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Indwelling ureteral stenting negatively impacts sexual function transiently after endourological procedure among adult male and female patients: a prospective cohort study

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ABSTRACT

BACKGROUND

Ureteral stents, which are widely used after endourological procedures, cause adverse effects. However, its potential impact on sexual function remains unclear in patients undergoing ureteral stenting. This study aimed to investigate sexual function in adult male and female patients undergoing endourological procedures involving ureteral stent placement.

METHODS

We conducted a prospective cohort study in a double tertiary care hospital setting with 103 selected patients (53 male and 50 female). We used a self-administered questionnaire-based survey, namely the Indonesian version of the 5-item International Index of Erectile Function (IIEF-5) for male patients and the Indonesian Female Sexual Function Index (Indonesian FSFI) for female patients at three different times (pre-stenting, four weeks after stenting, and four weeks after stent removal). A paired t-test or Wilcoxon test was used for data analysis.

RESULTS

In the male group, significant changes were noted in the four IIEF-5 domains and overall IIEF-5 scores at pre-stenting and four weeks after stenting ($p=0.000$). The female group showed significant differences for all FSFI domains and overall FSFI scores at pre-stenting and four weeks after stenting ($p=0.000$). Most patients in both groups recovered sexual function four weeks after stent removal, as indicated by insignificant differences in the overall IIEF-5 and FSFI scores at pre-stenting and four weeks after stent removal.

CONCLUSION

Ureteral stenting led to significant but transient sexual dysfunction in both groups at four weeks after stenting. In this regard, male and female patients need to receive counselling and attention, that they may experience temporal sexual dysfunction at least for 4 weeks.

Keywords: Ureteral stent, sexual Dysfunction, IIEF, FSFI, male, female

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INTRODUCTION

Sexual activity is an essential component of human life. Sexual health is defined as “the state of physical, emotional, mental, and social well-being related to sexuality”. In addition, sexuality is a means of experiencing delight and physical release, and promoting quality of life and longevity.⁽¹⁾ Sexual dysfunction significantly affects the character of a person’s sexual life, even though Indonesians view sexual matters as taboo.⁽²⁾ Specific surgical procedures considerably affect the patients, who experience a sudden decline in sexual function. Ureteral stent use has become an essential component of current urological practices. Zimskind⁽³⁾ initially used a ureteral stent in 1967, which he developed in the late 1960s. Ureteral stents have been frequently used as an adjunct in endourological procedures.⁽⁴⁾ Several studies have examined minor and significant adverse effects of ureteral stents. However, only a few researchers have investigated sexual dysfunction associated with ureteral stent use. This was proven in a previous systematic review and meta-analysis that included only five studies found suitable for review. This meta-analysis suggests that the indwelling double-J (DJ) stent after endourological procedures could be a crucial factor causing temporary sexual dysfunction post-operatively.⁽⁵⁾

Zhu et al.⁽⁶⁾ showed impairment in sexual health in patients compared to that in healthy individuals at four weeks after stent placement. By contrast, another study showed no significant difference when comparing sexual health at the fourth week after placement with that at the fourth week after removal.⁽⁷⁾ A prospective study that aimed to evaluate the impact of an indwelling ureteral double-J (DJ) stent on the sexual health of Indian men undergoing ureteroscopy, showed that ureteral DJ stenting leads to significant sexual dysfunction affecting multiple components of the International Index of Erectile Function-5 (IIEF-5) questionnaire and also causes painful erection/ejaculation in a significant proportion of men.⁽⁸⁾ A randomized controlled study involving 72 male

patients who underwent ureteroscopic stone surgery (study group) and 42 healthy males as the control group, showed that ureteroscopic stone surgery with ureteral stent placement seems to have a progressively decreasing negative effect on male sexual function.⁽⁹⁾

However, these inconsistent results need further study to assess whether indwelling stenting is associated with postoperative sexual dysfunction. Also, with the increasing awareness amongst our patients, it is important to provide them evidence-based answers to their queries related to sexual dysfunction. In this prospective study, we conducted a questionnaire-based evaluation of sexual dysfunction in adult male and female undergoing ureteral stenting.

