

[여기에 입력]

PEER-REVIEW REPORT

Name of journal: *World Journal of Clinical Cases*

Manuscript NO: 85469

Title: Fournier's gangrene after insertion of thermo-expandable prostatic stent for benign prostatic hyperplasia: A case report

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 00069988

Position: Editorial Board

Academic degree: MD, MSc, PhD

Professional title: Associate Professor, Consultant Physician-Scientist, Doctor, Research Associate, Senior Scientist, Staff Physician, Surgeon

Reviewer's Country/Territory: Croatia

Author's Country/Territory: South Korea

Manuscript submission date: 2023-05-03

Reviewer chosen by: Geng-Long Liu

Reviewer accepted review: 2023-05-13 12:02

Reviewer performed review: 2023-05-13 12:52

Review time: 1 Hour

Scientific quality	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input checked="" type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
Novelty of this manuscript	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No novelty
Creativity or innovation of this manuscript	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No creativity or innovation
Scientific significance of the conclusion in this manuscript	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No scientific significance

[여기에 입력]

Language quality	<input type="checkbox"/> Grade A: Priority publishing <input checked="" type="checkbox"/> Grade B: Minor language polishing <input type="checkbox"/> Grade C: A great deal of language polishing <input type="checkbox"/> Grade D: Rejection
Conclusion	<input type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input type="checkbox"/> Minor revision <input checked="" type="checkbox"/> Major revision <input type="checkbox"/> Rejection
Re-review	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Peer-reviewer statements	Peer-Review: <input checked="" type="checkbox"/> Anonymous <input type="checkbox"/> Onymous Conflicts-of-Interest: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SPECIFIC COMMENTS TO AUTHORS

All comments are put as "comments" in the original Word document of the manuscript.

-> I appreciate for your prudent comment. We replied your all comments in the below original word document.

PEER-REVIEW REPORT

Name of journal: *World Journal of Clinical Cases*

Manuscript NO: 85469

Title: Fournier's gangrene after insertion of thermo-expandable prostatic stent for benign prostatic hyperplasia: A case report

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 03815884

Position: Peer Reviewer

Academic degree: MD

Professional title: Surgeon, Teaching Assistant

Reviewer's Country/Territory: Slovenia

Author's Country/Territory: South Korea

Manuscript submission date: 2023-05-03

Reviewer chosen by: Geng-Long Liu

Reviewer accepted review: 2023-07-08 04:49

Reviewer performed review: 2023-07-08 15:09

Review time: 10 Hours

Scientific quality	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Very good <input checked="" type="checkbox"/> Grade C: Good <input type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
Novelty of this manuscript	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No novelty
Creativity or innovation of this manuscript	<input type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input checked="" type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No creativity or innovation
Scientific significance of the conclusion in this manuscript	<input type="checkbox"/> Grade A: Excellent <input checked="" type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No scientific significance

Language quality	<input type="checkbox"/> Grade A: Priority publishing <input checked="" type="checkbox"/> Grade B: Minor language polishing <input type="checkbox"/> Grade C: A great deal of language polishing <input type="checkbox"/> Grade D: Rejection
Conclusion	<input type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input checked="" type="checkbox"/> Minor revision <input type="checkbox"/> Major revision <input type="checkbox"/> Rejection
Re-review	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Peer-reviewer statements	Peer-Review: <input checked="" type="checkbox"/> Anonymous <input type="checkbox"/> Onymous
	Conflicts-of-Interest: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SPECIFIC COMMENTS TO AUTHORS

Dear Authors, The topic of your paper is interesting. Below you can find my comments:

1) keywords: urethral stents instead of stents - you wrote:

-> I appreciate for your prudent comment. We agreed your comment. We changed this word; urethra stent instead of stents.

2) An 88-year-old man presented to the emergency room with a complaint of a skin color change in the right scrotal area for 1 d. - what was color of the skin? red? brown/black? - you wrote:

-> I appreciate for your prudent comment. This patient initially visited to another hospital for scrotal pain and red color change in right scrotal area for 1 day. However, his symptom aggravated for 7 days, and scrotal skin color was changed to black with foul-smelling. We described the sentence in case presentation part.

3) The patient was administered oral antibiotics for 1 week but the symptoms persisted. - which antibiotic? who prescribed the antibiotic? -

-> I appreciate for your keen comment. This patient initially had the empirical antibiotics; fluoroquinolone (ciprofloxacin) in accordance with epididymitis. We described the sentence in case presentation part.

4) what about medicamentous therapy ? (please add the medications that the patient was taking regularly) - why did you decide to insert stent? what about medicamentous therapy? - you wrote:

-> I appreciate for your keen comment. This patient had a-blocker (silodosin 8mg) and 5-alpha reductase inhibitor (finasteride) for several years due to lower urinary tract

symptom (LUTS). However, this symptom had persisted despite medications. We diagnosed refractory LUTS with bladder outlet obstruction (BOO). So, we decided to insert prostatic stent (Memokath 028). We described the sentence in case presentation part.

