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Functional medicine

CT-PLANNED transperineal prostate BIOPSY IN patients without a rectum

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ABSTRACT

A patient at risk of harboring prostate cancer with a history of ulcerative colitis surgically managed with total colectomy (including the distal rectum and anal canal) underwent CT-planned transperineal prostate biopsy with fluoroscopic guidance. We describe the planning and intraoperative technique to obtain prostate biopsy cores.

Introduction

Prostate biopsies are traditionally performed via transrectal or transperineal approaches utilizing transrectal ultrasound. However, the management of patients with an elevated PSA in the absence of rectal access is challenging. Patients without rectal access have undergone prostate biopsy via transperineal and transabdominal ultrasound and CT or MRI-guided transgluteal biopsy approaches.[1–5] Herein, we describe a CT-planned transperineal approach with fluoroscopic guidance for prostate biopsy in a patient who underwent a total colectomy (including the distal rectum and anal canal).

Case report

Patient was a 70 year old white male with a PSA of 8.84ng/mL who underwent a total colectomy (including the distal rectum and anal canal) for ulcerative colitis. The patient denied any family history of prostate cancer. Physical examination was unremarkable except for a right sided ileostomy. The perineum was in good repair without rectal access. A biopsy planning CT revealed a prostate volume of 59.8cm^3 with a length of 4.8cm. At biopsy, 32 biopsies were obtained. Pathology reported Gleason score 9 (4 + 5) and Gleason score 7 (4 + 3) adenocarcinoma known to involve 6 of the biopsies (right mid, right apex x 2, left base, left mid and left apex) without evidence of perineural invasion. A metastatic work-up revealed no evidence of metastases.

Technique

CT planning

The penis was prepped using sterile technique and a project was used prior to placement of an 18 French urinary catheter. 150 cc of dilute contrast was placed in the bladder. The patient was then appropriately positioned in the supine position and a thin slice (3mm) CT scan was obtained from above the level of the seminal vesicles to the penile bulb. Subsequently, prostate dimensions were obtained at the base, midgland and apex. Pre-planned biopsy locations were determined for the base, midgland and apex by recording the relationship to the urethra. Each biopsy was planned with coordinates to include the offset from the base and the lateral and posterior/anterior relationships to the urethra. Figs. 1 and 2 illustrate a biopsy at the mid gland. The biopsy was located 1.4cm lateral to the urethra and 0.7cm posterior to the urethra. The planning included biopsies of the anterior, lateral and posterior aspects of the gland.

Operative procedure

In the operating room with IV sedation, the patient was placed on the operating room table in the dorsal lithotomy position. An 18 French urinary catheter was placed and 150 cc of sterile saline with dilute contrast was placed in the bladder and 10 cc of contrast were placed in the catheter bulb. A brachytherapy template was used to facilitate needle placement and AP and lateral fluoroscopy was used to confirm needle placement. Each biopsy needle was placed in accordance with the

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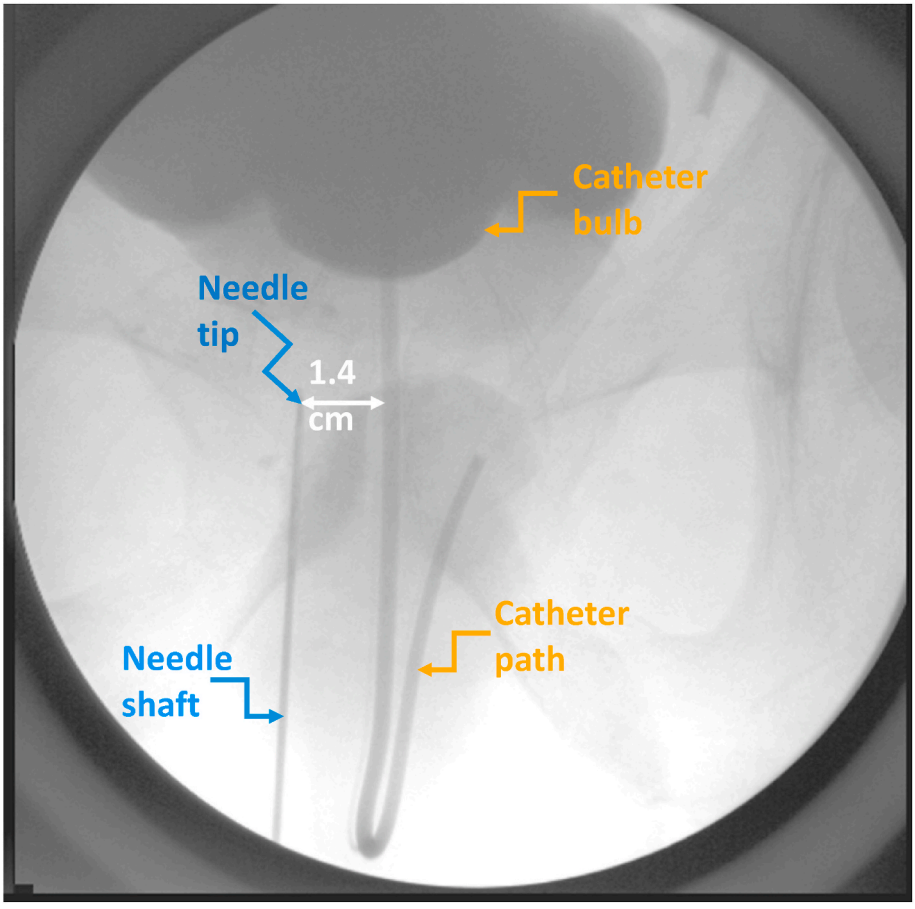