METHODS

Research design

This prospective observational study was conducted in two tertiary care hospitals in Yogyakarta (Dr. Sardjito Central General Hospital and Dr. Suhardi Hardjolukito Air Force Central Hospital) from September 2022 to April 2023.

Study subjects

Total sampling was used in this study. The sample size is representative of the entire population of all eligible patients admitted to the hospital. The investigators selected 103 patients (53 male and 50 female) aged 18–55 years who underwent an endourological procedure (ureteroscopy and percutaneous nephrolithotomy (PCNL)) with subsequent ureteral stent (4.7 Fr, 22–32 cm, multiloop, hydrophilic) placement from September 2022 to April 2023. Patients with existing erectile dysfunction, neurogenic bladder dysfunction, urethral stricture, pregnancy, menopause, a history of metabolic disease, pelvic surgery, or radiotherapy were excluded.

Details of the questionnaire

Patients were asked to complete the 5-item International Index of Erectile Function (IIEF-5)

questionnaire for males or the Female Sexual Function Index (FSFI) questionnaire for females after giving written informed consent. The IIEF-5 consists of five questions scored from 1 to 5, with overall scores ranging from 5 to 25. In contrast, the FSFI contains 19 questions and comprises six domains: sexual desire (questions 1–2), sexual arousal (questions 3–6), lubrication (questions 7–10), orgasm (questions 11–13), satisfaction (questions 14–16), and pain (questions 17–20). Overall scores range from 2.0 to 36.0 points. Both questionnaires were close-ended and collected information regarding sexual activity in the four weeks preceding the examination. Laksmita et al.⁽¹⁰⁾ and Nuring et al.⁽¹¹⁾ validated and standardized the Indonesian versions of these questionnaires. The patients completed the questionnaire in the following three phases: (1) pre-stenting, (2) four weeks after ureteral stenting, and (3) four weeks after removing the ureteral stent.

Statistical analysis

The collected data were analyzed for normality using the Kolmogorov–Smirnov test. A paired *t*-test or Wilcoxon test was used to evaluate the statistical significance of differences between means and proportions. Statistical significance was set at $p < 0.05$ using the IBM SPSS 23.00 application.

Ethical clearance

The protocol of this study was approved by the Medical and Health Research Ethics Committee, Faculty of Medicine and Nursing, Gadjah Mada University (KE/FK/1394/EC/2022).

RESULTS

Only 70 (40 males and 30 females) of the 103 designated patients continued the study because 28 patients (10 males and 8 females) were lost to follow-up and 15 patients (3 males and 12 females) did not perform sexual activity after the procedure. The age of the included patients ranged from 26 to 50 years and 93% and 7% of the patients had urolithiasis and ureteral stenosis, respectively. The patients underwent ureteroscopy and PCNL, which are indications for ureteral stent placement. Table 1 provides detailed information on patient characteristics.

Before and four weeks after ureteral stenting, almost all domains and overall IIEF-5 scores showed significant changes in the male group ($p = 0.000$). In contrast, a comparison of the outcome at pre-stenting and four weeks after ureteral stent removal showed no significant changes in all domains and overall scores ($p > 0.05$) (Table 2). Similar results were found in the female group, all domains of FSFI showing

Table 1. Characteristics of male and female patients

Parameters	Males (n=40)	Females (n=30)
Age (years)	42.23 ± 7.39	39.83 ± 6.78
Weight (kg)	74.73 ± 6.32	58.20 ± 8.54
Height (cm)	166.48 ± 4.31	151.60 ± 6.28
Procedure		
URS	26 (65.0)	23 (76.67),
PCNL	14 (35.0)	7 (23.33)
Site of insertion		
Right	19 (47.5)	10 (33.3)
Left	16 (40.0)	19 (63.3)
Bilateral	5 (12.5)	1 (3.4)
Duration (days)	41.98 ± 4.51	40.37 ± 5.35

Note: data presented as Mean ± SD, except for procedure and site of insertion (n,%); URS : ureteroscopy; PCNL : percutaneous nephrolithotomy

