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Retrospective Study of Patients with Forgotten Ureteral Double-J Stents in Aden, Yemen

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ABSTRACT

Background: Double-J stents are among the basic and commonly used tools in urology.
Objective: To study the morbidity associated with forgotten ureteral stents and to describe the variables of the reason for prolonged indwelling time, complications and treatment
Materials and method: This is a retrospective observational study, which conducted in Aden, during the period January 2019 to December 2020. The records of all patients diagnosed with forgotten ureteral stents reviewed, and obtained the following data: sex, age, governorates, medical history, presenting complaints, total indwelling time of the stent, the reason for prolonged indwelling time, the x-ray, ultrasound investigations, complications and treatment.
Fisher test was used and p-value < 0.05 was considered as statistically significant. The statistical software package SPSS version 17 was used.
Results: The study patients were 46 and they were 78.3% males and 21.7% females, (male:female ratio 3.6:1). The mean age of the patients was 35 ± 8.9 years, (range between 20 to 50 years). Patients of the age group < 40 years old were predominant 65.2%. Most of the patients were from rural governorates 89.1%. The mean duration of the indwelling stent in situ was 37.2 ± 13.2 months, and the duration ranged from 24 months to 60 months.
Reasons for these long indwelling times were poor education of patient 37.0% and doctor did not inform the patient 37.0% followed by lack of awareness of patients 26.0%.
In the treatment procedures we found cystolithotripsy with ESWL was applied in 41.3% patients followed by *ureterolithotripsy* with ESWL in 37.0% patients, ESWL in 15.2% patients and PCNL in 6.5% patients.
The complications were stone formation 45.7% followed by the irritative lower urinary tract symptom 28.2%, renal failure 17.4% and urosepsis 8.7%.
Conclusion: Using double-J stents should be accompanied with a well education of the patient to reduce forgotten double-J stents and physicians need to be sensitized towards this health problem.

Key words: Forgotten, ureteral double-J stents, Aden,

INTRODUCTION

Double-J (DJ) stents are among the basic and commonly used tools in urology in many procedures since its first introduction in 1967 by Zimskind et al [1]. These stents keep the ureter patent and ensure resolution of any edema and allow for any injury. Hence, it is considered as an effective method in postoperative management in patients with ureteric calculi, ureteric stricture, retroperitoneal tumors or fibrosis, ureteropelvic junction obstruction or in any iatrogenic ureteric injury [2].
The ureteral stents are primarily used for managing ureteral obstruction due to stones, tumours, external compression, fibrosis, and

for providing drainage after ureteral surgery or iatrogenic injuries [3].

They should be removed timely [4]. Failure to do so results in retained or "forgotten" ureteral stents. This results in complications in the form of stent encrustation, migration, fracture, stone formation, adjacent organ penetration, urinary tract infections (UTI), ureteral erosion, or fistula formation [5,6].

Objective

To study the morbidity associated with forgotten ureteral stents and to describe the variables of the reason for prolonged indwelling time, complications and treatment

MATERIALS AND METHOD

This is a retrospective observational study that was conducted at Hatroom Private Center in Aden, Yemen, during the period January 2019 to December 2020.

The records of all patients diagnosed with forgotten ureteral stents were retrospectively reviewed. The retained/forgotten ureteral stents were defined as the stents with an indwelling period of more than six months. We classified the patients in three age groups: Age group one: 20-29 years old, age group two: 30-39 years old and age group three: ≥40 years old. Each patient underwent ultrasonography kidney–ureter–bladder (KUB), X-ray KUB, and computed tomography (CT). Over the last few years, we have set a protocol in our Health Center about detailed counseling for the patients with DJ stents. Our private center database also maintains records of all the patients with DJ stent placement, which include name, age, sex, details of diagnosis, type of procedure, date of surgery, due date of stent removal and contact details.

The collected data were sex, age, governorate, medical history, presenting complaints, total indwelling time of the stent, the reason for prolonged indwelling time, the x-ray, ultrasound investigations, complications and treatment.

The collected data were tabulated and statistical analysis was done by estimating rates, means and standard deviations, Fisher test was used and p-value <0.05 was considered as statistically significant. The statistical software package SPSS version 17 was used.

RESULTS

Forty-six patients with forgotten ureteral stents were studied and they were 36 males (78.3%) and 10 females (21.7%), (male:female ratio 3.6:1). The age of patients ranged between 20 to 50 years and the mean age of the patients was 35 ± 8.9 years.

The most of the patients 65.2% were in the age group less than 40 years of old.

Most of the patients were from rural governorates (Abyan, Lahj and Shabwah) 89.1% while from urban governorate (Aden) were 10.9%.

We noted that the distribution of the patients among the three groups (20-29 years, 30-39 years and ≥ 40 years) were to some extent equally 30.4%. 34.8%, 34.8% respectively. Values of variables illustrated in Table 1 and Figure 1.

