CORRELATION OF STORAGE SYMPTOMS OR OVERACTIVE BLADDER SYMPTOMS POST TRANSURETHRAL RESECTION OF THE PROSTATE WITH THE DURATION OF CATHETER USE IN A PATIENT WITH URINARY RETENTION DUE TO BENIGN PROSTATE HYPERPLASIA

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ABSTRACT

Objective: *Find out the correlation of catheter use duration with the incidence of overactive bladder symptoms (OABS) post Transurethral Resection of The Prostate (TURP) in patients with urinary retention due to Benign Prostate Hyperplasia (BPH).* ***Material & Methods:*** *An observational analytical research correlation with a cohort approach was carried out on 29 patients with urinary retention due to BPH post TURP in five hospitals in Padang from January 2019 to August 2019. Data collected included the characteristics and duration of catheter use, which were obtained through interviews using questionnaires, while those of OABS were obtained based on the total score by using the overactive bladder symptoms score (OABSS) standard questionnaire.* ***Results:*** *The average duration of catheter use was 14.9 ± 8.0 days, and the average total OABSS score was 4.7 ± 2.5. Bivariate analysis results showed a positive correlation with a weak strength between the duration of catheter use and the total OABSS score (Pearson's correlation, r = 0.396, p = 0.033).* ***Conclusion:*** *It is necessary to shorten the duration of catheter use to decrease the incidence and severity of OABS in patients with urinary retention due to BPH post TURP.*

Keywords: *Benign Prostate Hyperplasia, duration of catheter use, overactive bladder, urinary retention.*

ABSTRAK

Tujuan: *Mengetahui hubungan lama pemakaian kateter dengan kejadian OABS pasca TURP pada pasien BPH dengan retensi urin.* ***Bahan & Cara:*** *Penelitian analitik observasional dengan pendekatan prospektif dilakukan pada 29 pasien BPH dengan retensi urin pasca TURP di lima rumah sakit di kota Padang mulai dari Januari 2019 sampai Agustus 2019. Data terdiri dari karakteristik dan lama pemakaian kateter didapatkan melalui wawancara menggunakan kuesioner, OABS didapatkan berdasarkan total skor dari kuesioner overactive bladder symptoms score (OABSS)* ***Hasil:*** *Rerata lama pemakaian kateter adalah 14.9 ± 8.0 hari, dan rerata total skor OABSS adalah 4.7 ± 2.5. Uji pearson menunjukkan terdapat korelasi positif dengan kekuatan lemah antara lama pemakaian kateter terhadap total skor OABSS (r = 0.396, p = 0.033)* ***Simpulan:*** *Merupakan hal penting untuk tidak memperlama pemakaian kateter agar terjadi penurunan insidensi dan tingkat keparahan dari OABS pada pasien BPH retensi pasca TURP.*

Kata Kunci: *Benign Prostate Hyperplasia, lama pemekaian kateter, overactive bladder, retensi urin.*

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INTRODUCTION

Transurethral resection of the prostate (TURP) is the gold standard management for patients with lower urinary tract symptoms (LUTS) caused by benign prostate hyperplasia (BPH), especially BPH with complications.[1] Repeated urinary retention is one of the indications to do TURP due to the long-term impact and progression of the disease.[2] The initial treatment for urinary retention in patients with BPH is Foley catheter insertion, followed by TURP as the main treatment for the causative problem.[3] In some cases, storage symptoms of LUTS persist in patients after

undergoing TURP. A previous study found that the most common cause of LUTS was detrusor hyperactivity (54%).[4] Detrusor hyperactivity is often associated with the involuntary contraction of the detrusor muscle and is linked to overactive bladder symptoms (OABS).[5] Detrusor hyperactivity can occur due to changes in the myogenic, neurogenic, and urotheliogenic factors that give rise to OABS, including symptoms such as urgency, frequency, nocturia, and urinary incontinence.[6]

