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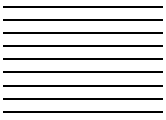

TRANSABDOMINAL ULTRASOUND-GUIDED URETHRAL CATHETERIZATION WITH TRANSRECTAL PRESSURE

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☐ **Abstract—Background: Occasionally, difficulty with standard urethral catheterization is encountered. Objective: We conducted a pilot study to evaluate whether transabdominal ultrasound (TAUS) showed the tip of a urethral catheter and whether TAUS-guided catheterization with transrectal pressure is successful in male patients in whom performing standard catheterization is difficult. Methods: The eligible study participants included adult male patients in whom standard catheterization failed in our emergency department or who were transferred from other facilities after failure of catheterization and subsequent urethral bleeding. The enrolled patients included those in whom the tip of a catheter could not be advanced through the posterior and bulbar urethra judging from the inserted length. First, an emergency nurse advanced a catheter until the progress was obstructed. Next, an emergency physician performed TAUS to detect the tip of the catheter. If the tip was detected, the physician inserted the index finger into the rectum and kept pushing the site of the obstruction. After following these procedures, the nurse again advanced the catheter. Results: Six patients were enrolled. The tip of a catheter was detected in the urethra or the false passage using TAUS in 4 of the 6 patients. In these 4 patients, the curve of the urethra became gentle or the false passage was compressed by transrectal pressure and the tip was advanced smoothly to the bladder. Conclusions: In some male patients in whom performing standard urethral catheterization is difficult, TAUS reveals the tip of the catheter and TAUS-guided catheterization with transrectal pressure can be safe and useful.** © **2014 Elsevier Inc.**

☐ **Keywords—male; difficult urethral catheterization; transabdominal ultrasound; transrectal pressure; emergency physician**

INTRODUCTION

Urethral catheterization is frequently performed for urinalysis, monitoring of the urine output, and management of acute urinary retention in emergency departments. Occasionally, difficulty with standard catheterization is encountered, especially in male patients. Difficulty in catheterizing male patients can result from a variety of causes, including the urethral angle associated with the S-shaped bulbar urethra, the urethral course altered by benign prostatic hypertrophy, a false passage, urethral stricture, and postsurgical bladder neck contractures (1–7). In such cases, repeated and unsuccessful blind attempts at catheterization can cause patient distress and damage to the urethra, usually requiring an emergent urological consultation (1,6–9). Urologists have alternative methods of draining the bladder, including flexible cystourethroscopy with placement of a hydrophilic guidewire and suprapubic cystostomy (3,7,9–12). However, these techniques incur greater expense by requiring the use of more costly equipment and more time (1,12).

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As mentioned here, some causes of difficulty are considered to be related to the course of the posterior and bulbar urethra (PBU). Transabdominal ultrasound (TAUS) is usually performed to examine the lower urinary organs, such as the bladder and prostate, not the urethra (13). However, we assumed that the possible course of the PBU, which is located in or near the prostate, can be evaluated with TAUS and manipulated with transrectal pressure using a digital rectal examination. As a pilot study, we evaluated whether TAUS revealed the tip of a urethral catheter and whether TAUS-guided catheterization with transrectal pressure is successful in male patients in whom performing standard catheterization is difficult, the cause of which might be related to the course of the PBU.

METHODS

The eligible study participants included adult male patients in whom standard urethral catheterization attempted by experienced emergency nurses or experienced emergency physicians failed or who were transferred from other hospitals or nursing homes to the emergency department after failure of the procedure and subsequent urethral bleeding. An exclusion criterion was having a history of urological surgery. Patients in whom the tip of the catheter could not be advanced through the PBU judging from the inserted length were enrolled in the study when a study physician (T. Kameda) was available. The study physician was an emergency physician experienced with TAUS.

The catheter used in the attempts at standard catheterization was reused in the study. TAUS was performed using a portable device with a 2- to 5-MHz convex probe (MicroMaxx; SonoSite, Bothell, WA). The patients were placed in the supine position throughout the study. First, an emergency nurse advanced a catheter until the progress was obstructed. Next, the physician placed the probe on the suprapubic region longitudinally, observed the possible course of the PBU, and tried to detect the tip of the catheter. To detect the tip more easily, the physician asked the nurse to oscillate the catheter gently and move the tip. If the tip was detected, TAUS-guided catheterization with transrectal pressure was subsequently performed as follows. The nurse withdrew 2−3 cm from the point of the obstruction. The physician then inserted the index finger of the free hand into the rectum and kept pushing the point of the obstruction ventrally under TAUS guidance. After these procedures, the nurse again advanced the catheter. Finally, the physician checked the presence of the tip in the bladder.

This study was performed under the approval of the ethics committee of our institution.

RESULTS

Six patients (age range 56−93 years) were enrolled between March 2011 and April 2012. The backgrounds of the 6 patients are provided in Table 1. In cases 1−3, the patients were transferred from hospitals or a nursing home due to difficult standard catheterization. In case 2, the patient also had urethral bleeding and subsequent acute urinary retention after an attempt to exchange an indwelling catheter.

In cases 1 and 2, ten milliliters of lidocaine jelly was injected in a retrograde manner into the urethra just before performing TAUS. In 4 of the 6 patients, the tip of a catheter was detected with oscillation on a real-time TAUS examination and performing TAUS-guided catheterization with transrectal pressure without forceful manipulation was successful on the first attempt (Figure 1). In cases 1 to 3, the tip was observed in a part of the PBU while the progress was obstructed. The curve of the PBU became gentle with transrectal pressure. In case 4, the tip was observed in the false passage arising from the bulbomembranous urethra at the site of 6 o'clock. After the false passage was compressed and the course of the PBU became gentle with transrectal pressure, the tip was advanced through the normal urethral channel.

In case 5 with acute urinary retention, it was difficult to observe the possible course of the PBU due to the

Table 1. Backgrounds of the 6 Patients

	Histories			
Case	Illnesses or Problem	Approaches to DUC	Aims of Standard Catheterization	Sizes and Types of Catheters
1	CVA, BPH, DUC	UC, SC	Exchange	16Fr, curved tip
2	CVA, BPH, DUC	UC, FC + Gw	Exchange	14Fr, straight tip
3	BPH, DUC	UC, FC + Gw	Exchange	16Fr, curved tip
4	CVA		Urinalysis	14Fr, straight tip
5	BPH, DUC	UC, Cystostomy	Relief of AUR	14Fr, straight tip
6	BPH		Monitoring	14Fr, straight tip

AUR = acute urinary retention; BPH = benign prostatic hypertrophy; CVA = cerebrovascular accident; DUC = difficult urethral catheterization; FC = flexible cystourethroscope; Gw = guidewire; SC = standard catheterization; UC = urological consultation.