Case Report

Life-threatening urethral hemorrhage after placement of a Foley catheter in a patient with uroseptic disseminated intravascular coagulation due to chronic urinary retention induced by untreated benign prostatic hyperplasia

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Case: A 77-year-old man with severe septic disseminated intravascular coagulation following urinary infection was transported to our hospital. He had developed urinary retention induced by untreated prostatic hyperplasia. Immediate drainage with a Foley catheter was successfully carried out, but the hematuria progressed to life-threatening hemorrhage.

Outcome: Complete hemostasis was impossible by surgical treatment because the tissue around the prostatic urethra was very fragile and hemorrhagic. Organized treatments (continuous hemodiafiltration combined with polymyxin-B immobilized fiber column hemoperfusion and systemic treatment with antibiotics and coagulation factors) were commenced soon after the operation. The patient eventually recovered from the septic disseminated intravascular coagulation.

Conclusion: This case report illustrates the risk of placement of Foley catheters in patients with severe septic disseminated intravascular coagulation.

Key words: Benign prostatic hyperplasia, chronic urinary retention, PMX, septic DIC, urethral hemorrhage

INTRODUCTION

URINARY RETENTION, MAINLY induced by lower urethral obstruction secondary to benign prostatic hyperplasia (BPH), is classified as either acute or chronic. Acute urinary retention is frequently induced by excessive alcohol drinking or intake of antihistamine drugs. Urinary function is maintained in most patients, who therefore experience severe pain. Chronic urinary retention frequently occurs in older people. Obstruction progresses until the bladder is chronically filled with urine, resulting in paradoxical incontinence. Many older patients with advanced chronic urinary retention cannot feel the occurrence of micturition. A full urinary bladder may be associated with a high risk of infection, and repeated inflammatory reactions induce fragility of the urethral tissue. We herein describe a case of life-threatening urethral hemorrhage after placement of a Foley catheter in a patient with uroseptic disseminated intravascular coagulation (DIC) due to chronic urinary retention induced by untreated BPH.

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CASE

A 77-YEAR-OLD MAN with a severe consciousness disorder was transported to our emergency department by an emergency medical service. His initial vital signs were as follows: consciousness level, 4 points by Glasgow Coma Scale; respiratory rate, 36 breaths/min; systolic blood pressure, 98 mmHg; and body temperature, 35.2°C. The patient's blood glucose concentration was 56 mg/dL, but increased to 105 mg/dL after administration of 40 mL of 50% glucose. His consciousness did not recover, although brain computed tomography showed no abnormalities. Laboratory findings showed severe renal dysfunction and metabolic acidosis (blood urea nitrogen, 209 mg/dL; creatinine, 7.8 mg/dL; estimated glomerular filtration rate, 6 mL/min; pH, 7.26; base excess, −18.9 mmol/L). The patient also showed symptoms of severe septic DIC (white blood cell

count, 47,200 μ/L; C-reactive protein, 27.3 mg/dL; procalcitonin, 92.2 ng/mL; platelets, 35,000 μ/L; prothrombin time–international normalized ratio, 1.25; fibrin/fibrinogen degradation products, 24.4 μg/mL). Physical examination revealed marked swelling of the patient's lower abdomen. Echography showed a severely distended bladder and bilateral hydronephrosis. According to an interview with the patient's son, the patient had been diagnosed with BPH but had never been treated for this condition. He had never experienced severe pain. We presumed that obstruction of the prostatic urethra secondary to the untreated BPH had induced his urinary retention, and we promptly attempted placement of a 14-Fr Foley catheter to relieve the obstruction. The catheter was smoothly inserted, and more than 2000 mL of urine was immediately drained. However, the patient's hematuria progressively worsened after the drainage, and life-threatening hemorrhage developed. We requested treatment by a urologist because severe urethral injury induced by insertion of the Foley catheter was suspected. Echography by the urologist showed that the balloon of the catheter was present within the urinary bladder. Inappropriate placement of the catheter was excluded. The patient was treated with aspirin (100 mg/day) because of an old cerebral infarction. In this case, anticoagulation therapy was thought to have induced an adverse effect leading to the development of severe hemorrhage.

The patient's hemoglobin concentration decreased from 10.2 to 6.0 g/dL within 6 h. We requested transurethral hemostasis by the urologist 7 h after admission. Cystoscopy showed massive diffuse hemorrhage in the prostatic urethra (Fig. 1). The urologist was unable to achieve complete hemostasis using an electrode because the tissue around the prostatic urethra was very fragile and hemorrhagic. After the operation, we immediately introduced continuous hemodiafiltration (CHDF) combined with polymyxin B-immobilized fiber column hemoperfusion (PMX), systemic administration of meropenem, and transfusion of red cell concentrates mannitol adenine phosphate (RCC-LR) (total of 10 units), fresh frozen plasma (FFP) (total of 21 units), and platelet concentrates (PC) (total of 30 units). On day 3, the patient's consciousness disorder