5) He was diagnosed with BPH and we planned a transurethral resection of the prostate (TURP). - you diagnosed BPH based just on TRUS and uroflowmetry? BPH is histopathological diagnosis!!!! - you wrote:

-> I appreciate for your keen comment. We completely agree your comments. As mentioned above answer, this patient had a-blocker and 5-alpha reductase inhibitor for several years, but his symptom had persisted. IPSS was 26 points, and the prostate volume was 126cc. Therefore, we diagnosed refractory LUTS with BOO. We described the sentence in case presentation part.

6) Therefore, we performed MIS under local anesthesia and implanted a thermo-expandable urethral stent (Memokath 028) - what kind of local anesthesia? which aesthetic did you use?

-> I appreciate for your keen comment. We used the intraurethral lidocaine gel before procedure. Also, we used the analgesic drug injection intravenously during procedure. Another anesthetic procedure was not performed. We described the sentence in case presentation part.

7) what kind of CT did you performed? - you wrote:

-> I appreciate for your keen comment. We performed abdominal-pelvic enhanced CT in emergency room. We described the sentence in case presentation part.

8) Necrotic tissues throughout the right inguinal region, scrotum, and perineum were resected, and right orchiectomy was performed urgently; the Memokath 028 stent was removed simultaneously using cystoscopy - can you add more data about the urethra and bladder; did you find necrosis in urethra and bladder?

-> I appreciate for your keen comment. In cystoscopy, the anterior and posterior urethra were intact, but prostatic urethra was erythematous change after removal of stent. In bladder, multiple erythematous mucosal change was identified in cystoscopy. We

described the sentence in case presentation part.

9) have you send any samples (if yes, which) for microbiology evaluation?

-> I appreciate for your prudent comment. We performed the microbiological evaluation in urine, blood, wound, and prostatic stent. We described these result in table 1.

10) when did you start antibiotic treatment? which antibiotics/doses?

-> I appreciate for your prudent comment. We started antibiotics treatment before extended surgical debridement and persisted after debridement. As mentioned above case presentation part, we used meropenem (0.5g twice daily), vancomycin (1g twice daily), and clindamycin (0.6g thrice daily) intravenously. We described the sentence in case presentation part.

11) did you change antibiotic therapy? which microorganisms were isolated? - you wrote:

-> I appreciate for your prudent comment. We did not change antibiotics therapy, as a consultation of infectious disease. The type of isolated microorganism was described in table 1. We described the sentence in case presentation part.

12) The treatment of FG involves emergency surgical drainage and the use of extended broad-spectrum antibiotic. - in patients with FG we are performing necrectomy!!! not drainage

-> I appreciate for your prudent comment. We completely agree your comments. We performed the extended surgical debridement, not simple drainage. We changed the word in case presentation part.

13) please mark clearly the structures on the CT images (stent, bladder, prostatic urethra, subcutaneous emphysema...) you can cite the following article: 1. Sethi K, Bozin M, Jabane T, McMullin R, Cook D, Forsyth R, Dodds L, Putra LJ. Thermo-expandable prostatic stents for bladder outlet obstruction in the frail and elderly population: An underutilized procedure? *Investig Clin Urol.* 2017 Nov;58(6):447-452. doi: 10.4111/icu.2017.58.6.447. Epub 2017 Oct 23. PMID: 29124245; PMCID: PMC5671965.

-> I appreciate for your prudent comment. We marked the structures on CT Image using arrows (figure 3). Also, we cited your suggested article.

PEER-REVIEW REPORT

Name of journal: *World Journal of Clinical Cases*

Manuscript NO: 85469

Title: Fournier's gangrene after insertion of thermo-expandable prostatic stent for benign prostatic hyperplasia: A case report

Provenance and peer review: Unsolicited Manuscript; Externally peer reviewed

Peer-review model: Single blind

Reviewer's code: 02513151

Position: Peer Reviewer

Academic degree:

Professional title:

Reviewer's Country/Territory: Reviewer_Country

Author's Country/Territory: South Korea

Manuscript submission date: 2023-05-03

Reviewer chosen by: Geng-Long Liu

Reviewer accepted review: 2023-07-08 20:01

Reviewer performed review: 2023-07-08 20:07

Review time: 1 Hour

Scientific quality	<input checked="" type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Very good <input type="checkbox"/> Grade C: Good <input type="checkbox"/> Grade D: Fair <input type="checkbox"/> Grade E: Do not publish
Novelty of this manuscript	<input checked="" type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No novelty
Creativity or innovation of this manuscript	<input checked="" type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No creativity or innovation
Scientific significance of the conclusion in this manuscript	<input checked="" type="checkbox"/> Grade A: Excellent <input type="checkbox"/> Grade B: Good <input type="checkbox"/> Grade C: Fair <input type="checkbox"/> Grade D: No scientific significance
Language quality	<input checked="" type="checkbox"/> Grade A: Priority publishing <input type="checkbox"/> Grade B: Minor language polishing <input type="checkbox"/> Grade C: A great deal of language polishing

	<input type="checkbox"/> Grade D: Rejection
Conclusion	<input checked="" type="checkbox"/> Accept (High priority) <input type="checkbox"/> Accept (General priority) <input type="checkbox"/> Minor revision <input type="checkbox"/> Major revision <input type="checkbox"/> Rejection
Re-review	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Peer-reviewer statements	Peer-Review: <input type="checkbox"/> Anonymous <input checked="" type="checkbox"/> Onymous
	Conflicts-of-Interest: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

SPECIFIC COMMENTS TO AUTHORS

Excellent manuscript

-> I appreciate for your prudent comment.

