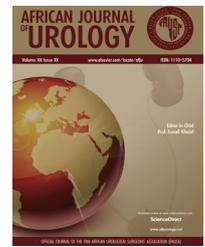




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A guidewire on your fingertip: A novel innovative technique[☆]



Ahmed Adam^{a,b,c,d,*}

^a Department of Urology, Helen Joseph Hospital, University of the Witwatersrand, Johannesburg, South Africa

^b Department of Paediatric Urology, Rahima Moosa Mother & Child (Coronation) Hospital, University of the Witwatersrand, Johannesburg, South Africa

^c The Division of Urology, Department of Surgery, Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, South Africa

^d Donald Gordon Medical Centre, Parktown, Johannesburg, South Africa

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KEYWORDS

Method;
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Abstract

Objective: We aimed to describe a novel method to attain direction and control of the guidewire at the fingertip. This will serve to allow for ease of guidewire placement during open and combined open and endoscopic surgery.

Subjects and methods: Over a gloved hand, a ureteric catheter is placed over the index finger, with the distal tip over the distal end of the index finger. Thereafter, adhesive tape is applied over the ureteric catheter (over the proximal, and middle phalanges) to allow for ease of flexion of the index finger. A second glove is then covered over the first one, with care not to rotate or dislodge the fixated ureteric catheter. A small hole is cut at the distal end of the glove, at the tip of the ureteric catheter to allow the guidewire to exit. The guidewire is advanced easily and can now be directed using the 'loaded' fingertip.

Results: An easily manipulated system of guidewire insertion, with fingertip mobility and dexterity is obtained utilizing everyday consumables in a simple to perform fashion.

Conclusion: A simple, novel method to allow flexibility and stress-free maneuvering to pass a guidewire, in open or combined open and endoscopic urological surgery is described.

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* Correspondence to: Division of Urology, Department of Surgery, Wits Medical School, 9th Floor, Room 9S19, 07 York Road, Parktown, Private Bag X3, Johannesburg, 2050, South Africa.