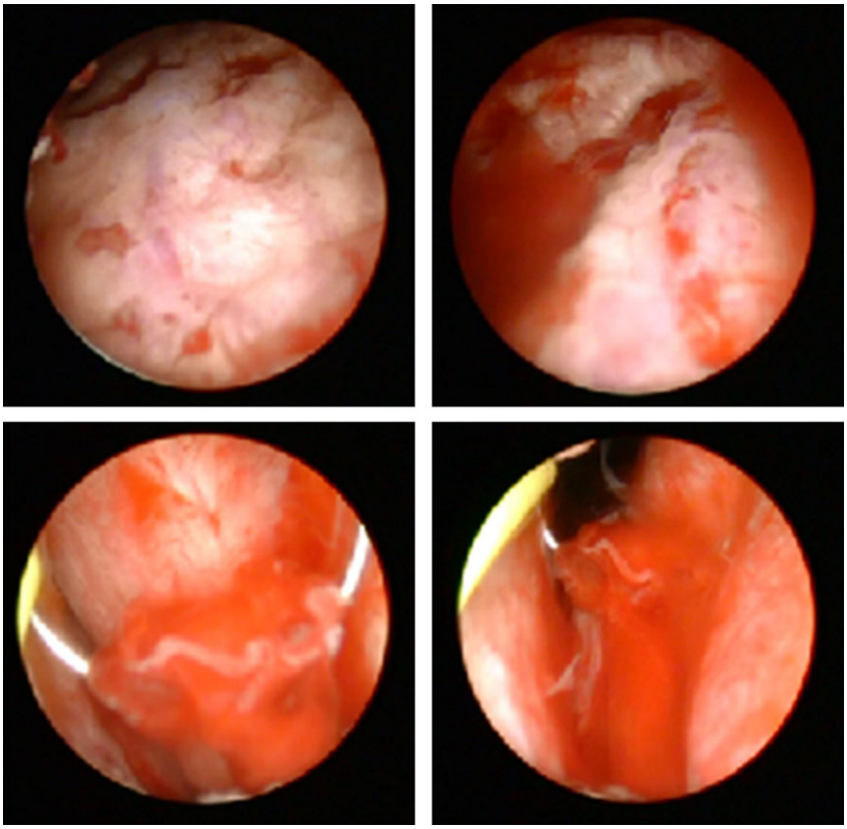

Fig. 1. Cystoscopy in a 77-year-old man with severe septic disseminated intravascular coagulation following urinary infection. After drainage with a Foley catheter, hematuria progressed to massive diffuse hemorrhage in the prostatic urethra.

improved and he was weaned from artificial ventilation. *Enterobacter cloacae* was detected from a blood culture that had been carried out on the first day of admission. On day 4, CHDF + PMX was completed and the patient's septic DIC improved. He was discharged from the intensive care unit on day 6.

Continuous transurethral irrigation was carried out using a wide-diameter catheter (24-Fr) because of the risk of obstruction by an old clot. Irrigation was finished on day 8, and his hematuria improved. Laboratory findings showed remarkable improvement of renal function and coagulation (Fig. 2). Cystoscopy showed hemorrhage and obstruction in the prostatic urethra. Biopsy was subsequently performed, and the pathological examination findings ruled out prostate cancer. The urologist maintained placement of the Foley catheter because there was a possibility of recurrence of urinary retention. Oral treatment with dutasteride and tamsulosin was started on day 14. On day 15, the patient was discharged from the hospital. The urologist followed up the patient's BPH, and transurethral prostatectomy was planned after further recovery of his clinical condition.

DISCUSSION

SEVERAL COMPLICATIONS ASSOCIATED with urinary catheterization have been described, including urinary tract infection, urethral hemorrhage, urethritis, and others.[1] Gentle insertion of the catheter should always be undertaken because forceful and rough manipulation during catheterization induces urethral injury.[2] Life-threatening adverse effects induced by Foley catheter insertion, such as urethral rupture, are not frequent,[3] and previous studies have shown that placement can be safely achieved even by medical staff members other than urology experts.[4,5]

Placement of a Foley catheter was necessary to resolve the urinary retention in this case. We were able to smoothly insert the Foley catheter, and hematuria was not initially observed after placement. However, our experience suggests the risk of uncontrolled hemorrhage after placement of a Foley catheter. The hemorrhage in this patient was induced by friction between the mucosa of the prostatic urethra and the Foley catheter. In this case, severe septic DIC and prostatic urethral tissue fragility caused by repeated inflammatory reactions seemed to be important factors for the