25 **Abstract**

26 **BACKGROUND**

27 Thermo-expandable urethral stent (Memokath 028) implantation is an alternative
28 treatment for older patients with lower urinary tract symptoms and benign prostatic
29 obstruction. Following prostatic urethral stent implantation, minor complications
30 such as urinary tract infection, irritative symptoms, gross hematuria, and urethral
31 pain have been observed; however, there are no reports of life-threatening events.
32 Herein, we report a critical case of Fournier's gangrene that occurred 7 years after
33 prostatic stenting.

34
35 **CASE SUMMARY**

36 An 81-years-old man with benign prostatic hyperplasia (volume, 126 ccs; as measured
37 by transrectal ultrasound) had undergone insertion of a thermos-expandable urethral
38 stent (Memokath 028) as he was unfit for surgery under general anesthesia.
39 Additionally, the patient had undergone a suprapubic cystostomy for recurrent acute
40 urinary retention 4 years after the initial procedure. We had planned to remove the
41 Memokath 028; however, the patient was lost to follow-up. The patient presented to
42 the emergency department 3 years after the second procedure with necrotic changes
43 from the right scrotum to the right inguinal area. He was diagnosed with Fournier's
44 gangrene based on the physical examination and computed tomography findings.
45 Therefore, he underwent emergency drainage and removal of the Memokath 028.
46 Broad-spectrum intravenous antibiotics were administered and necrotic tissue
47 debridement was performed. However, the patient died 14 days after surgery due to
48 sepsis.

49
50 **CONCLUSIONS**

51 If Memokath 028 is ineffective for benign prostatic hyperplasia in older patients, its
52 rapid removal may help prevent severe complications.

53
54 **Keywords:**

55 Stents, minimally invasive surgery, complication, Fournier's gangrene, Benign

批注 [GA1]: What initial procedure. Please specify.

批注 [영김2R1]: This procedure is the insertion of a thermo-expandable urethral stent (Memokath 028)

批注 [GA3]: Specify any of FG severity index values. It is important for prognosis.

批注 [영김4R3]: FG severity index (FGSI) value is 7 point in this patient.

批注 [GA5]: Can you specify what kind of drainage, what space. For FG debridement is the only treatment.

批注 [영김6R5]: This drainage was not simple drainage, such as aspiration. We performed excision of the necrotic tissue and debridement.

批注 [GA7]: From reading the Abstract, there is no clear connection between FG and prostate stenting.. The patient was unfit for surgery 8no additional data in the abstract). Maybe these comorbid conditions were the cause of FG.

批注 [영김8R7]: I agreed your concern. The prostatic urethral stent may be not main cause of FG. However, as you see a discussion part, we thought that this FG related the right epididymo-orchitis and prostatic urethral stent may provoke this epididymo-orchitis. Also, the long-term unnecessary indwelled state of prostatic urethral stent can lead to lower urinary tract infection, such as prostatitis and urethritis, because of foreign body reaction in urethra. Therefore, the long-term indwelled state of prostatic urethral stent may cause the prostatitis and urethritis and these infection can lead to epididymo-orchitis and necrotic change of scrotum.

批注 [GA9]: Please specify which stents, the location

批注 [영김10R9]: The location is prostatic urethra.

56 prostatic hyperplasia, case report

57

58 **Core tip:** Herein, we report a life-threatening complication occurring several years
59 after Memokath 028 implantation in an older and frail patient with benign prostatic
60 hyperplasia for the first time. Memokath 028 is a permanent stent and additional
61 urinary diversion procedures, including suprapubic cystostomy, were performed on
62 the patient 3 years before Fournier's gangrene occurred. However, our report suggests
63 that severe complications associated with genitourinary organ infection may occur in
64 patients with risk factors for Fournier's gangrene unless the stent is removed. This
65 report provides a good example of the management of patients with permanent or
66 temporary prostatic stents for benign prostatic hyperplasia.

67

68 INTRODUCTION

69 Bladder outlet obstruction (BOO) associated with benign prostatic hyperplasia (BPH)
70 is a common cause of lower urinary tract symptoms (LUTS). In men, the incidence of
71 BOO with BPH increases with age, affecting up to 80% of men by 70 years of age^[1].
72 Currently, the surgical treatment options for BPH vary among patients with BPH
73 refractory to medical therapy^[2]. Minimally invasive surgery (MIS) for frail and older
74 patients with BPH has recently been developed^[3].

