Suprapubic catheterisation is a minor surgical procedure traditionally performed in theatre, either under general or local anaesthesia, using blind or ultrasound-guided percutaneous trocar puncture. In recent years, suprapubic catheterisation has become increasingly used for those requiring long-term catheterisation, e.g. in patients with intractable incontinence or bladder outflow obstruction and in patients with neurological disorders.

Suprapubic catheterisation avoids the complications of long-term urethral catheterisation, such as traumatic hypospadias and ischaemic stricture. Patients report increased satisfaction with suprapubic catheterisation, stating they are more comfortable, and complain of less burning and reduced rates of urinary leakage when compared to urethral catheterisation (Ischsan and Hunt, 1982; Shapriro et al, 1982; Emberton and Fitzpatrick, 2008). Suprapubic catheterisation is also advantageous when performing a trial without catheter (TWOC), as it negates the need for re-catheterisation in the event of an unsuccessful TWOC, thereby reducing unnecessary patient anxiety and the risks associated with further, sometimes multiple, urethral catheter insertions.

In a Cochrane review of complications in patients catheterised for short periods (<14 days), 12 out of 14 trials demonstrated that bacteruria was more common after urethral catheterisation (RR 2.6, 95% CI 2.12 vs. 3.18) (Niel-Weise and van den Broek, 2005). In addition, urethral stricture rates are dramatically reduced when suprapubic catheterisation is used (Horgan et al, 1992) and it is preferred by those who are sexually active.

New technology has allowed the development of the Seldinger technique, a medical procedure that facilitates safe access to blood vessels and other hollow organs such as the bladder via the insertion of a trocar.

The MediPlus suprapubic catheter (MediPlus) uses this technique, which improves the safety and ease of insertion.

Conventional suprapubic catheterisation technique
In the recent past, the most widely used suprapubic catheter in the UK has been the Lawrence Add-a-Cath (Femcare-Nikomed), a single unit trocar introducer. The patient is required to have a full and palpable bladder prior to insertion. With the patient lying flat, the bladder is palpated and local anaesthetic is infiltrated approximately 2–3 finger breadths above the pubic symphysis. The bladder is located via aspiration.

Once the clinician is assured of the bladder position, a 1 cm horizontal incision is made. Using the introducer (trocar and sheath) and a twisting motion, the introducer enters the bladder blindly. The trocar is removed, a Foley catheter is passed down the sheath and a balloon inflated. No sutures are required.

New technology and Seldinger suprapublic catheterisation
More recently, the Seldinger technique has been employed for suprapubic catheterisation using the MediPlus suprapubic catheter (Figure 1). This has a number of advantages both to the clinician and patient:
- High degree of control for accurate placement
- Less pressure needed to insert the trocar; so more comfortable under local anaesthetic and easier to use for the clinician
- Minimum trauma for the patient and minimum tissue damage
- Utilising the Seldinger technique, the user can be more confident that the trocar is being inserted into the bladder as the track has already been secured
- A three-stage guide-wire improves insertion and removal and guarantees insertion of the trocar along the anaesthetised track. The variable stiffness of the guide-wire allows secure placement and curling up in the bladder; while reliably guiding the trocar and preventing damage to the posterior wall of the bladder
- The soft uniformly inflated balloon is flush to the catheter shaft to improve insertion and removal and sits well against the bladder.

Insertion technique for the MediPlus suprapubic catheter
Conventional suprapubic catheterisation insertion using kits with a trocar can be daunting to the user; as well as the patient, due to the risks involved (Ahluwalla et al, 2006). The Seldinger technique allows controlled entry of the trocar into the bladder over a guide-wire and is designed to reduce the potential hazards of the blind technique.

The equipment consists of a long needle, guide-wire, trocar with outer sheath and a silicone catheter (8, 14 or 16 French are available).

With the patient supine and the suprapubic area thoroughly cleaned, local
anaesthetic is infiltrated 2cm above the pubic symphysis in the midline. In the elective setting, the bladder is filled with a target volume of 250–350mls sterile water either using a urethral catheter or a flexible cystoscope. In the emergency setting the bladder will be palpable.

A 1 cm incision is made in the skin to allow easier insertion of the trocar. The bladder is then punctured using the 18-gauge needle. After confirming the position in the bladder via aspiration, the floppy end of the three-stage 0.035-inch guide-wire is introduced through the needle to the first of two measured markers. The needle is then removed leaving the guide-wire in the bladder. The trocar and sheath are introduced over the guide-wire through the incision until safely in the bladder (as determined by reaching the second measured marker on the guide-wire). The guide-wire and trocar are then removed from the outer sheath and the supplied silicone catheter from the pack is inserted into the bladder through the peel-away sheath (the kits are supplied with an 8, 14 or 16fr catheter).