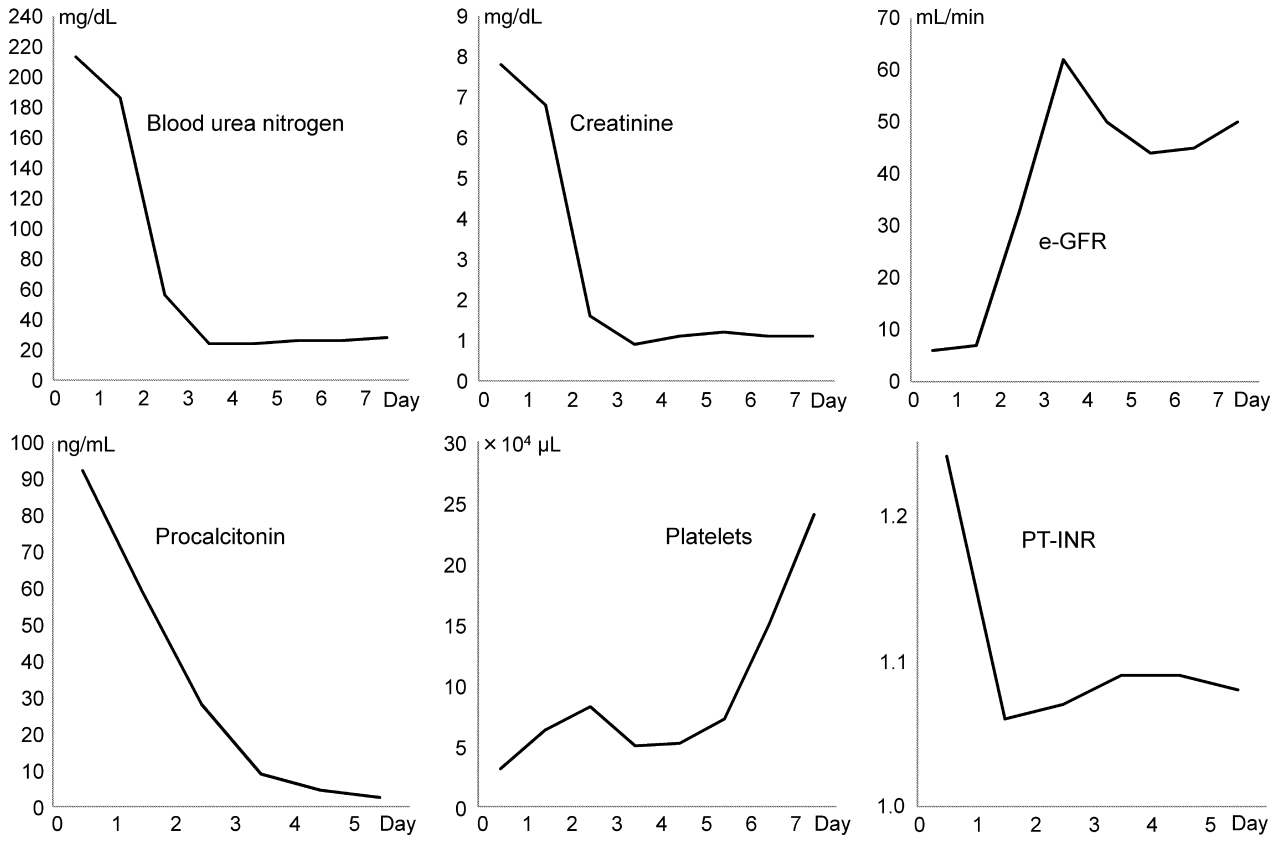

Fig. 2. Laboratory findings showed remarkable improvement of renal function and coagulation.

development of hemorrhage. We searched for previously published case reports to discuss adequate treatment for severe urinary hemorrhage induced by slight friction; however, we found no similar cases. The discussion of optimal techniques for insertion of Foley catheters should be continued because slight mucosal injury may induce life-threatening urethral hemorrhage in similar cases.

Benign prostatic hyperplasia is a progressive disease, and severe urinary retention is an associated risk if adequate treatment is not performed.[6] Unfortunately, this patient had received no treatment for his BPH. Although the exact duration of his urinary retention was unclear, he had experienced chronic dysuria. Many older patients with cognitive disorders cannot appropriately explain their symptoms. The presence of chronic urinary retention and advanced age made this patient's urinary dysfunction more serious. Japan currently faces many difficulties related to its super-aged society, and the risk of untreated BPH should therefore be widely recognized to avoid clinical situations similar to that described here.

In patients with septic DIC, activation of inflammatory cytokines not only accelerates coagulation, but also suppresses fibrinolysis. Normalization of the coagulation–fibrinolysis system by a reduction in the level of activated cytokines is extremely important for resolution of DIC. We used CHDF + PMX for efficient removal of activated cytokines. Endotoxin adsorption therapy by PMX has been used to treat patients with septic shock in Japan since 1994.[7] Polymyxin B-immobilized fiber column hemoperfusion directly absorbs endotoxins, monocytes, activated neutrophils, and anandamide, indirectly decreases the levels of inflammatory cytokines and other mediators, and reduces endothelial damage.[8] We were finally able to control our patient's DIC by active removal of cytokines and treatment with strong antibiotics and coagulation factors.

CONCLUSION

THE NUMBER OF older patients with chronic retention due to untreated BPH is increasing in Japan. Chronic urinary retention induced by BPH is a risk factor for urinary infection, and repeated urethral inflammatory reactions become a potential risk factor for fragile prostatic urethral tissue. Slight urethral injury induced by friction between the mucosa of the prostatic urethra is associated with a risk of life-threatening hemorrhage in patients complicated with septic DIC. This case shows that early use of CHDF + PMX is effective for uncontrollable diffuse hemorrhage induced by septic DIC.

CONFLICT OF INTEREST

NONE.

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