75 Prostatic urethral stenting is an MIS technique used to treat BPH. This has evolved
76 with the development of materials, procedures, shapes, and plasticity^[4]. Memokath
77 028 (Pnn Medical, Denmark) is a non-epithelializing thermo-expandable prostatic
78 urethral stent made of nickel and titanium^[5]. In a previous study, Memokath 028
79 implantation reduced the International Prostate Symptom Score (IPSS) and improved
80 uroflowmetry parameters^[6]. It is also a feasible option for frail and older patients with
81 refractory to medical treatment of BPH who are contraindicated for surgery under
82 general anesthesia^[7].

83 Some cases of minor complications following Memokath 028 implantation have been
84 reported^[8]. However, to our knowledge, there are no reports of fatal complications of

批注 [GA11]: Is it necessary to have "case report" as a keyword

批注 [영김12R11]: This journal requested the 'case report' as a key word.

批注 [GA13]: In the core tip as well as Abstract we are not aware of any conditions that can lead to FG

批注 [영김14R13]: We agreed your comment. We deleted 'risk factors' and changed to 'elderly'.

批注 [GA15]: I do not think that this last sentence fit to this case report. The case report is about FG not about connection of benign prostatic hyperplasia and stent placement. And until this part of the text there is no connection with the cause of FG.

批注 [영김16R15]: As mentioned above, we thought that long-term indwelled state of prostatic urethral stent may lead to urethritis and prostatitis because this stent is foreign body and these infections can lead to epididymo-orchitis and even FG in some patients. Therefore, we concluded that unnecessary and long-term indwelling stent may have the relation of FG.

批注 [GA17]: Why only for frail patients. The method should be effective in the first place. If effective it should be done to everyone if it is minimally invasive.. Please do some research and put another references.

批注 [영김18R17]: This sentence means that minimally invasive surgery (MIS) for BPH is 'also' effective technique for older and frail patients, not mean 'only' for older and frail patients. In many studies, MIS for BPH is effective and safe method in patients who fit the indication for MIS for BPH. We attached another references.

批注 [GA19]: Can the authors specify which operation. And does that mean that surgery is still better option

批注 [영김20R19]: This operation is BPH surgery. Also, surgery is still better option as guideline.

85 Memokath 028 implantation. Herein, we report a critical case of Fournier's gangrene
86 (FG) in a patient who had undergone Memokath 028 insertion for BPH.

批注 [GA21]: After the revision of the text please modify this statement. Until here we do not have any proof that FG is from stenting.

88 CASE PRESENTATION

89 *Chief complaints*

90 An 88-year-old man presented to the emergency room with a complaint of a skin
91 color change in the right scrotal area for 1 d.

批注 [영김22R21]: We agreed your concern. We attached another paragraph for reason that why prostatic urethral stent could lead to FG in this patient in discussion part.

93 *History of present illness*

94 The patient had right scrotal pain for 1 week before presenting with a skin color
95 change in the right scrotal area. The patient was administered oral antibiotics for 1
96 week but the symptoms persisted.

批注 [GA23]: First, specify antibiotics and the dose. Second, why not iv. antibiotics initially.

批注 [영김24R23]: This patient had oral fluoroquinolone for 7 days. The reason for not used intravenous antibiotics initially may be that the symptom was not severe. Also, the initial treatment was performed in another medical center because of hometown.

98 *History of past illness*

99 Seven years prior, the patient had visited the urology department for voiding
100 dysfunction. The total IPSS score was 26, and the Quality of Life (QoL) score was 5.
101 On uroflowmetry, the maximal flow rate (Q_{\max}) was 6.5 mL/sec, voiding volume was
102 182 mL, and residual urine volume was 258 mL. The prostate volume was 126 cc on
103 transrectal ultrasonography (TRUS). He was diagnosed with BPH and we planned a
104 transurethral resection of the prostate (TURP). However, he was not suited for surgery
105 under general anesthesia because of a high American Society of Anesthesiologists
106 (ASA) score: history of myocardial infarction (MI), cerebrovascular accident (CVA),
107 and chronic obstructive pulmonary disease (COPD). Therefore, we performed MIS
108 under local anesthesia and implanted a thermo-expandable urethral stent (Memokath
109 028) (Figure 1). Six months after surgery, the Q_{\max} was 14.8 mL/sec and the residual
110 urine volume was 85 mL. Thereafter, he did not visit our urology department. The
111 patient had undergone a suprapubic cystostomy 4 years after the initial surgery at a
112 local medical center.

批注 [GA25]: The patient was not suited for general anesthesia. Please write comorbid conditions of the patients. Consult the anesthesiologist which contraindicated general anesthesia. The age is only a number. Comorbid conditions could increase the risk of FG. Also Was the urinalysis naand urine culture made. See my previous comment on antibiotics.

批注 [영김26R25]: As mentioned below, he had several disease; COPD, MI, and CVA. We consulted to anesthesiologist due to comorbidity. This operation was not absolute contraindication, but postoperative complications, such as heart and CVA re-attack, respiratory failure, could be highly occurred. We additionally described urinalysis and urine culture in Table 1.

