SHORT COMMUNICATION

FUNCTIONAL UROLOGY

Holmium laser enucleation of the prostate with transurethral intraprostatic anesthesia using Schelin catheter: a preliminary communication

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Introduction This study was aimed to evaluate the feasibility, safety, and advantages of the use of transurethral intraprostatic anesthesia (TUIA) using Schelin Catheter™ (SC) in patients undergoing holmium laser enucleation of the prostate (HoLEP).

Material and methods TUIA was performed using SC, a catheter equipped with an operative channel with a retractile needle, a standard drainage outlet, and a balloon port. After inserting the SC into the patient's urethra and filling the balloon to anchor it in the bladder neck, four target injections with local anesthetic were performed, one in each quadrant in the base area of the prostate. After injections, the catheter was removed and the HoLEP procedure started. During the procedure, patients also received moderate sedation/analgesia.

Results We selected two 63-year-old patients with good performance status. Prostate volume was 40 ml for the first patient and 31 ml for the second. TUIA and HoLEP operative times were 68 minutes in the first patient and 42 minutes in the second. During the procedure, patients complained of only minimal discomfort, and during hospitalization patients' numeric rating scale (NRS) pain score ranging from 1 to 0, with no need for additional analgesics. No complications were reported perioperatively and 15 days after the procedure.

Conclusions This is the first report on TUIA via SC in patients undergoing HoLEP. In our preliminary experience, TUIA via SC was safe and feasible, showing complete perioperative pain control. Further studies are needed to confirm these promising results and better define the category of patients eligible for this type of treatment.

Key Words: benign prostatic hyperplasia ‹› lower urinary tract symptoms ‹› holmium laser enucleation of the prostate ‹› prostate block ‹› transurethral intraprostatic anesthesia ‹› Schelin catheter

INTRODUCTION

Lower urinary tract symptoms (LUTS) secondary to benign prostatic hyperplasia (BPH) are one of the most common conditions affecting aging males, with approximately 80% of men over the age of 70 [1]. Historically, transurethral resection of the prostate (TURP) has been considered the gold standard in the treatment of LUTS due to BPH since the 1970s; contemporary literature indicates that holmium laser enucleation of the prostate (HoLEP) has replaced TURP and traditional open simple prostatectomy as the size-independent surgical gold standard for BPH treatment, due to the growing desire to reduce hospital stay, complications, costs, catheterization times, blood loss and transfusions,

and reoperations rates [2, 3]. HoLEP is a minimally invasive treatment for benign prostatic hyperplasia that consists of the anatomical removal of the adenoma following the surgical plane between the prostatic capsule and adenoma using a holmium laser, followed by morcellation of the adenoma tissue within the bladder lumen. HoLEP was first reported in 1996 by Gilling et al. as a viable technique for the management of BPH [4]. Since its introduction, several enucleation techniques have been described besides the original three-lobe approach. General anesthesia (GA) and spinal anesthesia (SPA) are the anesthesiologic modalities used during HoLEP, depending on the surgeon's and anesthesiologist's preference, patient characteristics and comorbidity, and also the patient's personal choice. GA can affect postoperative recovery and it exposes patients to anesthesia-related complications. Yielding a comparable functional outcome, SPA is a safe and efficient alternative to GA, especially in high-risk patients. To increase patient comfort and safety during different prostate treatments, several types of intra- and periprostatic blockade have been tested and proposed as viable options. To simplify the prostate block procedure, a catheter designed to deliver topic injections with mepivacaine/lidocaine with or without adrenaline, the Schelin Catheter™ (SC) (ProstaLund, Lund, Sweden), has been developed. Transurethral intraprostatic anesthesia (TUIA) via SC has already been successfully tested in TURP, high-energy microwave thermotherapy (HE-TUMT), and Rezum treatment (RT). To further reduce the invasiveness of HoLEP, we evaluate the feasibility, safety, and advantages of the use of TUIA via SC.

MATERIAL AND METHODS

We performed HoLEP with TUIA on two patients. TUIA was performed using SC, a catheter equipped with an operative channel with a retractile needle, a standard drainage outlet, and a balloon port (Figure 1). The SC was inserted into the patient's urethra using standard techniques for indwelling catheters. The balloon was filled with 20 ml of saline to anchor the SC to the bladder neck, and the bladder emptied through the drainage outlet. The injection needle was inserted into the needle lumen of the catheter and the prostate. The anesthetic, 20 ml of 2% lidocaine solution, was stepwise injected into the prostate and the periprostatic tissue through a syringe. By fully retracting the needle into the catheter, rotating it 90°, and then reinserting it into the prostate at other positions, four injections were administered in a square pattern in the four quadrants, according to the following scheme (Figures 2 and 3):

- 7 ml at 4 and 8 o'clock positions, 3 ml with a fully inserted needle, 2 ml with a needle retracted 10 mm to the first grey marking, and 2 ml with a needle retracted another 10 mm to the second grey marking;
- 3 ml at 1-2 and 10-11 o'clock positions, with a fully inserted needle.