E-mail addresses: Ahmed.Adam@wits.ac.za, aadam81@gmail.com

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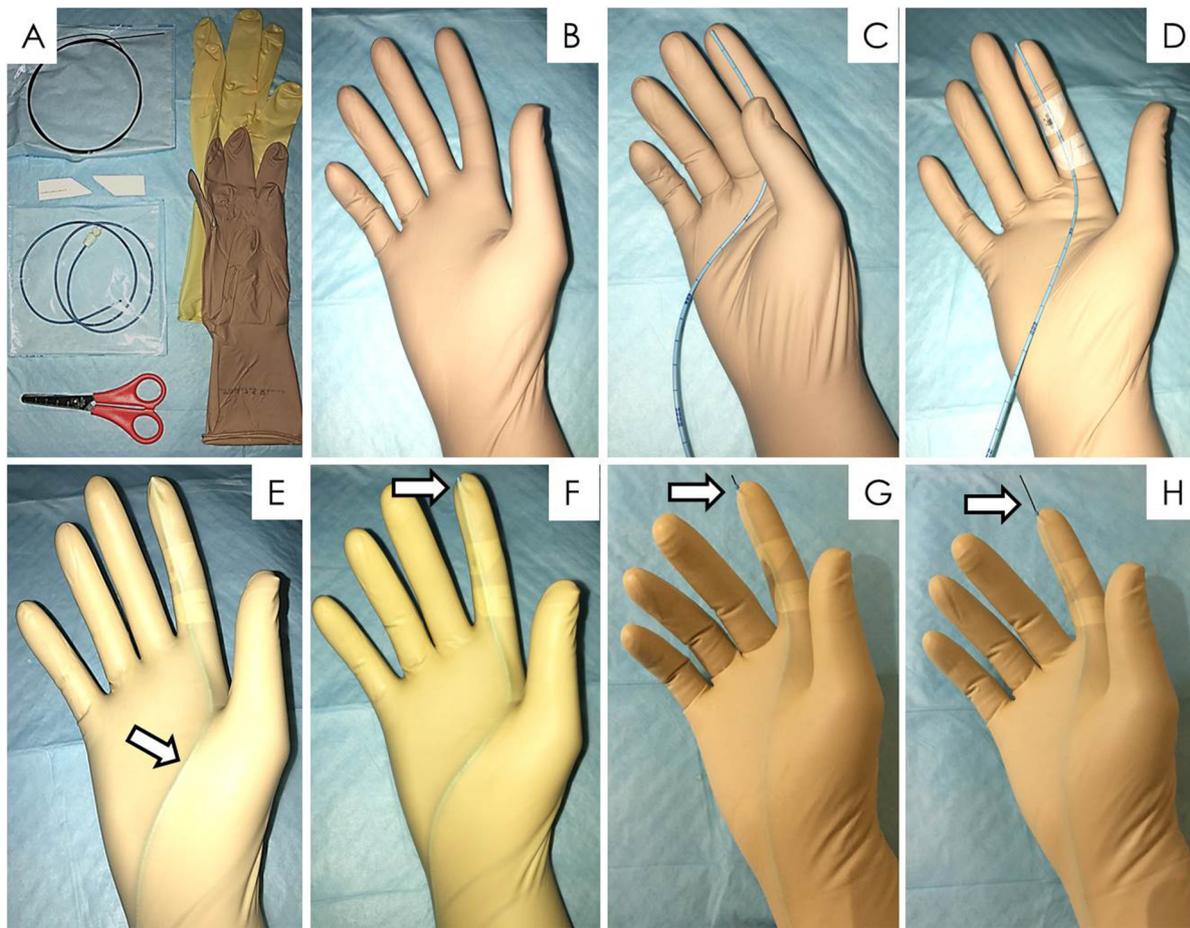


Figure 1 Construction of the components for the guidewire on the fingertip method.

Step-by-Step illustration of the technique:

- (a) Items required: two gloves, pair of scissors, ureteric catheter (open ended), adhesive tape and the guidewire.
- (b) Gloved right hand.
- (c) Ureteric catheter (open ended) placed over the index finger, with the tip at the distal end of the digit.
- (d) Adhesive tape is then applied onto the gloved finger (over the proximal and middle phalanges) to allow for ease of flexion and extension of the right index finger.
- (e) A second glove is then covered over the first one, with care not to rotate or dislodge the ureteric catheter.
- (f) A small hole is cut at the distal end of the gloved finger, to allow for the guidewire to exit easily from the 'fixed' ureteric catheter.
- (g) The guidewire is advanced and can be directed with the index finger.
- (h) Guidewire is easily advanced further out of the ureteric catheter.

Introduction

Various techniques have been described to gain ureteric access into both the orthotopic and abnormally placed Ureteric Orifices (UOs) [1–3], however guidewire placement may be required during open and combined (open and endoscopic) surgery as well. Although the motivation and attitude of the surgeon is of paramount importance, the experienced tactile advantage using the finger is a valuable asset to the primary surgeon performing the operation. Furthermore, despite the recent technological advancements, the role of the hand and fingers, its dexterity, tactile ability and surgical application is at the worst of times, difficult to replace [4].

Herein, we describe a novel method to attain direction and control of the guidewire at the fingertip.

Subjects and methods

Tools and materials required

For this method, the following items are required; two gloves, scissors, ureteric catheter (open ended), adhesive tape, and a standard guidewire (Fig. 1a).

Construction

Over a gloved hand, a ureteric catheter is placed over the index finger, with the tip at the distal end of the digit. Thereafter, adhesive tape is applied on the proximal and middle phalanges to allow for easy flexion of the index finger.