批注 [GA27]: What about spinal anesthesia

批注 [영김28R27]: This patient had spine problem, as spinal stenosis. So, spinal anesthesia cannot be performed in this patient.

批注 [GA29]: Can the authors specify how was the local anesthesia administered. And for which localization.

批注 [영김30R29]: We used the intraurethral lidocaine instillation.

批注 [GA31]: What was the indication. Probably the stent was not working correctly. Please make it clear.

批注 [영김32R31]: This patient had voiding symptom and urinary retention, so prostatic urethral stent may be not working, probably

114 *Personal and family history*

115 No relevant personal or family history was identified.

116

117 *Physical examination*

118 On physical examination, the patient's blood pressure was 110/70 mmHg, heart rate
119 was 90/min, body temperature was 36.0°C, and oxygen saturation was 96% in room
120 air. The skin color change indicated necrosis and ranged from the right lower
121 abdomen to the right scrotum (Figure 2). The left lower abdomen, left scrotum, and
122 penis were normal.

123

124 *Laboratory examinations*

125 The levels of several serum inflammatory markers were elevated. The white blood
126 cell count was 13.62 /uL, C-reactive protein level was 23.79 mg/dL, procalcitonin
127 level was 7.12 ng/mL, serum lactate level was 3.5 mmol/L, serum creatinine level was
128 2.47 mg/dL, and serum glucose level was 33 mg/dL.

129

130 *Imaging examinations*

131 Computed tomography (CT) revealed emphysematous changes and inflammatory
132 infiltration in the right inguinal, suprapubic, scrotal, and perineal regions (Figure 3).
133 In addition, the prostatic urethral stent was observed in the enlarged prostate (Figure
134 3).

135

136 FURTHER DIAGNOSTIC WORK-UP

137 No further diagnostic work-up was required.

138

139 FINAL DIAGNOSIS

140 The final diagnosis was Fournier's gangrene.

141

142 TREATMENT

143 Necrotic tissues throughout the right inguinal region, scrotum, and perineum were
144 resected, and right orchiectomy was performed urgently; the Memokath 028 stent was
145 removed simultaneously using cystoscopy (Figure 4). After surgery, the patient's
146 condition worsened, and he was promptly admitted to the intensive care unit (ICU)

批注 [GA33]: FG is characterized with "black spot" as initial clinical sign. There is no description of that. There are many subgroups of subcutaneous or skin infections. Some of these are necrotizing. FG is necrotizing infection of specific area. Please consult the excellent reference [Rectal cancer and Fournier's gangrene - current knowledge and therapeutic options - PubMed \(nih.gov\)](#). Also, please use some of the FG severity indexes so we can have the orientation on the severity of necrotizing infection.

批注 [영 김34R33]: He had initially scrotal swelling and 'red' skin color change of right scrotum for 1 day. However, we could not see initial physical status of right scrotum because he visited to another hospital initially. After 7 days, the scrotal skin color was changed to 'black' with foul-smelling and he visited to our hospital. This skin color change was identified at specific area such as right inguinal and scrotal area. FCSI value is 7 point. Also, we attached above article which your recommended article.

批注 [GA35]: Were there any changes in the prostate or around the prostate. Was the stent working properly. How about voiding parameters.

批注 [영 김36R35]: In cystoscopy, prostatic urethra changed to erythematous mucosa after removal of prostatic stent. On CT image, no definite change around prostate was identified. However, on digital rectal examination, tenderness of prostate was

批注 [GA37]: From the above mentioned there is no strong clinical confirmation of FG.

批注 [영 김38R37]: We diagnosed FG because of CT imaging and physical examination. On CT image, subcutaneous emphysema was identified at right inguinal, scrotum, and perineum. Also, necrotic

批注 [GA39]: Organ is resected, the tissues are excised

批注 [영 김40R39]: We changed to 'excised'.

批注 [GA41]: Why orchiectomy. Again please consult the reference [Rectal cancer and Fournier's gangrene - current knowledge and therapeutic options - PubMed \(nih.gov\)](#)

批注 [영 김42R41]: In operation field, right spermatic cord and epididymis changed to necrosis. Also, subcutaneous tissue was changed to necrotic status along right spermatic cord and epididymis.

批注 [GA43]: Was the suprapubic cystoscopy in place. What about urine output.

批注 [영 김44R43]: This cystoscopy was performed through urethra not suprapubic tract. In terms of urine output, shutdown of urine output postoperative 1 day. Before surgery, he said urine

147 for management. Mechanical ventilation, broad-spectrum antibiotics administration,
148 and total parenteral nutrition were required in the ICU. Meropenem (0.5 g twice daily),
149 vancomycin (1 g twice daily), and clindamycin 0.6 g thrice daily) were administered
150 intravenously. Hemodialysis was initiated on postoperative day 1 due to the
151 shutdown of urine output. Necrotic tissues were debrided several times
152 postoperatively. Despite the intensive management, the patient's condition did not
153 improve and he died on postoperative 14 days.

