

## Memokath™ Urethral Stents Induce Incontinence in Patients with Urethral Balloon Catheters

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### Abstract

**Objective:** With an aging society, elderly patients increasingly require long-term placement of urethral balloon catheters. In this study, we investigated if Memokath™ urethral stents, when inserted from the bladder neck to distal to the urethral sphincter in elderly men being treated with urethral balloon catheters, induce incontinence, which would then be managed with adult briefs.

**Patients and Methods:** Of all outpatients who were being managed with urethral balloon catheters at our institution from September 2011 through March 2012, 4 patients who had had problems with the catheters were included in the study. Exclusion criteria were a performance status of 1 or 2 and the ability to urinate after standard placement of the stent. After application of local anesthesia to the urethra, the Memokath™ stent was placed distal to the urethral sphincter under radiographic guidance in all patients.

**Results:** After stent placement, all patients had total incontinence and were catheter-free. Although 2 patients were receiving anticoagulant therapy before the procedure, no intraprocedural or postprocedural anticoagulant-related complications were noted.

**Conclusions:** Memokath™ stent-induced incontinence is a safe and effective treatment for patients requiring long-term placement of urethral balloon catheters who are expected to have continuing urination difficulties.

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**Key words:** urethral strictures, balloon catheters, urethral stents, Memokath™, incontinence

### Introduction

For patients with urinary retention associated with obstructive disease or dysfunction in the lower urinary tract (LUT), cholinergic agents,  $\alpha$ -1 adrenergic blockers, or dual 5- $\alpha$ -reductase inhibitors, such as dutasteride, represent the first-line therapy.

Surgical intervention, such as transurethral resection of the prostate, is reserved for patients in whom these agents are ineffective. On the other hand, for patients in whom general anesthesia is considered risky due to the presence of comorbidities, but whose activities of daily living (ADL) are good, insertion of urethral stents in the prostatic urethra often helps relieve LUT obstruction, thereby

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Fig. 1-a The Memokath™ urethral stent

facilitating urination<sup>1</sup>. However, standard urethral stents do not facilitate urination in patients with LUT obstruction who have poor ADL status, tend to be bedridden, or have advanced dementia, and thus urethral balloon catheters are necessary in these patients.

The Memokath™ stent (PNN Medical A/S, Kvistgaard, Denmark) is a nickel-titanium shape-memory alloy stent developed for temporary placement in the urethra (**Fig. 1-a**). The urethral stent used in the present study, Memokath TW, has before placement a 24-Fr coil shaft, the distal end of which extends to up to 44 Fr when heated to 55°C or higher. This stent can be securely fixed in the urethra and softens for easy removal when cooled to 10°C or lower. Stent lengths vary in 1-cm increments, from 3 cm to 8 cm, thus simplifying the choice of stent lengths to meet the needs of individual patient<sup>2</sup>.

In the present study, we investigated the short-

term efficacy of Memokath™ urethral stents in inducing artificial incontinence in patients requiring long-term use of urethral balloon catheters.

### Patients and Methods

Four patients in whom urethral balloon catheters had been inserted at our institution and left in place for at least 1 month, and who had had the catheters replaced on a regular basis, were included in this study. Informed consent for use of Memokath™ urethral stents to induce incontinence was obtained from the family members of all study participants. Inclusion criteria included a poor performance status (PS) (i.e., PS 3 or 4), trouble with urethral balloon catheters (e.g., catheter obstruction or difficulty in catheter removal, including manual removal or spontaneous expulsion), or if they were thought likely to have continued urination difficulties even after standard placement of urethral stents. Prostate size was not included as a criterion.

Before stent placement, cystourethroscopy was performed under local anesthesia to observe the inside of the bladder, to confirm the absence of foreign material, such as a calculus or hair, as a source of the obstruction, and to remove any such material found with an endoscopy forceps. The bladder neck and the colliculus seminalis were then identified and marked under radiographic guidance. The distance from the bladder neck to the external urethral sphincter was measured, and a stent 1 cm longer than the measured length was chosen for each patient. As the Memokath™ stent is available in 1-cm increments, a longer stent length was used for any measured bladder neck-external sphincter length that fell below the decimal point. The urethral stent was then inserted into the target location, extended, and secured with 60°C water injected into the urethra.

Of the patients enrolled, 2 were receiving anticoagulants, which were not discontinued before the procedure. Postprocedural assessments included those for the presence or absence of urination, complications associated with stent obstruction or dislocation, pyuria, and other complications.

Table 1 Patient characteristics

Patient	Age (years)	Performance status	Prostate volume (mL)	Prostate-specific antigen	Comorbidities	Anticoagulant	Duration of balloon catheter placement (months)	Number of self-removals	Stent length (cm)
1	78	4	12.7	0.123	Diabetes mellitus, hypertension	Bayasprin, 100 mg	2	2	7
2	80	3	18	5.19	Parkinson's disease, dementia	None	24	0	8
3	80	4	46	3.19	Diabetes mellitus, liver cirrhosis	None	3	1	8
4	90	4	33.8	5	Dementia	Bayaspirin, 100 mg	1	3	8
Mean	82	3.75	24.8	3.375			7.5	1.5	8



Fig. 1-b Abdominal radiography after stenting

## Results

The characteristics of the 4 patients are shown in **Table 1**. Mean age was  $82 \pm 5.41$  years (range, 78–90 years). The observation period was 164 to 364 days (mean,  $227 \pm 79.0$  days). The PS was 3 in 1 patient and was 4 in 3 patients. The mean prostate volume was  $24.8 \pm 18.6$  mL (range, 10.56–46 mL). The length of the stent used was 7 cm in 1 patient, and 8 cm, the longest available length, in the remaining 3 patients. Three patients (75%) had a history of self-removal of catheters, and 2 patients (50%) were receiving anticoagulant therapy.