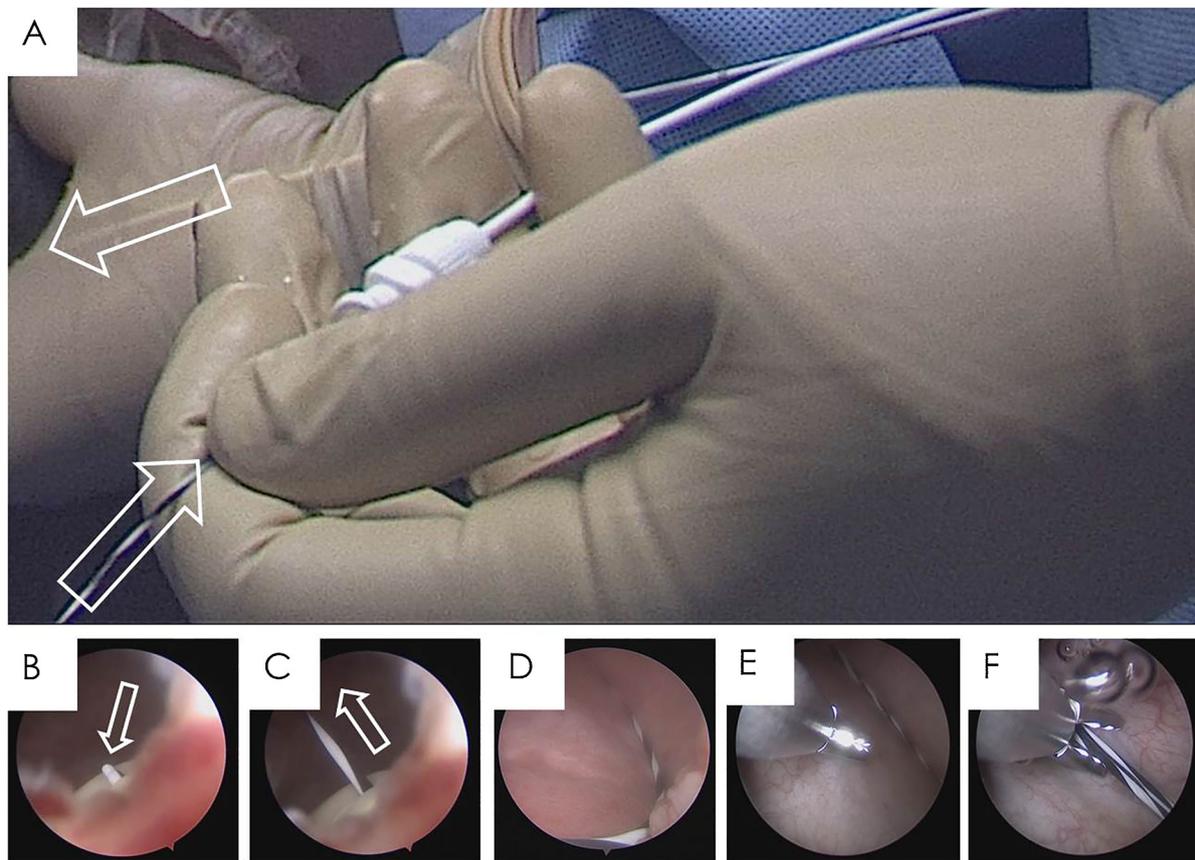


Figure 2 Clinical Depiction of the ‘Guidewire on the Fingertip’ method used to locate and isolate a large (20 mm) proximal Vesico-Vaginal Fistula, prior to definitive laparoscopic, vesico-scopic repair. Here, it is illustrated using a Zebra™ Urologic Guidewire (Boston Scientific) (striped black and white guidewire) and the standard Axxcess™ Ureteral Catheter (Boston Scientific).