154

155 OUTCOME AND FOLLOW-UP

156 On postoperative day 14, the patient died due to sepsis.

157

158 DISCUSSION

159 FG is a necrotizing fasciitis that involves the perineal, perianal, or genital areas^[9]. FG
160 can progress rapidly and cause sepsis, multiorgan failure, and even death. The
161 treatment of FG involves emergency surgical drainage and the use of extended broad-
162 spectrum antibiotics^[10]. Despite a combination of well-timed surgical and medical
163 treatments, the mortality rate associated with FG is high^[11]. The fatality rates of FG
164 were reported to be approximately 16% and 8.8% in the 1900s and the 2000s,
165 respectively^[12]. AEE *et al.* demonstrated that the comorbid risk factors for mortality in
166 FG were diabetes, heart disease, renal failure, and kidney disease^[13]. Sugihara *et al.*
167 reported that old age, sepsis, and a broad range of FG debridement were associated
168 with a high mortality rate^[11]. The cause of death in FG has been associated with sepsis
169 and multiorgan failure^[13]. Herein, the patient had diabetes and heart disease (MI).

170 As mentioned earlier, prostatic stents for LUTS with BOO have been developed over
171 several decades and their application is feasible in frail and older men who are
172 contraindicated for conventional BOO surgery^[7]. Perry *et al.* reported the long-term
173 outcomes of older patients who underwent Memokath 028 placement for LUTS with
174 BOO^[6]. This previous study demonstrated that Memokath 028 was a valuable
175 treatment option for frail and older patients who could not undergo surgery. In our
176 case, the patient was 81 years old and not suited for surgery because of a high ASA
177 score. Although the prostate volume was large (approximately 126 ccs), the IPSS and

批注 [GA45]: What about swabs. What bacteria were found. What about antibiogram. Was there a need for change in antibiotics. From the photo of debridement it was obvious that further debridement was necessary because it was incomplete. To save a FG patient initial debridement is crucial. Are there photos of the final situation after the last debridement.

批注 [영검46R45]: We completely agree your comments. The isolated microorganisms were described in table 1. In last wound culture, no growth is identified. The change of antibiotics was not performed as consultation of infectious disease

批注 [GA47]: This is very nonspecific. Can you describe in more detail the last several days and what was the management in that part.

批注 [영검48R47]: We described about last several days.

批注 [GA49]: This is not the correct term and this can lead to higher mortality. Early extensive debridement not drainage is the key. Please consult

批注 [영검50R49]: The term of 'drainage' change to 'early extensive debridement' and this reference was added.

批注 [GA51]: There is no well timed surgery. It should be as early as possible. Antibiotics cannot cure NECROTIZING infection because antibiotics

批注 [영검52R51]: This sentence did not mean 'well-timed surgery' in this case. In general, treatment of FG is well-timed surgical debridement

批注 [GA53]: The authors did not mention any comorbid condition in their patient.

批注 [영검54R53]: This article is about meta-analysis for the comorbid risk factors for mortality in FG. In this article, diabetes, heart disease, renal

批注 [GA55]: Please put that in the part about medical history. Was the diabetes regulated. What was the value of A1c. Heart disease is also not

批注 [영검56R55]: He had diabetes mellitus (DM) and his HbA1C was 6.0. His blood sugar was controlled in oral medication (metformin) for DM.

批注 [GA57]: In the previous text it is written 88 years old.

批注 [영검58R57]: He was 81 years old when the insertion of the prostatic stent performed.

批注 [GA59]: Please include the reasons for high ASA score. Also the ASA score is determined. Please include the number for ASA score.

批注 [영검60R59]: He had poor-controlled COPD and his ASA score is 3 point (one or more condition of severe systematic disease).

178 uroflowmetry parameters improved after Memokath 028 implantation. In addition,
179 no aggravation of symptoms was observed during the follow-up period after surgery.
180 Meanwhile, the rate of complications following Memokath 028 placement was shown
181 to be low in previous studies. Lee et al. reported that 3 of their 15 patients experienced
182 minor complications after Memokath 028 implantation, such as dysuria and perineal
183 discomfort^[7]. In a study on the 8-year outcomes of Memokath 028 implantation, the
184 majority of complications were minor, such as migration, pain, or incontinence^[6].
185 Severe and fatal complications after Memokath 028 implantation have not been
186 reported in previous studies. Herein, we report a life-threatening complication that
187 occurred several years after Memokath 028 insertion for the first time. We concluded
188 that the cause of death in our patient was sepsis due to FG from the right epididymo-
189 orchitis associated with the Memokath 028.

190 Our patient had undergone a suprapubic cystostomy in a local urologic clinic 3 years
191 before the diagnosis of FG for acute urinary retention. Despite the suprapubic
192 cystostomy, FG occurred in this patient. Igawa *et al.* demonstrated that urethral
193 catheterization was associated with epididymitis^[14]. Our patient had a Memokath 028
194 implant, which might have provoked prostatitis and epididymitis, similar to urethral
195 catheterization. Many studies on the efficacy of the Memokath 028 have reported that
196 it is a permanent stent, and only minor complications occur during the indwelled state.
197 To prevent severe complications, such as urosepsis or FG, we believe that the
198 Memokath 028 stent should have been removed when the patient had undergone the
199 suprapubic cystostomy. In addition, with the development of anesthetic techniques
200 and MIS for BPH, other MIS techniques, such as anatomical endoscopic enucleation
201 of the prostate or robot-assisted simple prostatectomy, may have been effective in this
202 patient who had a large prostate volume exceeding 100 ccs.

