How I Do It: Transperineal prostate biopsy using local anesthetic in an outpatient setting

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Transperineal prostate biopsy (TPPB) is proven to be an effective diagnostic tool for prostate cancer detection. It allows satisfactory sampling of apical and anterior areas which is not well achieved with the transrectal route, without the associated risks of urinary tract infection or sepsis. The main objective of this paper is to describe the technique utilized in our institution to perform transperineal prostate biopsy under local anesthetic in the outpatient clinic setting.

Key Words: transperineal, prostate biopsy, prostate cancer, local anesthetic

Introduction

Prostate cancer is the one of the most common cancers in men, second only to skin cancer. The primary method of disease confirmation is via a prostate biopsy and the majority of these biopsies have historically been performed using a transrectal approach.

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A video clip is available online at www.canjurol.com

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The risks associated with transrectal prostate biopsy (TRbx) are significant, with infectious complications being observed in 7% of cases and a post procedural sepsis rate of 0.3 to 3.5%.[1] Resistance within these causative urinary tract pathogens is now up to 22%,[2] so avoidance of infection and rationalization of antibiotic use is increasingly important. According to the Canadian database,[1] consisting of over 75 000 patients, the overall risk of post-procedural admission was around 2% with approximately 70% being infection-related admissions. The risks and costs incurred by these complications have pushed many centers to move towards the transperineal prostate biopsy (TPPB) approach.

The transperineal approach does not pass through the rectal mucosa avoiding cross contamination of

pathogens and results in much lower rates of infection. Some studies already suggest that antibiotic prophylaxis might not be necessary.[3] With regards to cancer detection, TPPB is proven to offer better sampling of anterior and apical prostatic zones[4] and, a higher chance of histology upgrade on confirmatory biopsy in the subset of patients on active surveillance (when compared to TRbx).[5]

Current European Association of Urology (EAU) guidelines suggest TPPB should be the first choice for men who need prostate biopsy. The American Urological Association (AUA) white paper,[6] published in 2017 also recommends TPPB as an alternative, with the desire to maintain antibiotic stewardship.

Historically, TPPB was first described in the 40's, but did not become widely deployed. More recently, its popularity has progressed, and many centers have started utilizing it, using the standard brachytherapy grid and a stepper. This method, however, needs to be performed in the operating room (OR), usually under general anesthetic. Multiple small punctures are made in the perineum as the needle is guided into the prostate using ultrasound. In 2003, Novella et al[6] described the use of a coaxial needle as a guide for a free-hand (FH) technique, that would avoid many punctures in the perineal area and thus reduce pain for the patient. A new device (Precision Point) was then introduced, bringing further development to the FH technique allowing this procedure to be performed under local-anesthetic in an outpatient clinic setting. The ability to move TPPBs to the outpatient department is significant where time in the OR is expensive and scarce. Further support of the Precision Point FH technique was recently published[7] suggesting that it outperforms the standard grid-based approach in terms of procedure length. The Tauranga Urology Department has recently made the transition to an outpatient clinic-based TPPB LA technique.

Method/technique

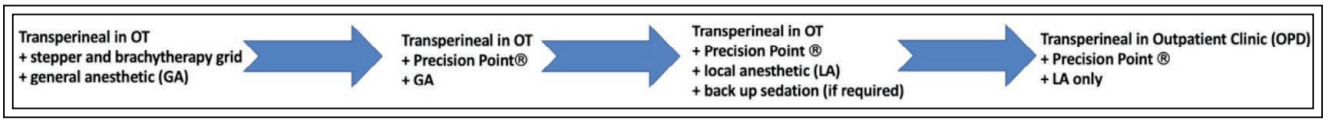
In order to create a smooth transition from the grid-based approach under general anesthetic (GA) to a FH technique under LA, we initially performed this technique with the Precision Point (R) device in the OR with the patient under general anesthetic. We completed

Figure 1. Mayo table with standard equipment required (described in the text).

25 cases during this phase, refining our technique and using a broad local anesthetic block. Next, the cases were done with local anesthetic in the OR, having an anesthetist on standby to provide sedation if required, see flowchart 1. Once the technique was satisfactory and the LA block effective, we moved out of theatre and into the outpatient department clinic. Our current outpatient technique is described.