Table 2. Comparison of total IIEF-5, individual component questions, scores between pre-stenting and four weeks after ureteral stenting, and four weeks after removing the ureteral stent

Parameter	Pre-stenting	Four weeks after ureteral stenting	p value (after stenting vs pre-stenting)	Four weeks after removing the ureteral stent	p value (after removing stenting vs pre-stenting)
IIEF-5 domains					
Total	22.97±1.29	20.43 ± 1.85	0.000*	22.77 ± 1.07	0.296
Erectile confidence	4.90 ± 0.30	4.10 ± 0.66	0.000*	4.77 ± 0.50	0.366
Erection firmness	4.45± 0.51	4.17 ± 0.38	0.366	4.47 ± 0.51	0.564
Maintenance frequency	4.43 ± 0.50	4.20 ± 0.48	0.000*	4.40 ± 0.56	0.366
Maintenance ability	4.50 ± 0.50	3.93 ± 0.52	0.000*	4.53 ± 0.51	0.655
Intercourse satisfaction	4.55 ±0.49	4.03 ± 0.67	0.000*	4.50 ± 0.50	0.084

(*) Significant with Wilcoxon test; IIEF-5: International Index of Erectile Function-5 (IIEF-5) scores

significant changes between pre-stenting and four weeks after ureteral stenting ($p=0.000$). No significant differences were found in the overall IIEF-5 and FSFI scores between pre-stenting and four weeks after ureteral stent removal ($p>0.05$) (Table 3).

DISCUSSION

Ureteral stenting is occasionally unavoidable during endourological procedures.⁽¹²⁾ However, the disadvantages of ureteral stents outweigh their advantages. The complications associated with

ureteral stenting include lower urinary tract syndrome and sexual dysfunction. Sexual dysfunction, which is occasionally a negligible side effect, has been investigated with much less frequency and specificity than other side effects. The pathophysiology of sexual dysfunction associated with ureteral stents remains unknown.^(10,11)

Our study shows that sexual dysfunction following ureteral stenting is transient but persists when the stent is *in situ*. This was indicated by the return of sexual function to baseline within four weeks after ureteral stent removal, with no

Table 3. Comparison of total FSFI, individual component questions, and pain question scores between pre-stenting, four weeks after ureteral stenting, and four weeks after removing the ureteral stent

Parameter	Pre-stenting	Four weeks after ureteral stenting	p value (after stenting vs pre-stenting)	Four weeks after removing the ureteral stent.	p value (after removing stenting vs pre-stenting)
FSFI domains					
Total	24.22±1.83	15.24 ± 1.89	0.000**	24.40 ± 1.70	0.213
Desire	4.74 ± 0.40	2.76 ± 0.62	0.000*	4.70 ± 0.39	0.543
Arousal	4.81 ± 0.42	2.81 ± 0.48	0.000*	4.82 ± 0.43	0.180
Lubrication	4.84 ± 0.47	2.89 ± 0.59	0.000*	4.86 ± 0.46	0.317
Orgasm	4.88 ± 0.62	2.92 ± 0.77	0.000*	4.89 ± 0.61	0.317
Satisfaction	4.64 ± 0.8	2.96 ± 0.74	0.042*	4.74 ± 0.55	0.317
Pain	4.91 ± 0.49	3.56 ± 0.66	0.005*	4.94 ± 0.45	0.180

(*) Significant with Wilcoxon test. (**) Significant with paired t-test; (*) Significant with Wilcoxon test. (**) Significant with paired t-test; (*) Significant with Wilcoxon test. (**) Significant with paired t-test; FSFI: Female Sexual Function Index; FSFI: Female Sexual Function Index; FSFI: Female Sexual Function Index

significant differences between pre-stenting and after stent removal in any domain in either group. Patients must be informed of this complication before undergoing an endourology procedure that requires the placement of a ureteral stent.