- (a) Using the index finger now ‘loaded’ with the guidewire, the vaginal component of the VVF is isolated using the fingertip of the right hand. The guidewire is then advanced using the left hand. (Arrows depicting the direction of the guidewire, cf 2b, corresponding cystoscopic image)
- (b) Cystoscopic image of the gloved finger. The guidewire can be visualized exiting from the gloved fingertip. The finger also acts as a ‘plug’ and allows the bladder to fill adequately, (arrow showing the gloved finger where the guidewire can be seen exiting the finger).
- (c) The guidewire is easily advanced into the bladder, (arrow showing the direction of advancement),
- (d) The guidewire coil is now visualized coiling against the posterior bladder wall.
- (e) A cystoscopic grasper is now inserted into the bladder.
- (f) The guidewire is now brought out of the urethra using the grasping forceps, thus the VVF component is now easily isolated. (With the proximal guidewire entering the vaginal component of the VVF and the distal guidewire now exiting the urethral meatus).

A second glove is then placed over the first one, with care not to rotate or dislodge the fixated ureteric catheter. Using the scissors a small cut is carried out at the distal end of the glove, at the tip of the ureteric catheter to allow for a guidewire to exit easily. The guidewire is advanced easily and can be directed using the finger (Fig. 1b–f. Step-by-Step illustration of the technique).

Ethics approval

Local Institutional Ethics approval had been obtained, with the Human Research Ethics Committee (Medical) Clearance Certificate No. M180892 (2018).

Surgical technique/Clinical Application

The guidewire is advanced after the desired orifice or lumen is isolated with the index finger. Method illustrated (intra-operative photos) with the isolation of the vaginal component of the VVF, prior

to the definitive operative laparoscopic vesicoscopic VVF repair (Fig. 2. Clinical Application of this technique).

Results

An easily manipulated system of guidewire insertion, with fingertip mobility and dexterity is obtained utilizing everyday consumables in a simple to perform fashion. Once guidewire access is attained, the ureteric catheter can be unfixated from the inner glove and advanced over the guidewire, if or when needed. Initial results using this simple technique have proved successful and have been tabulated (Table 1).

Discussion

Although the use of guidewires for routine endoscopic procedures may be questionable in some instances [5], the insertion of this basic

Table 1 Table of the successful Clinical Application using the “Guidewire on the Fingertip” technique.

	Sex/age	Planned operative intervention	Utilized for	Notes	Outcome
1	55/M	Open prostatectomy	Catheterizing the UO	Difficult ureteric access due to massive prostatic midlobe	Access achieved with ease
2	45/F	Laparoscopic (Vesico-scopic) VVF repair	Isolating the VVF component trans-vaginally	Vaginal component very proximal within the vagina	Access achieved with ease

UO: Ureteric Orifices; VVF: Vesico-Vaginal Fistula

consumable is vital to many open and endoscopic procedures. The potential use of this novel method may be applied in various clinical scenarios.

Clinical Application of this technique

- 1) to isolate (trans-vaginally) the *vaginal component of the VVF*,
- 2) for catheterizing the UOs in *cases of laparoscopic/open prostate adenectomy*,
- 3) UO cannulation of *intra-peritoneal [advanced grade] bladder injuries*,
- 4) UO cannulation in patients with *deep and narrow pelvises*, during trans vesical surgery,
- 5) Isolating the *distal ureteral lumen* in an open Anderson Hynes Pyeloplasty with an atretic distal lumen.

To better visualize the VVF and to assist with the operative plan, catheterization of the fistula and UOs are advised prior to planning for surgical repair [6]. Further, an incidence up to 15% of VVF cases may have an associated ureteric injury as well [7].

This technique is also ideal for catheterizing the UOs in cases of open prostate adenectomy, where the UOs are not easily identified due to a prominent obstructed median lobe. The gloved finger can be inserted into a laparoscopic access port incision site, for catheterization of the UOs if needed, prior to finger-assisted enucleation of the large prostatic lobes. Further, in cases of intra-peritoneal [advanced grade] bladder injuries, where surgical repair is mandatory and manipulation and guidewire introduction into the UOs are technically difficult to perform [8]. This method may also be beneficial in patients with deep and narrow pelvises that require intra-vesical surgical repair or diverticulectomy where ureteric catheterization may be required intra-operatively, and the UO may be technically difficult to isolate during the procedure.