Detrusor hyperactivity can be caused by the physical stimulation of the catheter. Catheter use can stimulate afferent nerves in the bladder, resulting in the release of acetylcholine, which causes involuntary contractions mediated by muscarinic receptors in the detrusor muscle.[7] The use of a catheter may cause irritation of the urinary tract, especially the bladder.[8] Bladder irritation caused by the catheter may cause an uncomfortable feeling, known as catheter-related bladder discomfort (CRBD) that is characterized by an increased urinary frequency, urgency, and pain in the suprapubic region.[9] The incidence of CRBD that occurs in the postoperative period is as much as 47%–90%.[10] Compared with other types of surgery, the incidence of CRBD is higher in patients who underwent urological surgery, and this incidence is much higher in post TURP patients.[11] The high incidence of CRBD in TURP patients is not caused by the surgical technique used but the history of using a catheter before the procedure. In one study, it was found that a history of catheter use before surgery was an independent predictor of the severity of CRBD.[12]

Chronic irritation due to mechanical factors and increased epithelial proliferation caused by catheter use lead to histological changes observed in patients with long-term catheter use.[13] It is suspected that transmitter compounds are released in the mucosal layer of the bladder and affect the spontaneous contraction of the detrusor. Transmitter named urotheliogenic as the origin of intrinsic activity, these compounds are arranged in the mucosal layer to regulate and increase the intrinsic contraction of the detrusor.[14] Currently, however,its causes have not been identified yet because of the many factors that can affect it. We conducted a prospective analysis in Padang, Indonesia, on patients with urinary retention due to BPH who used catheters before undergoing TURP to find out the correlation between the duration of catheter use and the incidence of OABS post TURP.

OBJECTIVE

This study aimed to find out the correlation of catheter use duration with the incidence of OABS post TURP in patients with urinary retention due to BPH.

MATERIAL&METHODS

This is an observational, analytical research with a cohort approach. The respondents are patients with urinary retention due to BPH and were observed from the beginning of urinary retention symptoms and using a catheter until TURP. This research was conducted from January 2019 to August 2019, with respondents coming from the urology departments of several hospitals in Padang, Indonesia, namely Dr. M. Djamil Central General Hospital, Bunda Medical Center Padang General Hospital, Siti Rahmah Islamic Hospital, Naili DBS General Hospital, and Yosudarso Padang General Hospital.

The study population included all patients with urinary retention due to BPH in 2019 in the city of Padang. Inclusion criteria are patients with urinary retention due to BPH who have used a catheter and are able to communicate well verbally, who have been treated with the TURP procedure, can be interviewed after 7 days to 6 weeks after TURP, are able to urinate, and who are willing to become research subjects by agreeing to sign the informed consent. Exclusion criteria are patients with urinary retention due to BPH after TURP with bladder stones, urethral stricture, and neurogenic bladder.

The Indonesian version of the OABSS questionnaire, which assesses urinary frequency, nocturia, urgency, and urge incontinence, among others, and has a very good level of reliability, was the research instrument used. Every component question corresponds to a certain value based on a Likert scale (2, 3, 5, and 5). The scores of each component question related to the severity of a person's OABS were added.

The data were analyzed using univariate and bivariate analyses. A univariate analysis was performed to describe each of the variables studied. Numerical data is normally distributed and is presented as mean ± standard deviation (SD); if the numeric data is not normally distributed, it is presented as the median, minimum, and maximum. Categorical data is presented as the frequency and percentage for each category. A bivariate analysis

was performed to examine the relationship between the independent and dependent variables. The scale of measurement of the numeric variable is between the duration of catheter use and the incident OABS post TURP using the Pearson test if the data is normally distributed or the Spearman test if otherwise. The degree of significance used is 0.05 with a 95% confidence level.

RESULTS

The research data obtained is then tested in a univariate and bivariate manner. The results are shown in Table 1.