The MediPlus guide-wire is the key to success of this technique. It is made up of three parts. The first is the ‘floppy tip’, followed by a more rigid section, with the third part being a solid section with two reference black marks printed on it. When inserted into the bladder, the floppy tip protects against posterior bladder wall injury. The second section allows the user to feel resistance on the guide-wire in the bladder; providing a good reference as to how far it has been inserted. The third section features two reference points that are used to identify the location of sections relevant to the patient’s anatomy. The first mark is used with the 18-gauge needle and alerts the user that the solid section is at the tip of the needle. The second mark indicates to the user that the solid section is level with the outer sheath of the trocar (Mohammed et al, 2008).

The authors have extensive experience of this technique and recommend the following helpful hints when performing the procedure:

- In the case of bladder scanning, prior to filling up the bladder the clinician should check the residual level of urine. A significant proportion of patients will have over 350mls residual, due to underlying problem (stricture/outflow obstruction etc) negating the need for further filling.
- On removal of the trocar; pinch the outer sheath to avoid urine flowing onto the patient whilst inserting the catheter, and remove the pressure only once the catheter is in the sheath.
- For ease of use and comfort for the patient, ensure that all equipment is connected prior to beginning the procedure. The authors connect the catheter bag to the catheter and have the water syringe (for balloon inflation) in the port. This has two benefits – it avoids excessive urine spilling onto the patient and also increases efficiency for the user.
- Finally, a hoist needs to be available as a number of the patients attending clinic will have underlying neurological disease and poor mobility.

**Benefits of the MediPlus Seldinger technique**

The authors have embraced this technique as it has allowed them to offer an outpatient suprapubic catheterisation insertion clinic in their hospital. Following introduction of this clinic, retrospective audit comparing suprapubic catheterisation insertion has revealed the extent to which they have improved the service.

The authors have compared general anaesthesia requirements, inpatient admission rates, duration of stay and complication rates one year before and one year after establishing the outpatient suprapubic catheterisation clinic using the MediPlus system (Table 1). In addition to this, the introduction of the Seldinger technique has dramatically improved the service.

**Table 1**

<table>
<thead>
<tr>
<th>Comparison of conventional SPC and Seldinger system</th>
<th>Conventional SPC</th>
<th>Seldinger MediPlus SPC</th>
</tr>
</thead>
<tbody>
<tr>
<td>General anesthetic (%)</td>
<td>90</td>
<td>3</td>
</tr>
<tr>
<td>Duration of stay (days)</td>
<td>2.3</td>
<td>28 mins</td>
</tr>
<tr>
<td>Insertion in theatre (%)</td>
<td>91</td>
<td>11</td>
</tr>
<tr>
<td>Insertion in OP clinic (%)</td>
<td>0</td>
<td>75</td>
</tr>
</tbody>
</table>

**Figure 1: MediPlus Seldinger SPC equipment.**
reduced the number of patients requiring general anaesthesia with its associated morbidity and mortality (Figure 2).

Patient satisfaction rates are good with 100% reporting they were ‘highly satisfied’ or ‘satisfied’ with Seldinger suprapubic catheterisation and there have been no significant complications following insertion in this clinic to date.

This technique has proved so effective that it has been advocated by the NHS Technology Adoption Hub, which strongly recommends adoption of this system.

**Conclusion**

Introducing the Seldinger MediPlus suprapubic catheter has allowed the authors to offer an outpatient suprapubic catheterisation service which has increased patient satisfaction and safety. They have dramatically reduced the requirements for theatre and general anaesthesia, with its associated morbidity and mortality, and significantly reduced length of stay and negated the need for inpatient admission for this cohort of patients, therefore reducing cost to the NHS.

An additional unforeseen benefit of the clinic is that it has provided a focus for training clinicians from all specialities in this new technique.

Following the successful introduction of this clinic in Taunton, the authors would strongly recommend that other sites offer a similar outpatient service utilising the MediPlus Seldinger System.

**References**


Horgan AF, Prasad B, Waldron DJ, O’Sullivan

**Key Points**

- Conventional suprapubic catheterisation insertion using kits with a trocar can be daunting to the user, as well as the patient.
- The Seldinger technique allows controlled entry of the trocar into the bladder over a guidewire and is designed to reduce the potential hazards of the blind technique.
- The equipment consists of a long needle, guidewire, trocar with outer sheath and a silicone catheter.
- The MediPlus guide-wire is the key to success of this technique.
- Introducing the Seldinger MediPlus suprapubic catheter has allowed the authors to offer an outpatient suprapubic catheterisation service.
- This technique has proved so effective that it has been advocated by the NHS Technology Adoption Hub.

![Figure 1. Bar chart demonstrating the reduction in general anaesthetics compared to local anaesthetics when administered with a Seldinger SPC.](image-url)


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