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Original article

Simplified percutaneous large bore suprapubic cystostomy for acute urinary retention—A cost saving procedure



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KEYWORDS

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Abstract

Introduction and objectives: Commercial cystostomy kits/trocars are not always readily available in regions with insufficient funding. Open suprapubic cystostomy procedures are yet prevalent. This paper presents a simplified percutaneous suprapubic cystostomy technique that utilizes specially selected surgical blades in the place of commercial trocars.

Subjects and methods: Eighty-nine male patients with acute urinary retention underwent puncturing of the visibly and palpably distended bladder with surgical blade size 20 (7 mm diameter), 21 or 22 (9 mm diameter) to allow resistance-free placement of Foley catheter size 18 Fr (maximum diameter of 6 mm) or size 20 (maximum diameter of 6.7 mm) respectively under local anesthesia along the mid abdominal line in a sagittal direction – two finger breadths above the pubic symphysis. The main outcome measures were to determine the success rate and the encountered complications.

Results: Successful bladder puncture and insertion of the Foley catheter of choice was possible in all cases. There was no mortality and no adjacent visceral injury. There were two cases of catheter blockage with clots that were easily flushed out.

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Conclusions: Emergency cystostomy can be safely achieved through direct puncture of the visibly and palpably distended bladder with appropriately selected surgical blades that will subsequently allow resistance-free placement of sizable Foley catheters.

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Introduction

Acute urinary retention (AUR) is a frequent urologic emergency. In most cases of AUR, relief of the retention is readily achieved through urethral catheterization. However, when urethral catheterization fails or is contraindicated, it becomes necessary to deviate the urine through suprapubic catheterization. In many urologic centers – especially, in the high-resource economies – suprapubic catheterization can be readily achieved through a minimally invasive percutaneous technique using any of the suprapubic cystostomy kits or trocars that come in many varieties [1–7].

However, these commercial percutaneous suprapubic cystostomy kits and trocars are not always readily available in regions with insufficient funding. Hence, many suprapubic cystostomy procedures for AUR are still done through a formal or a modified open procedure with associated increased invasiveness, treatment time, and surgical cost.

In low-resource economies, lack of finance constitutes a major hindering factor for accessing early surgical intervention and as such the vast majority of these patients will end up carrying such inserted catheters for long before definitive surgery hence necessitating the placement of large bore catheters that have the added advantage of more reliable drainage.

This paper presents a simplified and out-patient large bore puncture suprapubic cystostomy technique that utilizes selected surgical blades in the place of commercial solid punch trocars/cystostomy kits. We hypothesize that these selected surgical blades will replicate the commercial solid punch trocars for entrance into the bladder.

Subjects and methods

This was a prospective and descriptive study of 89 consecutive male patients with acute urinary retention that were treated between January 2006 and September 2013 – all using a simplified suprapubic cystostomy approach. For this technique, the diameter of various and readily available surgical blades was obtained initially with a measuring tape but later using a Vernier Caliper. The obtained measurements were intended to be slightly larger than the diameters of the desired Foley catheters of sizes 18 or 20. Surgical blades of size 20 (7 mm in diameter), 21 or 22 (9 mm in diameter) were then chosen as appropriately sized blades that should permit resistance-free insertion of Foley catheter sizes 18 Fr and 20 Fr, respectively and at the same time be small enough to avoid large puncture wound. Cases of acute urinary retention secondary to pelvic fracture, especially, where the bladder was not palpable, cases of bloody aspirate from the bladder and cases of previous laparotomy were excluded.

For the simplified puncture suprapubic cystostomy, the following steps were ensured:

1. The bladder should be visibly and palpably distended.
2. Local anesthesia with 1% Lidocaine and successful aspiration of urine is done at a point two finger breadths above the pubic symphysis along the mid abdominal line – in a sagittal direction.
3. Surgical blade size 20 (7 mm in diameter), 21 or 22 (9 mm in diameter) were the chosen sizes for bladder puncture in this series giving a maximum skin puncture wound length of 7–9 mm.
4. After an initial cutting movement limited to the tip of the chosen surgical blade to get through the skin, a steady and careful pushing pressure is maintained to puncture into the bladder lumen (with a sudden give and appearance of urine noted) after which the Foley catheter is immediately inserted.
5. To insert a size 18 Fr Foley catheter – puncture the bladder with a size 20 surgical blade; while for size 20 Fr (and also for size 18 Fr) Foley catheters – puncture the bladder with size 21 or 22 surgical blades.

In all our patients, we were able to aspirate urine using size 21 injection needles – showing the absence of obesity in the contingent of patients in this series. For overweight/obese patients, this technique may be more challenging to accomplish. Some tips and tricks that were helpful during the early learning period were the use of catheter introducers to give the catheters some rigidity and also the liberal use of water-soluble lubricants. For beginners, it is also advisable to use size 21 or 22 surgical blades to insert size 18 Fr catheter and as such have more room to maneuver.