204 CONCLUSION

205 Although most complications after Memokath implantation 028 for BPH are minor,
206 life-threatening complications, such as FG, can occur in older and frail patients. To
207 avoid severe complications, when Memokath 028 is ineffective, its rapid removal may
208 be helpful in older and frail patients.

批注 [GA61]: Then why suprapubic cystostomy for this patient after 3 years in another hospital.

批注 [영김62R61]: He had acute urinary retention after 3 years and another hospital was in his hometown. Our medical center was far from his hometown.

批注 [GA63]: What is the proof that epididymo orchitis was from the stent after so many years. Could be be from the diabetes itself. You must confirm the casual relationship. There is no single urinalysis or urine culture in this case report.

批注 [영김64R63]: We agreed your concern. In a result of microorganisms, same bacteria was isolated in urine culture, wound culture, and prostatic stent culture. So, we anticipated that dirty prostatic stent may be caused to the necrotic change of right spermatic cord and epididymis and this clinical course can be lead to FG. The results single urinalysis and urine culture were described in case presentation part and table 1.

209
210
211
212
213
214

215
216
217
218
219
220
221
222
223
224
225
226
227
228
229
230
231
232
233
234
235
236
237
238

ACKNOWLEDGMENTS

This work was supported by the 2021 Yeungnam University Research Grant

REFERENCES

1. Egan KB. The Epidemiology of Benign Prostatic Hyperplasia Associated with Lower Urinary Tract Symptoms: Prevalence and Incident Rates. *Urol Clin North Am* 2016;43:289-297.
2. Dornbier R, Pahouja G, Branch J, McVary KT. The New American Urological Association Benign Prostatic Hyperplasia Clinical Guidelines: 2019 Update. *Curr Urol Rep.* 2020;21:32.
3. Franco JVA, Jung JH, Imamura M, Borofsky M, Omar MI, Escobar Liquitay CM, Young S, Golzarian J, Veroniki AA, Garegnani L, Dahm P. Minimally invasive treatments for benign prostatic hyperplasia: a Cochrane network meta-analysis. *BJU Int.* 2022;130:142-156.
4. Vanderbrink BA, Rastinehad AR, Badlani GH. Prostatic stents for the treatment of benign prostatic hyperplasia. *Curr Opin Urol.* 2007;17:1-6.
5. Poulsen AL, Schou J, Ovesen H, Nordling J. Memokath: a second generation of intraprostatic spirals. *Br J Urol* 1993; 72:331-334.
6. Perry MJ, Roodhouse AJ, Gidlow AB, Spicer TG, Ellis BW. Thermo-expandable intraprostatic stents in bladder outlet obstruction: an 8-year study. *BJU Int.* 2002;90:216-223.
7. G Lee, S Marathe, S Sabbagh, J Crisp. Thermo-expandable intra-prostatic stent in the treatment of acute urinary retention in elderly patients with significant co-morbidities. *Int Urol Nephrol.* 2005;37:501-504.
8. Armitage JN, Rashidian A, Cathcart PJ, Emberton M, van der Meulen JH. The thermo-expandable metallic stent for managing benign prostatic hyperplasia: a systematic review. *BJU Int.* 2006;98:806-810.
9. Hakkarainen TW, Kopari NM, Pham TN, Evans HL. Necrotizing soft tissue

infections: review and current concepts in treatment, systems of care, and outcomes.
Curr Probl Surg. 2014;51:344-362.

10. Chernyadyev SA, Ufimtseva MA, Vishnevskaya IF, Bochkarev YM, Ushakov AA, Beresneva TA, Galimzyanov FV, Khodakov VV. Fournier's Gangrene: Literature Review and Clinical Cases. Urol Int. 2018;101:91-97.

11. Sugihara T, Yasunaga H, Horiguchi H, Fujimura T, Ohe K, Matsuda S, Fushimi K, Homma Y. Impact of surgical intervention timing on the case fatality rate for Fournier's gangrene: an analysis of 379 cases. BJU Int. 2012;110:E1096-1100.

12. Eke N. Fournier's gangrene: a review of 1726 cases. Br J Surg 2000;87:718-728.

13. El-Qushayri AE, Khalaf KM, Dahy A, Mahmoud AR, Benmelouka AY, Ghozy S, Mahmoud MU, Bin-Jumah M, Alkahtani S, Abdel-Daim MM. Fournier's gangrene mortality: A 17-year systematic review and meta-analysis. Int J Infect Dis. 2020;92:218-225.

14. Igawa Y, Wyndaele JJ, Nishizawa O. Catheterization: possible complications and their prevention and treatment. Int J Urol. 2008;15:481-485.

