocate the migrated stent, obviating the need for an invasive procedure. Another complication is 'forgotten stent' usually due to poor follow up and inadequate patient communication. The so-called forgotten stent is a major complication that necessitates high endourologic expertise. As with any foreign body continuously exposed to urine, stents become covered with a bacterial biofilm that subsequently calcifies, leading to encrustation and frank stone formation. This, in turn, leads to stent entrapment that mandates elaborate endourologic manipulation for retrieval. Calcified stents are prone to spontaneous fragmentation that further complicates their removal.

Limitation of the study

This was a prospective observational study with a small sized sample. So, the findings of this study may not reflect the exact scenario of the whole country.

5. CONCLUSION

Late complications of stents are frequent and may appear in up to a third of the patients on long-term stenting. A closer follow-up and frequent periodic

monitoring are indicated the susceptible at-risk population.

6. RECOMMENDATIONS

1. The meticulous use of D J stent is mandatory.
2. Indwelling ureteral stent should not be performed routinely. Whenever used they must be tracked closely and removed at the earliest period of time.
3. To reduce the incidence of adverse effects related to use of D J stent, awareness among the general population should be increased.
4. Routine check-up, early consultation with trained personnel and close supervision is essential.
5. Unnecessary and prolonged use of ureteral stents should be avoided.
6. Proper counselling and communication with patient regarding D J stent indwelling and removal is mandatory.

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