

Points of Technique

A brachytherapy template approach to standardize saturation prostatic biopsy

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INDICATIONS

The increasing use of PSA testing has resulted in more men undergoing prostatic biopsy to diagnose or exclude malignancy. However, the standard sextant or octant biopsy regimen is reported to miss 15–35% of 'significant' prostate cancers [1–3]. The finding of 'no evidence of malignancy' on standard biopsy in the presence of a rising PSA level, a rapid PSA doubling time or a suspicious DRE may prompt further biopsies. Several studies have reported sites inadequately sampled using standard techniques, including the anterior transition zone superior and lateral to the urethra, the inferior part of the anterior horn where the peripheral zone wraps round the transition zone, and the midline of the peripheral zone [2,4,5]. Increasing the number of biopsies and targeting these sites after a negative standard prostatic biopsy results in increased cancer detection [1,2,5]. Saturation biopsy involves taking a large number of biopsies (14–45) using a periprostatic block, sedation, spinal or general spinal anaesthesia [6–8]. In men with a clinical suspicion of prostate cancer and previously negative sextant biopsies, transrectal saturation biopsies have a cancer detection rate of 14–34% [6–8]. We describe a systematic and comprehensive technique to take saturation prostatic biopsies through the perineum.

METHODS

After appropriate antibiotic prophylaxis and under general anaesthesia the patient is

placed in the extended lithotomy position. A 16 F Foley catheter is passed and a bladder syringe containing 20 mL of aerated aqueous gel is attached to the catheter. The gel is instilled to assist the ultrasonographic identification of the urethra. A biplanar TRUS probe is used with a silicone offset to lift the prostate anteriorly into the area accessible for perineal biopsy. The probe is attached to a brachytherapy stepping unit (Sure-point™, Amertek, Medical Inc, Florida) with a standard 0.5 cm brachytherapy template and positioned over the perineum. The prostate volume is measured as the width and height (the x and y axis, respectively) in the transverse plane and the length (z axis) in the longitudinal plane. The prostate is aligned so that the posterior aspect lies on the '1' row and the urethra on the 'D' column (Fig. 1a). The prostate is divided into right and left portions by the D column, and is further divided equally into anterior, middle and posterior areas, marking these divisions on the ultrasound monitor with a dry marker pen (Fig. 1b). The prostate can be further subdivided in the longitudinal plane (inferior and superior) if a needle biopsy placed at the apex does not adequately sample the base of the gland. Systematic biopsies may then be taken using the brachytherapy template, through the perineum. The 18 G biopsy needle, loaded on the Magnum™ gun (Bard Urological, Covington, GA) is introduced, e.g. at point 3.5, C (Fig. 1b), with TRUS in the transverse mode. On visualizing the needle in the correct site in the transverse plane (3.5, C) TRUS is switched to the longitudinal mode.

The needle is withdrawn until it is seen at the prostatic apex and the biopsy gun then fired. In an average-sized gland (30–50 mL) three biopsies are taken in each area as shown, although the number of biopsies can be varied depending on the size and shape of the prostate.

ADVANTAGES AND DISADVANTAGES

The brachytherapy template allows a systematic division of the prostate and by introducing the biopsy needle through the template, the needles can be accurately placed. By taking prostatic biopsies through the perineum the anterior prostate can be targeted. Over 20% of prostate cancers occur predominantly anterior to the urethra and these are more frequently missed using standard sextant or octant biopsies obtained rectally [4]. Perineal biopsies are taken in the caudal-cephalic direction parallel to the rectum, and therefore another area frequently missed at standard biopsy, the midline of the peripheral zone [5], can be targeted, without risk of urethral injury.

As the biopsies are taken through the perineum patients do not have rectal bleeding or discomfort, as experienced after transrectal biopsies. Taking biopsies through the perineum reduces the incidence of sepsis associated with the transrectal approach [9]. In addition, the presence of aerated gel in the catheter enables the easy identification of the urethra, so that biopsies can be targeted away, minimizing side-effects including haematuria and dysuria.

A disadvantage of this technique is the need for the brachytherapy equipment, including a stepping unit and template compatible with the ultrasound probe. In addition, transperineal saturation biopsy requires general anaesthesia to minimize patient discomfort.

The role of saturation biopsies in the diagnosis of prostate cancer remains controversial. The use of general anaesthetic, the risk of diagnosing clinically insignificant cancers and the increased workload for both the surgeon and the histopathologist mean that saturation biopsies are only appropriate for some men. Patients with a high index of suspicion for prostate cancer, who have had previous negative or equivocal standard biopsies and who would be candidates for radical therapy, may be suitable for saturation

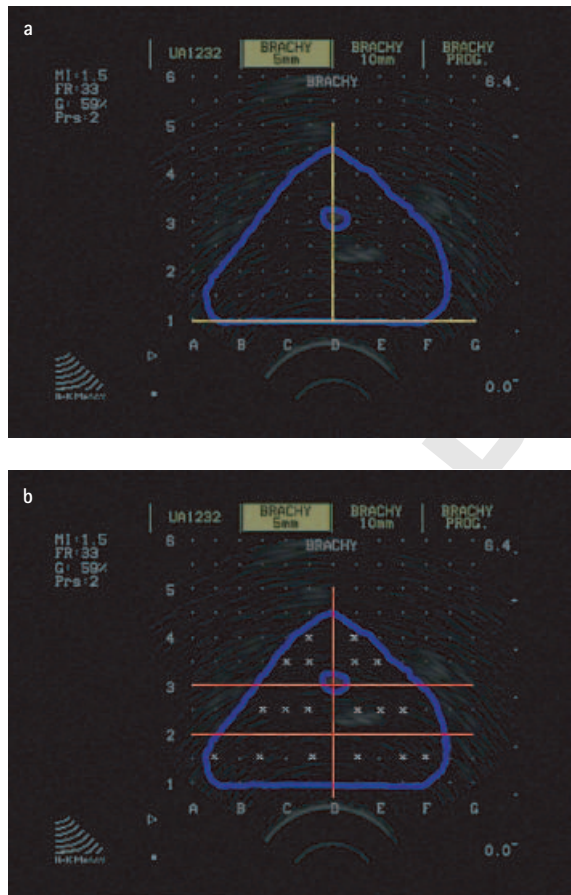


FIG. 1.

(a) TRUS image of a prostate in the transverse plane. The posterior surface of the prostate is aligned on row 1 and the urethra on column D. (b) The prostate is divided into right and left portions, and into anterior, middle and posterior areas. Biopsies are taken through the brachytherapy template (marked X).

biopsies. The technique described facilitates saturation biopsies and allows systematic sampling throughout the prostate.

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