After the procedure, all patients achieved near total incontinence, were able to urinate, and were considered eligible for care with adult briefs. **Figure**

**1-b** shows a radiograph obtained after stenting. A postprocedural ultrasound examination revealed little or no residual urine in these patients, whereas transabdominal ultrasound induced incontinence in those with some residual urine, which made it impossible to assess the residual urine volume.

Preprocedural urinary examination showed evidence of urinary tract infections in all patients, whereas, in contrast, a postprocedural examination of the urinary sediment showed fewer than 10 leukocytes per visual field in 3 of the patients and 10 or more leukocytes per visual field in the remaining patient, who, incidentally, had blood stains in his adult briefs about once every 2 months but had no fever.

Hematuria associated with the use of anticoagulants or cardiovascular complications associated with their discontinuation were not seen after the procedure. Currently, it is not done to replace the stent. During follow-up with regular abdominal radiography and ultrasonography for 164 to 364 days (mean,  $227 \pm 79.0$  days), continued to date, no stent expulsion or dislocation has been reported in any of the patients.

## Discussion

In an aging society, elderly patients are becoming increasingly bedridden and dependent upon nursing care. Elderly men often have urination difficulties, necessitating long-term care with balloon catheters,

which is associated with various problems and risks, such as self-removal of catheters, urethral laceration, and catheter obstruction. These problems can have enormous implications, particularly if any of these events occur at night, since they often necessitate catheter replacement at a healthcare facility with no qualified physician immediately available. Therefore, catheter replacement often necessitates referral of the patient to another facility, which itself is associated with a number of problems.

Therefore, in the present study, we attempted to induce artificial incontinence with urethral stents in patients who were drug-refractory, had urinary retention, and were being treated with long-term urethral balloon catheters, to facilitate removal of the balloon catheters and thereafter manage the resultant incontinence with adult briefs. Urethral stents are primarily intended for insertion in the prostatic urethra to relieve LUT obstruction, thereby potentially facilitating urination in patients with prostatic hyperplasia-associated urinary retention in whom general anesthesia is contraindicated because of comorbidities. In addition to being ineligible for general anesthesia, the patients in this study had a poor PS, were bedridden, and were thought likely to continue to have urination difficulties even after the standard placement of urethral stents. Thus, we aimed to induce total incontinence in these patients.

Memokath™ is a temporary urethral stent. Urethral stents have a long research and development history and are available for both temporary and permanent use<sup>3</sup>. However, no guidelines or consensus exists regarding the clinical situations in which permanent and temporary stents, represented by Memotherm™ and Memokath™, respectively, are indicated. Furthermore, because, to our knowledge, no studies similar to ours have been reported in the literature, predicting complications associated with our proposed stent use is difficult. Therefore, in the present study, we elected to use the Memokath™ temporary urethral stent for its ease of removal, should problems arise, in an outpatient setting<sup>4</sup>.

In addition to studies reported in the literature, conference reports also suggest that standard

urethral stent placement is safe and feasible without discontinuing anticoagulants<sup>4,5</sup>. Although discontinuing anticoagulants during stent placement is desirable, we did not do so in the present study because their discontinuation has been associated with unexpected complications and their use during outpatient ureteroscopy does not raise concerns. In fact, anticoagulant use in this study was not associated with any intraprocedural or postprocedural hemorrhagic complications, suggesting that anticoagulants do not need to be discontinued during the proposed procedure. In cases 1 and 2, although the prostatic urethra was short, we used long stents to prevent stent displacement and to ensure urinary incontinence.

Problems associated with urethral balloon catheters represent a major cause of stress for families of patients cared for at home and for healthcare personnel at facilities for the elderly and special nursing homes in Japan, where physicians are not available to deal with catheter-associated problems occurring at night. Making the situation more complex, in either setting, is that the patient's family must find a healthcare facility that can admit the patient and provide the necessary care—a significant burden on both the patient and the family. In the present study, all patients became catheter-free after urethral stent placement, which both pleased the patients' family and caregivers and greatly benefitted patients by encouraging them to perform the complete bed-bath procedure and self-rehabilitation process.

During the short follow-up period of  $227 \pm 79.0$  days of this study, 3 of the 4 patients (75%) became microscopically negative for urinary tract infections after stent placement, while the remaining patient remained positive for infection but had no complications, such as fever requiring hospitalization or urethral stent obstruction. This lack of complications was attributed to the absence of residual urine in these patients. Also, diaper rash associated with urinary incontinence was not observed.

Given the short follow-up of the patients in this study, a further long-term study is required to confirm the study findings. Annual replacement of

Memokath™ stents are recommended, and thus a large-scale study is also required to determine whether these stents can be safely left in place if urine findings remain favorable and whether their continued use is associated with long-term calculus formation.

To the best of our knowledge, the present report is the first to propose a novel approach to inducing incontinence with Memokath™ urethral stents. This approach is a potentially effective way to reduce urinary retention and balloon catheter-dependence in bedridden patients.

### Conclusions

Our proposed induction of incontinence with Memokath™ urethral stents appears to be a safe and effective approach in elderly patients with a poor performance status.

**Conflict of Interest:** The authors declare no conflict of interest.

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