Table 1. Characteristics of subjects with post TURP retention BPH.

Variable	n	mean ± SD	Min	Max
Duration of catheter use (days)	29	14.9 ± 8.0	1	150
Total OABSS	29	4.7 ± 2.5	0	12

After univariate analysis, we found that the respondents' average duration of catheter use was 14.9 ± 8 days; the shortest duration of catheter use was one day, and the longest was 150 days. The mean value of the total OABSS variable is 4.7 ± 2.5.

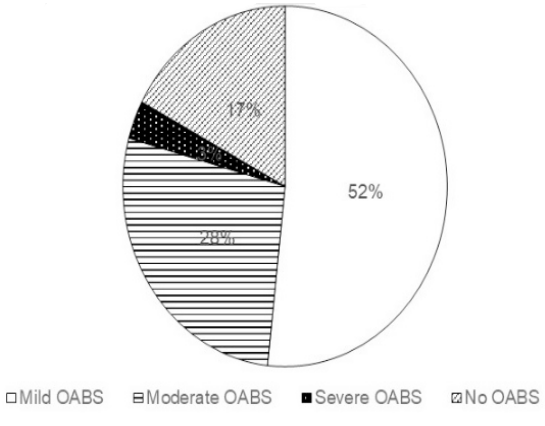

Figure 1. Severity ofrespondents' overactive bladder symptoms.

As shown in Figure 1, the majority of respondents (52%) had mild OABS. The number of respondents with moderate and severe OABS and those who did not experience OABS was 28%, 3%, and 17%, respectively.

The bivariate analysis test used in this study is test Pearson. It is based on the normality test Kolmogorov–Smirnov, data from the two variables, namely the total OABSS score and the duration of catheter use was worn, the values were transformed using the normally distributed Log10 method. As shown in Figure 2, there is a positive relationship between the duration of catheter use and the total OABSS with weak strength, meaning that the longer the catheter is used, the higher the total OABSS (Pearson's r = 0.396; p = 0.033).

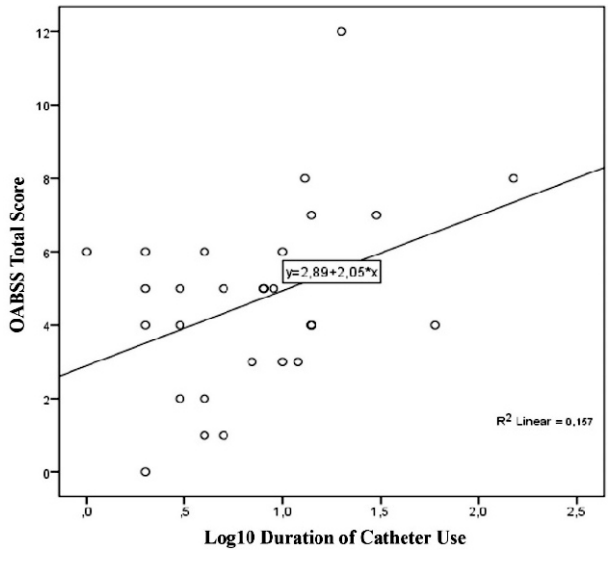

Figure 2. Correlation between duration of catheter use and total OABSS in patients withurinary retention due to BPH post TURP.

DISCUSSION

In this study, the average length of catheter use in patients with pre-TURP retention BPH in several hospitals in Padang was 14.9 days (Table1). In a study in Nigeria, the average duration of using different catheters was 37 days, whereas studies conducted in Europe found an average of 3–5 days.[15-16] The duration of catheter use in patients with chronic urinary retention due to BPH can be affected by comorbidities, such as urinary tract infection and hypertension, among others, and it can also be affected by the catheter used, which includes symptoms such as bleeding, urethral sepsis, pain in the area where the catheter is attached, and catheter obstruction.[15]