Table 1: Distribution of demographic variables of the study patients (n=46)

Variables	No	%
Sex:		
Males	36	78.3
Females	10	21.7
Range of age (years):	20 - 50	
Mean age (years):	35 ± 8.9	
Age groups (years):		
20 – 29	14	30.4
30 – 39	16	34.8
≥ 40	16	34.8
Governorate:		
Abyan	22	47.8
Aden	5	10.9
Lahj	10	21.7
Shabwah	9	19.6

Figure 1: Proportion of study patients related to sex

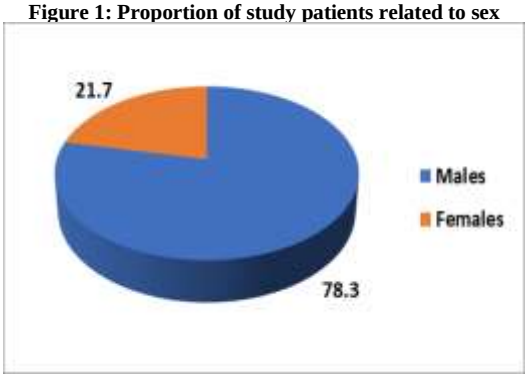


Table 2 summarizes the distribution of different variables of the study patients. Indwelling time of stent divided in 6 groups (24 months, 36 months, 48 months and 60 months).

Indwelling time of 24 months and 36 months found in 17 (37.0%) patients and in 16 (34.8%), followed by 48 months in 6 (13.0%) patients and 60 months in 7 (15.2%) patients. The mean duration of the indwelling stent in situ was 37.2 ± 13.2 months, and the duration ranged from 24 months to 60 months.

Reasons for these indwelling times were poor education of patient 17 (37.0%) and doctor did not inform the patient 17 (37.0%) followed by lack of awareness of patient 12 (26.0%).

In radiological examination, we observed KUB with ultrasound was done for 24 (52.2%) patients, KUB radiography for 12 (26.1%) patients and computed tomography (CT) scan for 10 (21.7%) patients.

In the treatment procedures we found cystolithotripsy with ESWL was applied in 19 (41.3%) patients followed by u*reterolithotripsy* with ESWL in 17 (37.0%) patients, ESWL in 7 (15.2%) patients and PCNL in 3 (6.5%) patients.

Table 2: Distribution of different variables of the study patients (no = 46)

Variables	No	%
Indwelling Time of stent:		
24 months	17	37.0
36 months	16	34.8
48 months	6	13.0
60 months	7	15.2
Mean duration of the indwelling stent (months)	**37.2 ± 13.2**	
Reason:		
Poor education of patient	17	37.0
Lack of awareness of patient	12	26.0
Doctor did not inform patient	17	37.0
Radiological exam:		
Computed Tomography (CT) Scan	10	21.7
KUB with Ultrasound	24	52.2
KUB radiography	12	26.1
Treatment:		
Cystolithotripsy with ESWL	19	41.3
ESWL	7	15.2
PCNL	3	6.5
Ureterolithotripsy with ESWL	17	37.0

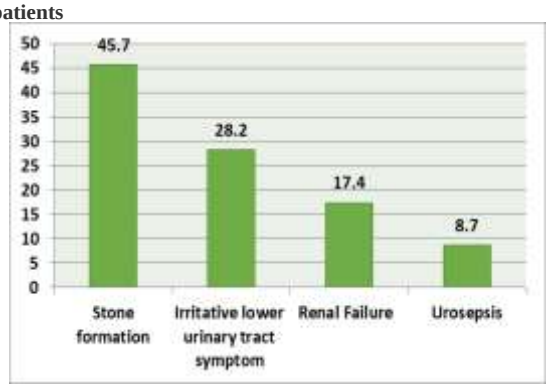
ESWL = Extracorporeal Shock Wave Lithotripsy; PCNL = Percutaneous Nephrolithotomy;

Table 3 & Figure 2 show the distribution of complications among the study patients. Stone formation represent the most complications 21 (45.7%) followed by the irritative lower urinary tract symptom 13 (28.2%), renal failure 8 (17.4%) and urosepsis 4 (8.7%).

Table 3: Distribution of complications among the study patients

Variables	No	%
Stone formation	21	45.7
Irritative lower urinary tract symptom	13	28.2
Renal Failure	8	17.4
Urosepsis	4	8.7
Total	46	100

Figure 2: Distribution of complications among the study patients



DISCUSSION

Previous studies have defined forgotten double-J stents (DJSs) differently. Tang et al [7] defined forgotten DJSs as those used for 6 months, whereas Ziemba et al [8] defined forgotten DJSs according to the date of anticipated extraction. Postoperative urology patients may sometimes require the insertion of a ureteral stent to facilitate the evacuation of retained urine in the renal pelvis and allow for stone removal, and also to prevent urinary obstruction.

Definition of "forgotten" Doble J ureteric stent is not standardized, with various studies considering a period of 3 to 6 months to define a forgotten DJ stent [9].

However, some patients will forget and fail to return on schedule for the removal of their DJSs. Overdue DJSs can lead to stone formation, stent fragmentation, infections, or stent migration. Severe encrustation and stone formation may cause hydronephrosis and, consequently, renal impairment [10,11,12]. Additional treatments are often required to handle ureteral stent

complications, including extracorporeal shock wave lithotripsy and the application of endourological techniques, which not only increase the risk of kidney failure [10] and the cost of treatment but also lower the working ability and quality of life of patients [13].