Equipment required

- Ultrasound which is compatible with biplanar probes (with axial and sagittal views) – currently using BK Specto with biplanar probe.
- Condom (tip filled with ultrasound gel) with rubber bands to secure the condom to cover the probe.
- Precision Point device, Figure 1H.
- "Cold spray" (ethylchloride).
- 10 mL syringe containing 10 mL of Lignocaine 1% + 1 mL of sodium bicarbonate 8.4% for skin and subcutaneous tissue as a superficial block, Figure 1A.
- 20 mL syringe containing 15 mL of Lignocaine 1% + 1.5 mL of sodium bicarbonate 8.4% for pelvic wall



Flowchart 1. Transitional process from TPPB in OR to TPPB in clinic.

muscles, periapical triangle and Allaway's space using 8 mL in each side as a deep block, Figure 1C.
- 11 gauge needle (0.7 mm x 38 mm - Gray) for the superficial block, Figure 1B.
- 20 gauge spinal needle (152 mm – yellow) for the deep block, Figure 1D.
- 50 mL catheter tip syringe filled with warmed ultrasound-gel, Figure 1E.
- Disposable core biopsy gun 18 gauge x 20 cm (Bard) – 22 mm penetration, Figure 1F.
- Chloraprep with tint (2% chlorhexidine gluconate 70% isopropyl alcohol) to prepare the skin, Figure 1G.
- Hypafix to secure scrotum anteriorly.
- Primapore dressing, Figure 1I.

Anesthetic block

The success of this technique depends upon the effectiveness of the local anesthetic block. Trials of different kinds of block, to cover both prostate and skin/subcutaneous tissue, were performed. In our view, the following method for a perineal and prostatic block is the most effective way to ensure patient comfort to complete successful TPPB in an outpatient clinic setting.

We divide the anesthetic technique into 3 parts:

1. The use of cold spray (ethylchloride) on the skin prior to the subcutaneous block (to desensitize the skin so the patient does not feel initial needle prick).
2. Bilateral skin and subcutaneous block, Figure 2A, with 1% lignocaine (10 mL) and sodium bicarbonate 8.4% (1 mL) using the 11 gauge needle. We place 5.5 mL on each side of the midline.
3. Bilateral pelvic wall muscle block, Figure 2B, followed by the periapical triangle block, Figure 2C, using the spinal needle, Figure 2D, and 8 mL of the solution (lignocaine 1% and sodium bicarbonate) on each side. This step requires the use of the ultrasound and the Precision Point device.

Systematically, we start the block on the left side, moving to the second half of the gland and waiting 3 to 5 minutes before starting the biopsy sampling.

Two factors are key in optimizing the block result: the use of sodium bicarbonate 8.4% with the lignocaine 1% (buffered solution) and, allowing adequate time for the local anesthetic to take effect (usually 3-5 minutes). Our experience concurs with published research suggesting that the use of sodium bicarbonate improves the block potency.[8] This increases the speed of onset and decreases the concentration of anesthetic needed to achieve satisfactory pain control. Thus, allowing us to keep within the maximum safe dose of lignocaine without adrenaline, reported to be 4.5 mg/kg.[9]

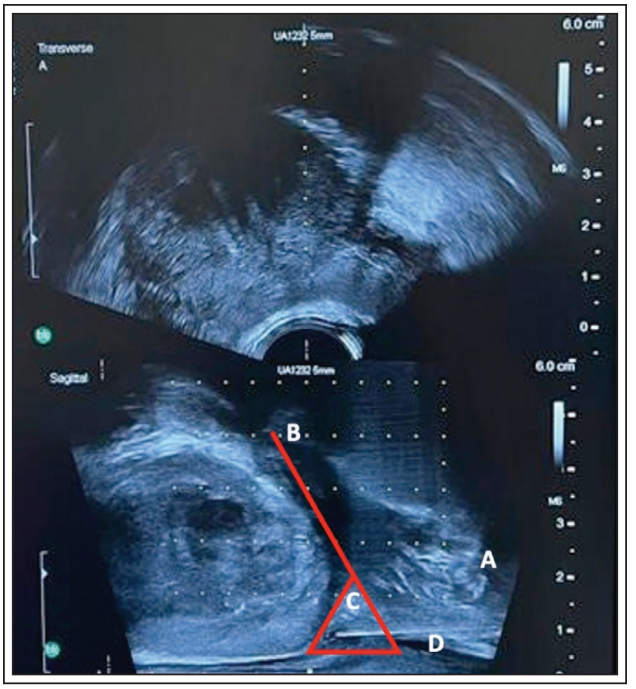


Figure 2. Sagittal view with landmarks: **A)** subcutaneous tissue; **B)** pelvic wall muscles; **C)** periapical triangle; **D)** 20 g spinal needle.

TPPB template

Targeted and standard transperineal templates were employed on patients with multiparametric MRI results suggesting Pi-Rads 3, 4 or 5 changes. Those patients whose MRIs showed no suspicious lesion had only the standard prostate biopsy template performed.

In this study, rather than adopting the Ginsburg protocol, the FH technique biopsy map (created with Precision Point) was used. For larger prostates, two sets of prostate biopsies are normally taken, one covering apex-to-mid gland and another covering from mid-to-base. All fragments are sent for pathologist review in separate formalin containers.

Conclusion

TPPB under local anesthetic is a safe and feasible procedure in an outpatient clinic setting. It has been demonstrated to offer the same or higher cancer detection rates whilst providing a lower chance of infection as compared to a transrectal approach. Using the technique outlined here, we have completed the successful transition from the OR to the outpatient setting with effective biopsy results and excellent pain control. □

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