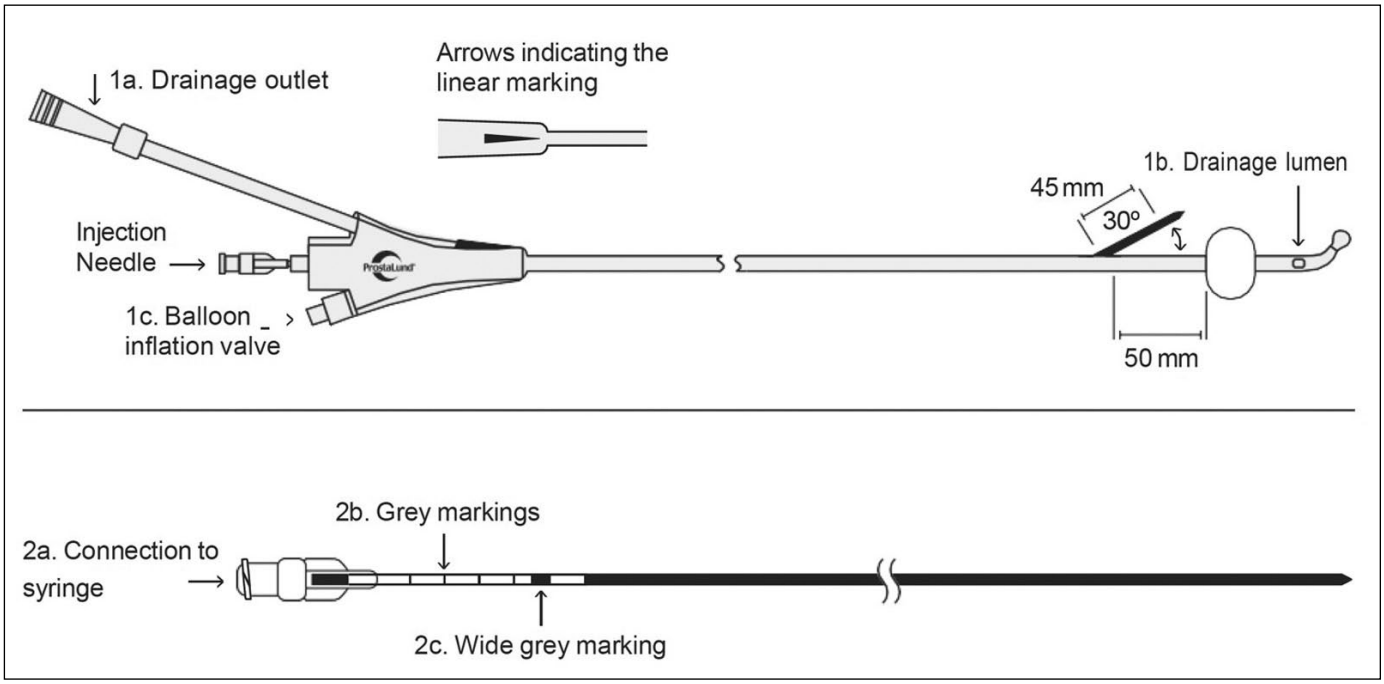

Figure 1. *The Schelin Catheter™ (SC) and injection needle incorporated in the SC. Courtesy of ProstaLund AB.*

Figure 2. *Anesthetic solution injection. By rotating the catheter, with the balloon always anchored to the bladder neck, injections can be performed in different directions and tissue regions using the bladder neck as an anatomical landmark.*

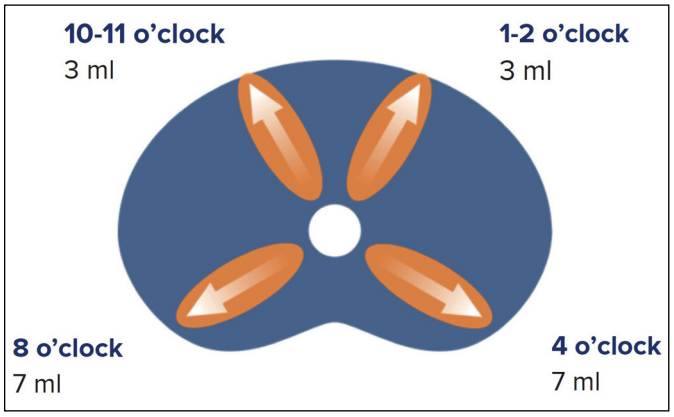

Figure 3. *Anesthetic injection scheme. Schelin Catheter™ allows to perform four target injections with anesthetic solutions, one in each quadrant in the base area of the prostate. Courtesy of ProstaLund AB.*

After injections, the balloon was deflated, the catheter removed and the HoLEP procedure started. In our center, we perform the T-L technique described by Porreca et al [5]. Patients also received moderate sedation/analgesia during the procedure with a low-dose combination of ketamine, fentanyl, and propofol. Other drugs administered were 1 g i.v. of paracetamol and 160 mg i.v. of ketoprofen.