Forgotten or retained ureteral stents observed in urologic practice because of poor compliance of the patient or failure of the physician to adequately counsel the patient. These forgotten stents can produce considerable morbidity and mortality, due to extensive encrustation with significant stone burden, knot formation, upward migration and fragmentation [14,15]. In our present study, 46 patients with retained/forgotten ureteral stents were studied and they were (78.3%) males and (21.7%) females, (male : female ratio 3.6:1).

Male patients were predominant in a study conducted in India by Sohrab et al [9], they found the male to female ratio was 25:3.

In the current study, the age of the patients ranged between 20 to 50 years and the mean age of the patients was 35 ± 8.9 years.

Similar to our findings were reported by Sohrab et al [9] that the mean age of their study patients was 37.7 ± 14 years and the patients age range between 14 to 62 years.

In our study we found the most of patients with forgotten DJ stent were from rural governorates (Abyan, Lahj and Shabwah) 89.1% while from Aden were 10.9%.

Patil et al [2] reported in their study that the most of patients presenting with forgotten DJ stent were from poor socioeconomic background and having low education status. Most of the patients were from rural background, and they were reluctant to travel to tertiary care center in view of poor transportation facility and cost of transportation involved.

In the current study, we classified the indwelling time of stent in 6 groups (24 months, 36 months, 48 months, and 60 months). Indwelling time of 24 months and 36 months found in (37.0%) patients and in (34.8%) patients, followed by 48 months in (13.0%) patients and 60 months in (15.2%) patients. The mean duration of the indwelling stent in situ was 37.2 ± 13.2 months, and the duration ranged from 24 months to 60 months. The available literature shows that DJ stent had been missed for a maximum of 17 years [16,17,18].

Sohrab et al [9] reported that in their study they found a forgotten stent for 23 years which is, the longest duration reported in literature.

A study conducted in India found the mean indwelling time of stents was 16.11 months, with a range of 7 to 98 months [19].

In a study by Lam JS et al [5], the average stent indwelling time was 10.7 months (range 3-28 months). In another study by Aravantinos et al [20], the average stent indwelling time was 24.1 months (range 6-85 months). In a study by Ankam et al [21], the average stent indwelling time was 4.9 years (range 1-12 years).

Previous studies reported varied range of indwelling period [22]. In the study by Thapa et al [23], indwelling time was four months to 10 years.

In the present study we found the reasons for these long indwelling times were poor education of patient (37.0%) and doctor did not inform the patient (37.0%) followed by lack of awareness of patient (26.0%). That mean poor compliance of the study patients represents the main cause 63% of forgotten stents, while physicians' compliance represent 37.0%.

Monga et al [10] mentioned that patient and sometimes physician compliance issues lead to stents being forgotten. Murthy et al [24] added that poor compliance of the patients represents the main cause, which is reflected in our study. Proper information and education of the patient regarding the need for stent removal or change is necessary [9].

Mahmood et al [22] mentioned that patient's forgetfulness or ignorance or incomplete knowledge regarding prolonged DJ stent complications as well as physician's inadequate counselling regarding timely removal of ureteral stents are the two key

reasons that attribute to the forgotten DJ stents and associated complications.

In our study, the treatment procedures were cystolithotripsy with ESWL applied in (41.3%) patients followed by u*reterolithotripsy* with ESWL in (37.0%) patients, ESWL in (15.2%) patients and PCNL in (6.5%) patients.

Forgotten ureteral stents after 1 year were extensively encrusted and required additional treatment modalities such as shock wave lithotripsy (SWL), ureteroscopy (URS) and percutaneous nephrolithotomy (PCNL) for both effective removal and treatment [25].

Management of forgotten DJ stents is mainly dependent on the site of encrustation, the size of the stone burden and the function of the affected kidney. Management of these complicated forgotten DJ stents was achieved by multimodality approach which included PCNL, URSL, ESWL, cystoscopic removal, cystolithotripsy, and nephrectomy [22].

Our study found the most complications among the study patients were stone formation which represented (45.7%) followed by the irritative lower urinary tract symptom (28.2%), renal failure (17.4%) and urosepsis (8.7%).

Previous studies [11,26,27,28,29] reported that a forgotten DJ stent can cause a spectrum of complications ranging from hematuria, stent occlusion, migration, fragmentation, encrustation, and stone formation.

Damiano et al [14] added a forgotten DJ stent can cause a serious complications like recurrent urinary tract infection, urinary tract obstruction, and renal failure. Even fistula formation to the iliac arteries is known.

Several previous studies highlighted the importance of timely removal of the DJ stent to prevent development of complications associated with prolongation of indwelling time [9,23,30,31].

CONCLUSION

Using double-J stents should be accompanied with a well education of the patient and his relatives to reduce forgotten double-J stents. Also, physicians need to be sensitized towards this menace and there awareness shall goes a long way in reducing the morbidity associated with the forgotten stent

Conflict of Interest: None

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