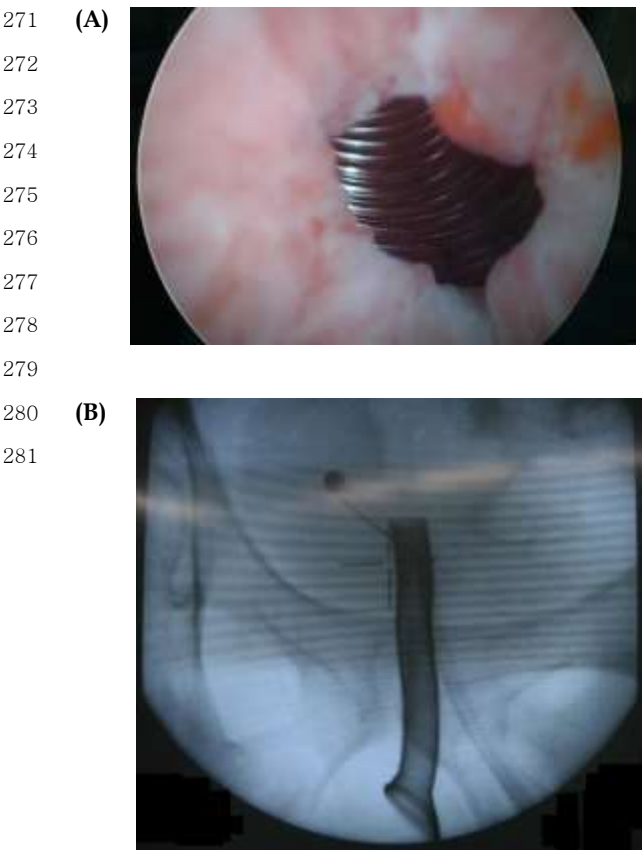
Footnotes

Informed consent statement: Informed written consent was obtained from the legal representative of the patient for the publication of this report and any accompanying images.

Conflict-of-interest statement: The authors declare that they have no conflict of interest to disclose.

CARE Checklist (2016) statement: The authors have read the CARE Checklist (2016), and the manuscript was prepared and revised according to the CARE Checklist (2016).

266 **Figure Legends**
267 **Figure 1**
268 **The insertion of thermo-expandable prostatic stent (Memokath 028) in cystoscopy**
269 **(A) and C-arm view (B).**



批注 [GA65]: Is it normal to see the stent throughout the cystoscopy view. Please clarify in the main text or figure text

批注 [영김66R65]: This cystoscopy was conducted 7 years ago during the insertion of thermo-expandable prostatic stent. He had only 'kissing sign'. Please re-check following sentence to this figure 1.

282 **Figure 2**
283 **The initial finding of necrotic skin lesion in right scrotum and inguinal area.**
284



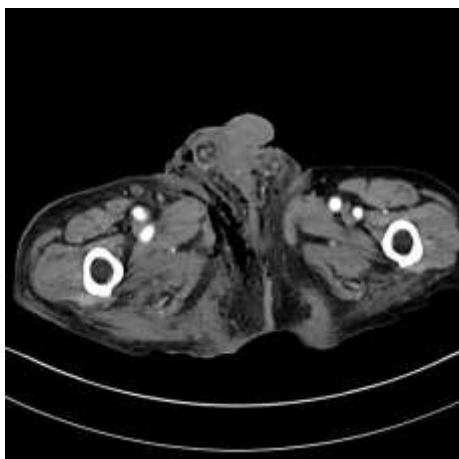
批注 [GA67]: The skin changes look necrotic. What does not resemble FG clinically is that the are of necrosis is homogenous and there is no redness and edema in the surrounding tissues.

批注 [영김68R67]: He had symptom of redness and swelling of right scrotum initially. However, he initially visited another hospital and administrated antibiotics. After that, This symptom was aggravated and skin color of right scrotum changed to as this figure. The evidence of diagnosis for FG was CT findings (abscess formation and gas-forming appearance in right scrotum) and clinical course of disease (initially redness and swelling of right scrotum).

Figure 3

The initial computed tomography of this patient. (A) showed the emphysematous and inflammatory change in right scrotum and perineum. (B) revealed the thermo-expandable prostatic stent (Memokath 028) in huge prostate.

(A)



(B)



302 **Figure 4**
303 **The gross findings after emergent surgical drainage of Fournier’s gangrene in right**
304 **inguinal, scrotum, and perineum.**



批注 [GA69]: This is inadequate excision for FG. All necrotic tissue should be removed. Completeness of excision is confirmed with vital (bloody) borders,. In other words, some bleeding should be visible. Also, what is telling against FG, is the absence of the reddish-brown, foul-smelling fluid (“dishwater fluid”). Please again consult the reference [Rectal cancer and Fournier's gangrene - current knowledge and therapeutic options - PubMed \(nih.gov\)](#)

批注 [영김70R69]: Initially, we incompletely performed the extended surgical debridement and excision of necrotic tissue because of unstable vital sign during operation. However, foul-smelling fluid was identified in necrotic tissue during operation. We attached your recommended article in reference part.