

Safety and efficacy of ultrasound-guided percutaneous suprapubic cystostomy in resource-poor setting: A 7-year review

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Abstract

Introduction: Percutaneous cystostomy techniques are usually done using disposable sets in developed countries which are not affordable in poor-resource settings. However, the percutaneous technique can be done using reusable trocar or selected big size surgical blades. This is simple, safe, and cost effective in poor-resource setting. The procedure is best done under ultrasound guidance but can also be done blindly in select cases. We present our 7-year experience in ultrasound-guided percutaneous suprapubic cystostomy.

Materials and Methods: This is a 7-year retrospective review of patients, who had ultrasound-guided percutaneous suprapubic cystostomy at Urology Unit of our institution from January 2010 to December 2016. Disposable cystostomy sets were used for the initial experience, but this was replaced with more cost-effective reusable metallic trocar or selected big size surgical blade methods in the later experience. Data were extracted from procedure register and patients' case notes and entered into pro forma and analyzed using Statistical Package for Social Sciences 20.0 version (2011) for windows (IBM, SPSS Incorporation, Chicago, IL, USA) 20.0 version for Windows.

Results: A total number of 135 patients had percutaneous cystostomy, which was ultrasound guided in 134 patients (99.3%). The mean age of the patients was 50.5 ± 23.3 years with a range of 2–90 years. The indications for the procedure include urine retention with failed urethral catheterization in 119 patients (88.1%), urethral injury in 14 patients (10.4%), and urethrocutaneous fistula in 2 patients (1.5%) with spinal cord injury. No major complication was recorded.

Conclusion: Ultrasound-guided suprapubic cystostomy using reusable trocar or selected surgical blade is simple, safe, effective, and associated with minimal complications in poor-resource setting.

Keywords: Efficacy of cystostomy, percutaneous cystostomy, safety of cystostomy, ultrasound-guided cystostomy, urine retention

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INTRODUCTION

Suprapubic cystostomy is a common procedure done for the management of acute urine retention after failed urethral catheterization and when there is a need for

prolonged catheterization.^[1,2] Percutaneous technique is more cost effective and has less morbidity than urethral catheterization or open technique.^[3,4] The procedure can be done under ultrasound guidance in underfilled bladder and

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in the presence of lower abdominal scar.^[5] In resource-poor settings, the procedure is done using more cost-effective reusable metallic trocar or stab technique using selected surgical blades.^[6]

We report our experience in percutaneous suprapubic cystostomy in the past 7 years.

MATERIALS AND METHODS

This is a 7-year retrospective review of patients who had percutaneous suprapubic cystostomy at Urology Unit, Department of Surgery of our institution from January 2010 to December 2016. The study was done in accordance with revised Helsinki Declaration. The data were extracted through a pro forma from procedure register and patient's case notes. The information extracted includes biodata, indications, diagnosis, type of procedure, and complications. The inclusion criteria include all cases of percutaneous suprapubic cystostomy. Exclusion criteria include incomplete records, those patients that could not have full bladder, previous abdominal surgery, anterior abdominal wall sepsis, pelvic fracture urethral distraction defect, and bladder mass.

Abdominal scan was done to rule out bladder carcinoma in all the patients. Those with empty bladder, 1 L of normal saline with or without intravenous frusemide 40 mg is given to achieve full bladder. Seldinger technique was used for the initial 3 years experienced, but this was replaced with more cost-effective reusable metallic trocar technique and stab technique using selected big size surgical blades in the past 4 years.

Trocar, large bore stab, and hybrid techniques of percutaneous suprapubic cystostomy

The procedure was explained to each patient, and informed consent was obtained.

Preliminary ultrasound scan was done to rule out bladder carcinoma and to confirm bladder fullness.