RESULTS

We selected two 63-year-old patients with good performance status (Charlson Comorbidity Index 2, American Society of Anesthesiology score 2) and moderate-to-severe LUTS. Both patients were on alpha-blocker therapy and were in an outpatient setting. Prostate volume was 40 ml for the first patient and 31 ml for the second. Before surgery, the Qmax was 12 and 9 ml/s, while the IPSS (International Prostatic Symptoms Score) was 23 and 21, respectively. TUIA and HoLEP operative times were 68 minutes in the first patient and 42 minutes in the second. Patients removed the catheter and were discharged on 2nd postoperative day.

Before surgery, on the day of surgery, and the 1st, 2nd, 7th, and 15th postoperative days, patients' pain was assessed using a numeric rating scale (NRS). During the procedure, patients complained of only minimal discomfort, and during hospitalization patients' NRS pain score ranging from 1 to 0, with no need for additional analgesics. No complications were reported perioperatively and 15 days after the procedure.

DISCUSSION

Nowadays, HoLEP represents the increasingly popular standard of care for the treatment of LUTS secondary to BPH regardless of prostate volume. Because this condition mainly afflicts elderly patients, urologists, and anesthesiologists often deal with patients with several comorbidities that may increase anesthesiologic risk. GA exposes patients to anesthesia-related complications. Therefore, anesthesiologists tend to prefer SPA to GA during HoLEP and recent studies have shown its safety and efficacy compared with GA [6, 7]. Nevertheless, high-risk patients or patients with particular comorbidities

remain unfit for HoLEP due to anesthesiological contraindications. In this context, several less invasive ablative and non-ablative techniques for BPH treatment have been developed and others are currently under investigation. Concurrently, the need to increase patient comfort and safety during BPH treatments has led to the development of different types of intra- and periprostatic blockade.

Prostate blockade, through a transrectal probe, is often used in patients undergoing RT in an office setting [8]. This approach may expose patients to discomfort due to the transrectal probe and the risk of infectious complications. The local anesthetic prostatic block is also performed transperineally, showing to be a useful and safe method for postoperative pain control and reduced analgesic consumption in patients undergoing TURP but not in those undergoing RT [9, 10]. In addition, TURP under sedation and transurethral local anesthesia also proved to be safe, acceptable, and an effective alternative to general or regional anesthesia in the majority of the patients with small to moderately sized prostate glands, regardless of their pre-existing medical condition [11, 12].

SC was developed to simplify and make the execution of prostate blockade safer, using the transurethral route to inject local anesthetics into the prostate and periprostatic tissue allowing sterile administration, thus avoiding bacterial contamination from the rectum. Schelin et al., using intraprostatic injections of mepivacaine and epinephrine before TURP, reduced operation time, improved visibility and safety, increased achievable resection volumes, and completed resections [13]. Encouraging results were also found by Knutson et al. in patients undergoing HE-TUMT, with a reduction in the number of patients needing intravenous analgesics during the procedure, as well as the treatment time and energy consumption [14, 15]. Recently, Siena et al. evaluated the feasibility of TUIA via SC also in RT. Preliminary results demonstrate that TUIA was safe and feasible, showing full operative and postoperative pain control with a shortening of hospitalization and treatment time [16].

Estimated treatment time, related to prostate volume and surgeon expertise, is a pivotal criterion in the proper selection of patients. Several studies, using TUIA via SC during different prostate treatments, have reported an average treatment time of about 60 min with a maximum time of 82 min. Therefore, it is reasonable to assume that for 1-hour-long procedures, TUIA is a feasible option [14, 15, 16, 17, 18].

Anesthetic solutions that can be used to perform TUIA may consist of local anesthetics alone, such as lidocaine or mepivacaine, or local anesthetic combined with epinephrine, reducing blood loss. In fact, according to the prostate vascular anatomy, four target injections via SC with local anesthetics and epinephrine, one in each quadrant in the base area of the prostate, irrespective of the actual prostate size, could serve not only for pain relief but also for decreased intraprostatic blood flow using the astringent effect of epinephrine. Schelin et al. demonstrated that intraprostatic injection of mepivacaine epinephrine reduces the increase in blood flow that is usually seen during HE-TUMT [19].

The fact that an even more minimally invasive and safe procedure is often the only viable curative treatment option in high-risk patients with severe LUTS or destinated to lifelong catheter dependency further underscores the importance of the findings of this report. Limitations of our preliminary experience are related to the treatment of only two selected cases, which may underpower the conclusions, and well-designed comparative studies are needed to define patients' eligible criteria.

CONCLUSIONS

This is the first report in the literature on TUIA via SC in patients undergoing HoLEP. In our preliminary experience, TUIA via SC was safe and feasible, showing complete operative and postoperative pain control even in selected patients undergoing HoLEP, and may be particularly useful for elderly comorbid patients. Further studies, comparing TUIA via SC with current commonly used anesthesiologic modalities, are needed to confirm these promising results and better define the category of patients eligible for this type of treatment.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

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