This method is advantageous in cases where maneuverability and access is within sight but difficult to advance or ‘direct’ the guidewire. This dilemma is encountered within clinical practice during various urological procedures. The availability, cost and time saving are all positives in implementing this novel technique. This is ever so relevant in today’s era, where the cost of operating theatre time is estimated at around 37 USD per minute [9]. The failure rate for accessing an unstented ureter at cystoscopy was shown to be around 6.04%, [10] this is obviously more technically challenging during any open procedure, as the magnification and directed, focused light cannot be replaced.

The differences in the physical, mechanical and safely profiles in the currently available hybrid guidewires and ureteral access sheaths

have been validated objectively [11,12]. The risk of perforation and injury to the mucosa is a small but mentionable risk [11,12]. The use of this novel method described will decrease the incidence of iatrogenic injury in the open ureteric access route by allowing better accessibility and direction, with an easier passage of the guidewire as the finger orientates the guidewire during its advancement up the ureter.

Other novel innovations in guidewire insertion or accessibility in urology

Various innovations and novel descriptions in the manipulation and direction of an advancing guidewire, have already previously been described in the urological literature.

For the insertion of the trans-urethral catheter, a guidewire advancement method has previously been published using a ‘railroading-like’ fashion, where the guidewire is inserted into a longitudinal incision made at the distal tip of a urethral catheter [14].

To allow for antegrade double J stenting during retroperitoneal laparoscopic pyeloplasty, another novel technique describing the antegrade insertion of a double J ureteric stent, has been described using a preloaded ureteric catheter (inserted in a retrograde fashion), prior to the commencement of the laparoscopic component of the repair. This preloaded ureteric catheter allows the advancement of a guidewire in the conventional retrograde fashion and is followed by the extraction of this guidewire out of a laparoscopic port. The double J ureteric stent is then inserted in the antegrade fashion via the existing laparoscopic port into the ureter, across the repaired pelvi-ureteric junction segment [15].

Guidewire passage down the ureter during the initial stages of the PCNL procedure, may also prove to be a challenge. Javali et al, described an ingenious method to circumvent this problem by utilizing an endoscopic assisted positioning down the ureter. This is achieved via the percutaneous introduction of a 6/7.5 Fr ureteroscopy, allowing for endoscopic insertion and direction of the guidewire down the proximal ureter [16].

In cases where the ureteral access sheath may be difficult to advance up the desired ureter, due to prostatic obstruction or unfavourable bladder neck anatomy, a novel endovisual technique was described. This was performed using the 8 Fr semi-rigid ureteroscopy, within the ureteral access sheath. The ureteral access sheath is thus placed using endoscopic and fluoroscopic guidance [17]. More recently, Aghamir et al., have described the feasibility of this technique using zero radiation in 106 procedures [13,18].

The method listed herein, is the first description of a technique allowing fingertip accessibility and direction of the advancing guidewire.

An advantage using the guidewire on the fingertip method is the fact that everyday consumables are used in the construction which has an obvious cost benefit. Making this method more economical compared to the more expensive angled tip or angiographic guidewires.

An obvious limitation is the small dataset described within this paper, also the fact that the flow of the surgery needs to be interrupted for a few moments prior to allow for setup and insertion of the guidewire.

Conclusion

A simple, novel, technique to allow for the flexibility and stress-free maneuvering of a guidewire on the fingertip is described. This time and cost saving method is advocated for use in certain challenging circumstances during open or combined open and endoscopic urological surgery where guidewire placement is needed.

Conflict of interest

None declared.

Author contribution

Sole Authorship, AA responsible for the concept, write up and imaging.

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