A trolley was set with all the required items [Figure 1]. Intravenous access was obtained and patients were given prophylactic intravenous antibiotics using 1 g ceftriaxone. In supine position, suprapubic region was skin prepared using 10% povidone and draped exposing the intended site of puncture only. Skin and soft tissues superficial to the bladder were infiltrated with 10 ml of 2% xylocaine with adrenaline, two finger breaths above the pubic symphysis. A small nick of 0.5–1 cm was made on the skin up to the fascia using size 10 or 11 surgical blade. A metallic trocar 20 Fr was advanced into the bladder



Figure 1: A trolley containing requirements for percutaneous cystostomy

steadily under ultrasound guidance [Figure 2] until a give was felt and trocar tip was visualized in the bladder as hyperechoic structure^[5]. This was followed by urine flashback [Figure 3]. The inner obturator was immediately removed, and 20 Fr Foley's catheter was advanced into the bladder through the outer sheath [Figure 4]. Urethral balloon was inflated and catheter was connected to the urine bag. In large bore stab technique to insert 20 Fr urethral catheter and above, tip of size 21 or 22 blade was used to create the skin puncture. This was steadied with pushing pressure until entry into the bladder^[6]. The two techniques were hybridized in which tip of 21 or 22 surgical blade was used to create a skin puncture of 9–10 mm and 20 Fr trocar was advanced into the bladder as above. This allowed passage of at least 20 Fr urethral catheter. The patient was cleaned and a small pressure dressing was applied around the catheter to limit bleeding [Figure 5].

The data was analysed using Statistical Package for Social Sciences 20.0 version (2011) for windows (IBM, SPSS Incorporation, Chicago, IL, USA). The results were reported in mean \pm standard deviation (SD) and percentages.

RESULTS

A total number of 151 patients had percutaneous suprapubic cystostomy within the period of study, but only 135 patients (89.4%) with complete records were included in the final analysis. The mean age of the patients was 50.5 ± 23.3 years with a range of 2–90 years. There were 131 males (99.3%) and 1 female (0.7%).

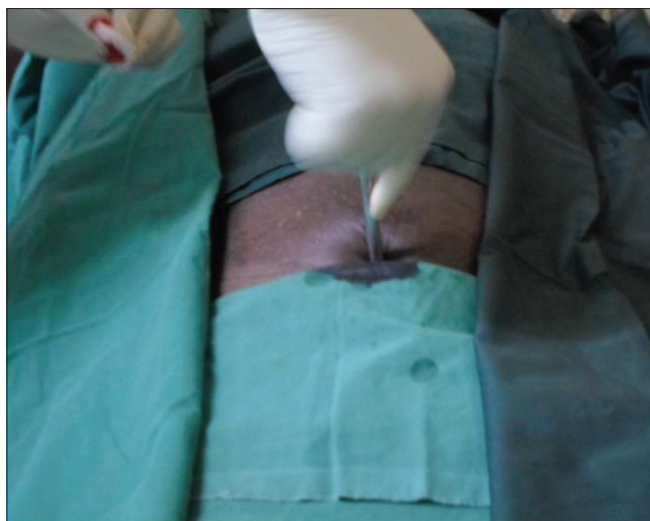


Figure 2: Metallic trocar being steadily advanced in to the bladder by rotation under ultrasound guidance



Figure 3: Flashback of urine when metallic trocar punctures the bladder



Figure 4: Passage of 20 Fr Foley's urethral catheter through 20 Fr sheath after removal of the obturator



Figure 5: Pericatheter pressure dressing applied to limit stoma bleeding after inflation of the balloon

Table 1: Diagnosis of patients who had the percutaneous suprapubic cystostomy

Diagnosis	Number of patients (%)
Urethral stricture	63 (46.7)
BPH	37 (27.4)
Urethral injury	14 (10.4)
CAP	7 (5.2)
Urethral stone	4 (3.0)
PUV	4 (3.0)
Spinal cord injury	3 (2.2)
BPH/stricture	2 (1.5)
BNS	1 (0.7)
Total	135 (100.0)

BPH: Benign prostatic hyperplasia, caP: Cancer of the prostate, PUV: Posterior urethral valve, BNS: Bladder neck stenosis

Ultrasound-guided suprapubic cystostomy was done in 134 patients (99.3%) and blind technique was done in 1 patient (0.7%) with chronic retention in the intensive care unit, who was not stable enough to be taken to the procedure room where the ultrasound scan machine is

located. Ten patients (7.4%) had the procedure using size 22 surgical blade only, and this was combined with the use of metallic trocar in five patients (3.7%).

Eighty-nine patients (65.9%) had acute urinary retention (AUR), 37 patients (27.4%) had chronic urinary retention, while six patients (4.4%) had acute-on-chronic urinary retention. Five patients (3.7%) had chronic kidney disease from the chronic retention. Seven patients (5.2%) with urethral stricture had Fournier's gangrene with urinary extravasation. Among the three patients (2.2%) with spinal cord injury, two patients (1.5%) developed urethrocutaneous fistula while one patient (0.7%) developed AUR due to blocked retained urethral catheter.