Results

The mean age of the patients was 61.2 years (range of 28–96 years). The main complaint of all the patients was inability to pass urine, for which attempted urethral catheterization failed. The causes of urinary retention were: urethral stricture – 44 patients, benign prostatic hyperplasia (BPH) – 21 patients, cancer of the prostate – 9 patients, urethral trauma – 8 patients, co-existing BPH and urethral stricture – 6 patients, and bladder neck stenosis – 1 patient.

Successful bladder puncture and placement of suprapubic catheter was possible in all cases utilizing minimal surgical supplies (Fig. 1). There were two cases of catheter blockage with clots that were easily flushed out in the immediate post-operative period. On a minimum of at least three catheter changes per patient at the urology clinic (usually at 3–4 weeks catheter change intervals), there was no case of mortality and no adjacent viscera puncture.

Some Foley catheters in our locality were noted to have smaller diameters as measured using a Vernier Caliper than documented by manufacturers. The significance of this observation is still being studied.



Figure 1 Minimal surgical supplies needed for the puncture cystostomy.

Discussion

In this study, 89 patients with AUR in whom attempted urethral catheterization failed were successfully treated with a simplified percutaneous cystostomy technique with good outcome. For the cystostomy, selected sizes of surgical blades (size 20, 21, and 22) were used. These surgical blades make a puncture skin wound size of 7–9 mm which gives this approach a minimal invasive outlook that can be compared to the surgical wounds obtainable with the commercial suprapubic cystostomy kits while permitting resistance-free insertion of large bore catheters sizes 18 and 20 Fr.

A significant disadvantage of most solid punch-trocars is the sudden out-pouring of urine on removal of the obturators for catheter insertion; this is, especially, the case as the presence of the sheath after removal of the obturator maintains a wide open communication between the bladder and the exterior enabling resistance-free out-flow of urine. In the present technique, such significant out-pouring of urine is not the case as the opening into the bladder is slit like (from the surgical blade), and as such, there is considerable overlying tissue resistance for the urine attempting to flow out of the bladder to the exterior hence maintaining adequate bladder volume until catheter insertion which should any way be done quickly. For any unforeseen delay in catheter insertion that could lead to significant efflux of urine and loss of bladder volume, the percutaneous cystostomy opening should be covered with the tip of the finger until whatever is the problem is quickly resolved.

Safety in suprapubic cystostomy procedures has always been a point of concern for the blind puncture techniques. In as much as percutaneous suprapubic cystostomy has commonly been safe and mostly associated with very good outcome, significant complications, however, can occur. The most disturbing and serious complication of blind suprapubic cystostomy that has occasionally been reported is the injury to adjacent viscera [8,9]. Small bladder volume and previous abdominal/pelvic surgery are factors that have been associated with increased risk of injury to the intra-abdominal contents [10]. This very serious complication should and can be avoided by very careful patient selection and careful execution of the procedure. For this modified technique, making sure that the bladder is visibly and palpably distended and carefully following the other steps listed in the “methods” section is strongly recommended as doing such in

this series has helped avoid any case of bowel or other organ injury making this procedure relatively safe.

Most contemporary cystostomy kits use catheters of small sizes [2]. This is understandable since these catheters are mostly meant to be in place for a short time before definitive resolution of the cause of urinary retention. However, in our environment and in many other developing economies, patients with Foley catheters inserted for urinary retention often wait for months to years before their definitive surgery. Hence, it is desirable to use Foley catheters of larger lumen to avoid frequent catheter blockages. This modified technique can be used to insert chosen Foley catheter of size 18 and 20 which has large enough drainage lumen while at the same time – are not too big to demand wider skin puncture-wounds.

Cost of surgical procedures in low-resource economies has always been a hindering factor to access surgery due to the significant disparity between the financial status of most of the populace and the cost of surgery [11,12]. In our region, many patients with obstructed urination delay seeking medical help and end up presenting to the emergency department with urinary retention. Many patients who present to hospitals do not have sufficient funds. If urethral catheterization fails, taking them to the operating room to insert a suprapubic cystostomy through the open or modified open technique will increase the treatment cost and put these patients in a more difficult financial situation. This modified technique utilizes minimal surgical supplies, replicates the commercial solid punch trocar technique for entrance into the bladder and as such is not technically demanding but easy to learn. Furthermore it is an outpatient procedure that can be done at the patient’s bedside or in a minor procedure room and as such is cost saving both for the patient and the hospital system.

For any surgical technique to be free of complications – training, adequate precautions, and experience do play a major role. The outcome in this series was extremely good in the author’s hand. Being cautious, paying attention to details and following the recommended steps are essential for other surgeons who may find this technique necessary in their centers of practice.

Conclusions

Large-bore emergency access to the bladder can be safely achieved through direct puncture of the palpably distended bladder with appropriately chosen surgical blades (size 20, 21, and 22). This will subsequently allow resistance-free placement of a sizable Foley catheter (18 Fr or 20 Fr) and, hence, minimize open surgical procedures for this pathology.

Conflict of interest

The author declares that there is no conflict of interest.

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