In this study, 83% of patients experienced OABSS after TURP at various levels of severity (Figure 1). This is in line with a study in China, where the incidence of CRBD, whose pathophysiology is related to postoperative OABS, which is as high as 47%–90%,[10] in contrast to studies in Italy, where over activity of the detrusor still occurs in 30%–50% of patients after prostatectomy.[17]

The occurrence of storage symptoms after TURP proves that LUTS is not only caused by obstruction of the prostate but can be due to nocturnal polyuria, strictures, neurogenic bladder, and detrusor dysfunction during voiding.[18] Research in Thailand on patients who experienced post TURP BPH found that the most common cause for these storage symptoms is detrusor hyperactivity (54%).[4] The causes of OABS include myogenic, neurogenic, and urotheliogenic changes, BOO, metabolic syndrome, and inflammatory factors.[6]

Long-term catheter use can cause various complications, one of which is CRBD with OABS.[12] The catheter affects changes in the function of the muscarinic receptors, which play a role in the involuntary contraction of the detrusor muscle due to irritation from the catheter.[19] In this study, a positive correlation was found between long-term catheter use and the incidence of OABS, which was assessed through the total OABSS ($p = 0.033$) (Figure 2). These results are in line with those of the research conducted on patients who underwent urological surgery in China, which found that there was a significant correlation between the two variables and became an independent predictor based on multiple logistic regression tests (EXP(B) = 2.458, 95% confidence interval (CI 95%) [1.1–5.9], $p < 0.05$).[12] In contrast, a study in France found that there was no relationship between a history of catheter use and the incidence of CRBD (odds ratio = 1.1, CI 95% [0.4–2.8], p = NS).[20]

Detrusor hyperactivity can be caused by physical stimulation of the catheter. Prolonged use of the catheter can cause histological changes due to chronic irritation of the bladder mucosa and physiological changes due to the replacement of bladder function in the urinary process by the catheter.[7] The urothelium, the outermost layer of the bladder, serves as a protective barrier. Some factors, such as the pH of the bladder tissue, mechanical or chemical trauma, and infection by bacteria, can modulate the function of the urothelium. When the urothelium is damaged, substances such as water, urea, and toxic substances pass through the damaged tissue and cause changes in the properties of the sensory nerves, which leads to OABS.[21]

Chronic irritation due to mechanical factors coupled with increased catheter-induced epithelial proliferation leads to the histological changes observed in patients with prolonged catheter use.[13] In the mucosal layer of the bladder, which is covered by the urothelium, it has been suspected that there are transmitter compounds that are released, which affect the spontaneous contraction of the detrusor.[22] The intrinsic activity in the detrusor is urotheliogenic in origin and serves to regulate and enhance the intrinsic contraction of the detrusor.[14] Catheter use can also stimulate afferent nerves in the bladder, resulting in the release of acetylcholine, which causes involuntary contractions mediated by muscarinic receptors in the detrusor muscle.[9] In the urothelium, there are receptors and ion channels that are thought to have a role in the occurrence of OABS, i.e., cholinergic channels, which include muscarinic receptors, transient receptor potential, and other factors that play a role in OABS.[19]

Long-term catheter use before undergoing TURP may increase detrusor contractions due to reduced bladder capacity and tone.[23] This is a process of adaptation to the urinary process that is interrupted by the catheter, which causes a decrease in bladder capacity, so that when the catheter is no longer used, there is a change in the sensation of urination in the bladder, which is marked by an increase in the frequency of urination.[24]

The weak correlation between the duration of catheter use and the incidence of OABS in this study could be due to other factors that affect OABS. Neurogenic, myogenic, and urotheliogenic factors, as well as BOO, metabolic syndrome, inflammation, and drugs, can influence the occurrence of OABS.[6]

CONCLUSION

In conclusion, optimizing the duration of catheter use can reduce the incidence and severity of OABS in patients with urinary retention due to BPH post TURP.

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