Fig. 1a. Anterior-posterior fluoroscopic image showing the positions of the biopsy needle and the urethra as defined by the Foley catheter. The needle tip is 1.4 cm lateral to the urethra.

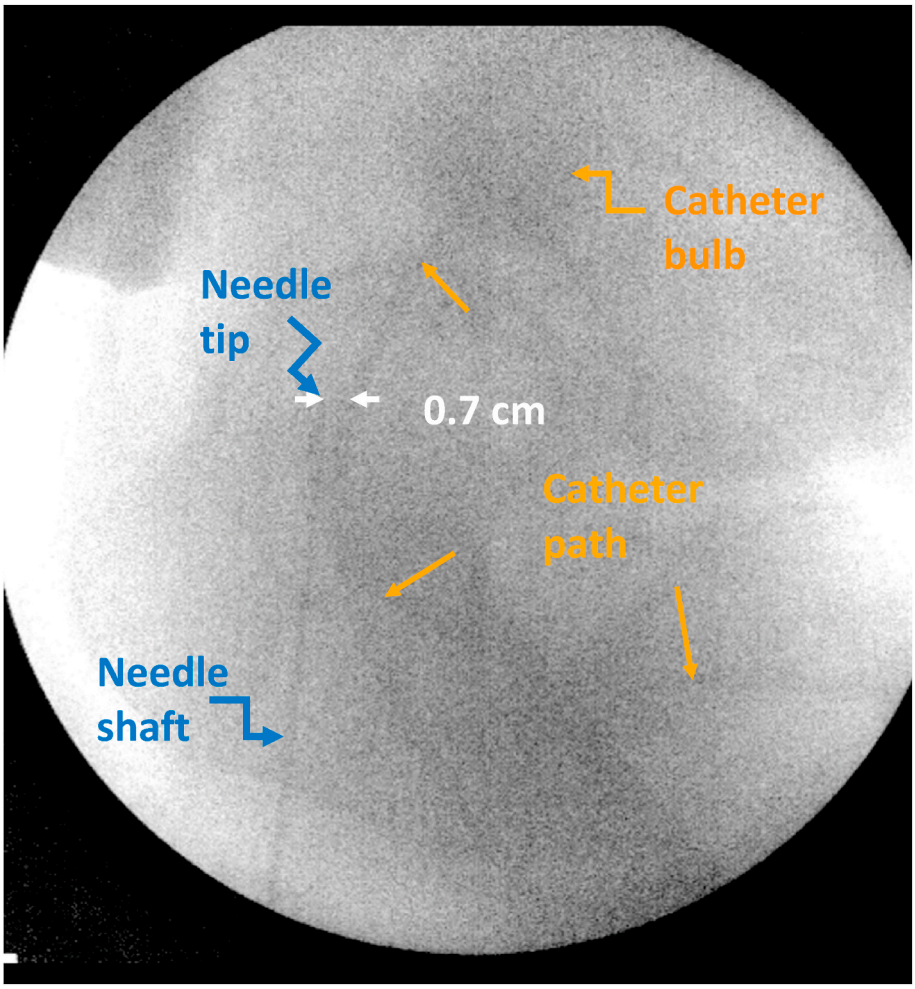

Fig. 1b. Lateral fluoroscopic image showing the positions of the biopsy needle and the urethra as defined by the Foley catheter. The needle tip is 0.7 cm posterior to the urethra.