The most common causes of urine retention were urethral stricture and benign prostatic hyperplasia in sixty-three (46.7%) and thirty-seven (27.4%) patients, respectively. The two pathologies coexisted in two

patients (1.5%). Other details of the patients' diagnosis are shown in Table 1.

The complications encountered include stoma bleeding and hematuria in one patient (0.7%) each, and two patients (1.5%) had revision of the procedure due to tube displacement and blockage. No major complication recorded such as bowel injury.

DISCUSSION

Suprapubic cystostomy is indicated when urethral access is not possible or undesirable. Percutaneous approach is less invasive and can be done in the emergency department, under local anesthesia without the need for operating theater.^[4] When done under image guidance or cystoscopic assistance, the procedure can be done in obese patients, underfilled bladder, and in the presence of lower abdominal scar.^[4,5] The use of reusable metallic trocar or selected big size blade is more cost effective and affordable in resource-poor settings.^[6]

The mean age of 50 years in this study is lower than 61 years reported by Okorie^[6] in Nigeria but higher than 42 years reported by Goyal *et al.*^[7] in India. This might be due to the fact that the most common cause of urine retention in our study was urethral stricture.

The procedure was done in only a female patient in this study, which is comparable to the previous studies where all the patients were males.^[6,7] The females are less likely to have urethral trauma, stricture, and failed catheterization due to wide, short, and mobile urethra. They also lack prostate, so they cannot have urine retention from benign or malignant prostatic diseases.

The most common causes of urinary retention in this study were urethral stricture and benign prostatic hyperplasia as reported by Okorie^[6] in Abakaliki. In four patients, the AUR was caused by impacted urethral stones. This is a common cause of AUR in our facility. Other indications for percutaneous suprapubic cystostomy include prostate cancer, urethral injury, and bladder neck stenosis as reported by the previous studies.^[6,7] Three of our patients with spinal cord injury developed urethrocutaneous fistula and retained catheter following prolonged urethral catheterization as reported by previous studies.^[4,8] These complications could have been avoided by early suprapubic cystostomy. Suprapubic catheterization is associated with more comfort and better quality of life in spinal cord-injured patients.^[3] Even in short-term catheterization up to 2 weeks, suprapubic method is associated with

more comfort and less bacteriuria.^[9] Hence, we advocate suprapubic cystostomy early in spinal cord-injured patients, neurogenic bladder, and other patients that require at least 1-month bladder catheterization to avoid prolonged urethral catheterization and its attendant complications. Four patients with posterior urethral valve had prolonged urethral catheterization and chronic kidney disease, percutaneous suprapubic cystostomy was passed for effective larger bore catheter drainage with at least 18 Fr catheters, as urethra in these children can only admit 10–12 Fr catheters. The small catheter in children blocks intermittently due to kinking and positional manipulations, thus poor drainage and slow recovery of renal function.

In our initial experience with ultrasound-guided percutaneous suprapubic cystostomy, we used disposable kits, but this was replaced by used of reusable metallic trocar or use of selected big size surgical blades which are more affordable and cost effective for our community. These were reported to be safe and effective as we observed in our study.^[6,7]

As reported in many studies,^[6,8,10] the few complications we encountered include exit site bleeding, hematuria, and catheter malfunction. The hematuria we saw in one patient was due to hematuria ex-vacuo or postobstructive hematuria in a patient with high pressure chronic urinary retention and it resolved within 24 h. This was reported in literature and occurs in 2%–16% of patients and is self-limiting.^[11]

Bowel injury was reported to occur in 2.2% of patients following trocar punch technique.^[7,12] We did not record such complication in our patients. This is due to our patient selection, use of ultrasound scan, exclusion of all patients with previous lower abdominal surgery, and those with empty urinary or underfilled bladder that cannot be distended with saline.

CONCLUSION

Ultrasound-guided percutaneous suprapubic cystostomy is safe, effective, and associated with few self-limiting complications. It can be done using single use cystostomy kit, reusable metallic trocar or selected big size surgical blade. The reusable metallic trocar and selected surgical blade techniques are more cost effective and affordable in poor-resource setting.

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Conflicts of interest

There are no conflicts of interest.

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