Leibovici et al.⁽¹⁵⁾ first studied the effects of ureteral stenting on sexual function in 2005 and found sexual dysfunction in both men and women. Other studies using more specific questionnaires have also been conducted to date. The present study is the first prospective study conducted in an Indonesian population using questionnaires administered at pre-stenting, four weeks after the procedure, and four weeks after ureteral stent removal.

Previously, similar prospective studies have been conducted using the IIEF-5 and FSFI questionnaires to study the impact of ureteral stenting on sexual functions. A systematic review and meta-analysis included only five studies, and only three similar studies have been published after the meta-analysis.^(5,8,13,16) Furthermore, in the past, the effects of ureteral stenting on sexual functions were measured using the less specific Ureteral Stent Symptom Questionnaire, which contains only one of the six domains to evaluate sexual dysfunction.⁽⁴⁾

Among studies evaluating sexual dysfunction following ureteral stent placement in male patients, only three used a specific IIEF-5 questionnaire with five questions.^(8,14,17) Our study employed a five-question validated Indonesian IIEF-5 questionnaire to facilitate patient filling out, especially in Indonesia.⁽¹⁰⁾ The results showed significant changes in erection confidence, erection firmness, maintenance ability, and sexual satisfaction domains and the overall IIEF-5 score at pre-stenting and four weeks after ureteral stenting. In contrast to the findings of the three other studies that used similar questionnaires, two studies revealed insignificant results in all five domains. However, the total IIEF-5 score was significantly lower in these two investigations.^(14,17) Amandeep et al.⁽⁸⁾ discovered significant changes in erection confidence, maintenance ability, and intercourse satisfaction domains and overall IIEF-

5 score before stenting and at the time of stent removal.

A few studies have investigated sexual dysfunction caused by ureteral stents in women. Four studies used an identical FSFI questionnaire, showing results consistent with the present study. In the present study, we used a questionnaire comprising 19 segments in six domains. The study by Eryldirim et al.⁽¹⁴⁾ also used the IIEF questionnaire in males and the FSFI questionnaire in females and showed that ureteroscopic interventions could have some adverse effects on sexual function, particularly in males, but not in females. Akdeniz et al.⁽¹⁸⁾ explained these domains in more detail. Four domains (arousal, orgasm, satisfaction, and discomfort) and overall FSFI scores differed significantly between pre-stenting and four weeks after the removal of ureteral stenting. Similar results were reported by Eryldirim et al.⁽¹⁹⁾ and Kazmi et al.⁽¹³⁾ who showed significant changes in each domain and in total FSFI scores between pre-stenting and four weeks after removal of ureteral stenting.

Our study has some limitations. The number of patients included was limited. However, it is common knowledge that prospective cohort studies are restricted by a high dropout rate. Moreover, a few members of both groups refrained from sexual activities after ureteral stent insertion. Additionally, we used only one type of stent of the same size and material. In this study, we did not include a control group consisting of patients who underwent endourological procedures but did not require ureteral stenting because these procedures are not known to affect sexual function.⁽⁵⁾

We expect that our research will encourage urologists to pay more attention to sexual dysfunction in ureteral stent users. Several preventive and pharmacological treatments for ureteral stenting related lower urinary tract syndromes have been tested.^(15,16) Although sexual dysfunction is transient, it still reduces the patient's quality of life. Therefore its treatment should be further investigated. Prior to the insertion of a stent, informing the patients about

the symptoms and ureteral stent effect on quality of life can help them recognize the symptoms and improve their perception.⁽²²⁾

CONCLUSIONS

The present study showed that the use of a ureteral stent as an adjunct to an endourological procedure negatively affects male and female sexual function. Although the effect is temporary, clinicians need to inform patients before endourological surgery. Furthermore, new therapeutic strategies and additional studies are needed to address this problem.

CONFLICTS OF INTEREST

There are no conflicts of interest in this study.

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AUTHOR CONTRIBUTIONS

This study was conceived and designed by FBK, NB, and SRB. FBK implemented the study, analyzed the results, and drafted the manuscript. NB and SRB contributed to data acquisition and critical revision. All authors read and approved the final manuscript.

DATA AVAILABILITY STATEMENT

The data used to support the findings of this study is available from the corresponding author upon request.



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