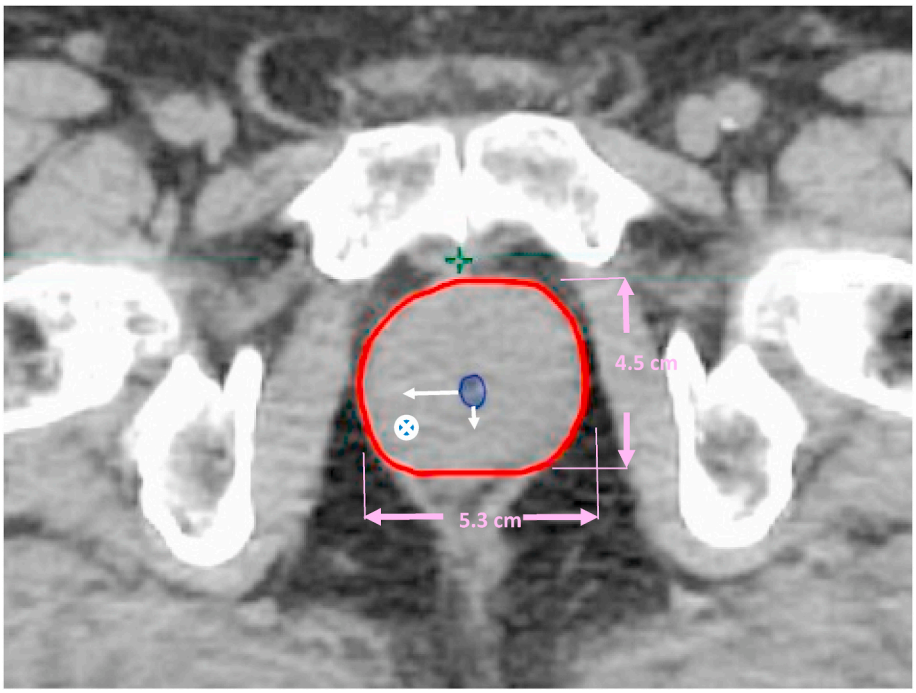

Fig. 2. Transverse CT image showing the pre-planned position of the biopsy needle relative to the urethra as defined by the Foley catheter (dark blue). The needle tip was 1.4 cm to the patient's right and 0.7 cm posterior to the urethra. The prostate is outlined in red, and its dimensions are 5.3 cm lateral and 4.5 cm anterior-posterior. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

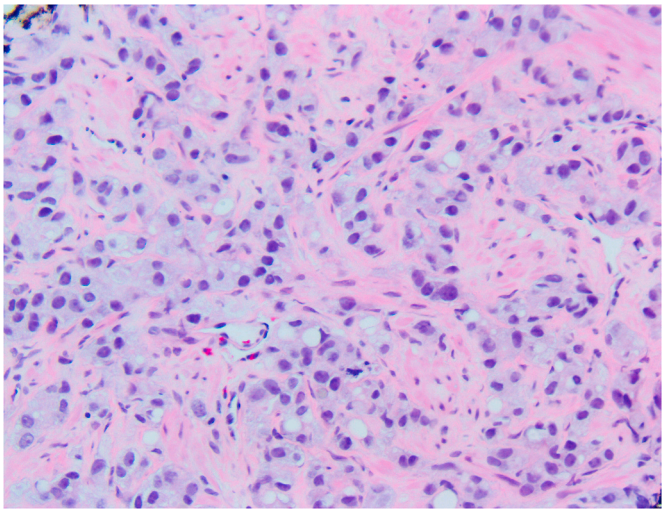

Fig. 3. Photograph of the histologic evaluation of the biopsy core obtained in Fig. 2 demonstrating Gleason score 9 (4 + 5) adenocarcinoma of the prostate gland.

pre-plan and determined by its relationship to the urethra. The base was identified with AP fluoroscopy by advancing the biopsy needle until the bladder wall "tented". This position was considered the base plane. Subsequently, the needle was retracted 2cm and its preplanned location was confirmed on both the AP and lateral fluoroscopic images. For a 4.8cm long prostate gland, the mid gland was biopsied by retracting the needle 2.4cm from the fluoroscopically defined base and then retracted another 10mm so that the biopsy needle would traverse the 2.4cm offset. For a 4.8cm long prostate, the apex was defined by retracting the needle 4.8cm from the fluoroscopically defined base. This procedure was repeated for each pre-planned biopsy. Pre-planned biopsies were obtained from the anterior, lateral and posterior gland. Fig. 3 is a photograph of the histologic evaluation demonstrating Gleason score 9 (4 + 5) adenocarcinoma of the prostate gland.

Discussion

An elevated PSA in the absence of a rectum presents a diagnostic dilemma. Several imaging modalities have been described for prostate biopsy in the absence of rectal access.

In the past, transperineal ultrasound, transurethral ultrasound, transabdominal ultrasound and CT or MRI-guided transglutial biopsy approaches have been reported.[1–5] An advantage of transperineal biopsies is the ability to biopsy all aspects of the gland and in particular the anterior apex. In certain cases access can be limited by pelvic arch interference. If pelvic arch interference is present, this should be identified prior to biopsy via an evaluation of the planning CT. Despite the fact that CT has low sensitivity for detecting prostate cancer, we utilized CT-planned transperineal biopsy because of the ability to use the urethra as a guide to direct prostate biopsies and the ability to pre-plan biopsies of the anterior, posterior and lateral prostate at the base, midgland and apex. In the future, we plan to incorporate prostate MRI as part of the planning procedure to identify high-risk regions and to further localize prostate biopsies.

Conclusion

We describe a CT planned transperineal prostate biopsy technique with fluoroscopic guidance in a patient without rectal access. The technique was reproducible, produced good biopsy cores with the resultant diagnosis of prostate cancer.

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