



Oncology

Lesion Targeted CT-Guided Transgluteal Prostate Biopsy in Combination With Prebiopsy MRI in Patients Without Rectal Access

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ABSTRACT

With prostate and colorectal malignancies being the most common cancers in men, elevated prostate specific antigen (PSA) in patients without rectal access due to prior surgery poses a diagnostic dilemma. We report the first use of CT-guided biopsy in combination with prebiopsy MRI in 2 patients with a clinical suspicion of prostate cancer and no rectal access. In both cases, a diagnostic multiparametric MRI of the prostate was performed to detect and to localize a potential suspicious lesion. The localization served as a cognitive map for guiding needle placement using a CT-guided transgluteal approach.

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Introduction

Prostate and colorectal malignancies are among the most common cancers in men, therefore it is not uncommon to encounter patients with synchronous or metachronous disease. Abdomino-perineal resection (APR) is a common surgical technique performed in patients with rectal cancer and additionally may be offered prophylactically in high risk patients with inherited colorectal syndromes, or as a treatment option for inflammatory bowel disease. APR completely removes the distal colon, rectum, and anal sphincter complex using both anterior abdominal and perineal incisions, resulting in a permanent colostomy.¹ Digital rectal examination (DRE) and transrectal ultrasound-guided (TRUS) prostate biopsy remain the current standard approach for diagnosing suspected prostate cancer, with histopathologic tissue evaluation considered essential before commencement of treatment.³ Both require rectal access, thus elevated prostate specific antigen (PSA) in patients without rectal access due to prior surgery poses a diagnostic dilemma.

To date, different approaches have been described for such patients in the literature, including systematic biopsy sampling via an ultrasound-guided transperineal approach, or a transgluteal

route under the guidance of CT or MRI, respectively.^{2,3} To our knowledge, however, there is only one case report describing targeted biopsy, using MRI and a transgluteal approach.⁴ We report on two patients presenting to our department with a raised PSA following rectal surgery where lesion-targeted CT-guided transgluteal biopsy was employed to achieve a diagnosis of prostate cancer.

Case presentation

Patient 1, 63-year-old man, presenting with a rising PSA of 18.3 ng/mL, 7 years post neoadjuvant chemotherapy and resection of rectum for pT3N0M0 rectal cancer. Patient 2, a 69-year-old man presenting with PSA 10.2 ng/mL, 1 year following APR for pT2N0M0 rectal cancer.

Prebiopsy MRI

Prebiopsy multiparametric 3T MRI of the prostate was performed incorporating T2-weighted, diffusion-weighted imaging (b-values 50, 400, 1000), and dynamic contrast-enhanced sequences. Images revealed highly suspicious lesions in the right base peripheral zone in patient 1 (Fig. 1) and in the right mid peripheral zone in patient 2 (Fig. 2). The MR images served as a cognitive map for subsequently directing the biopsy.

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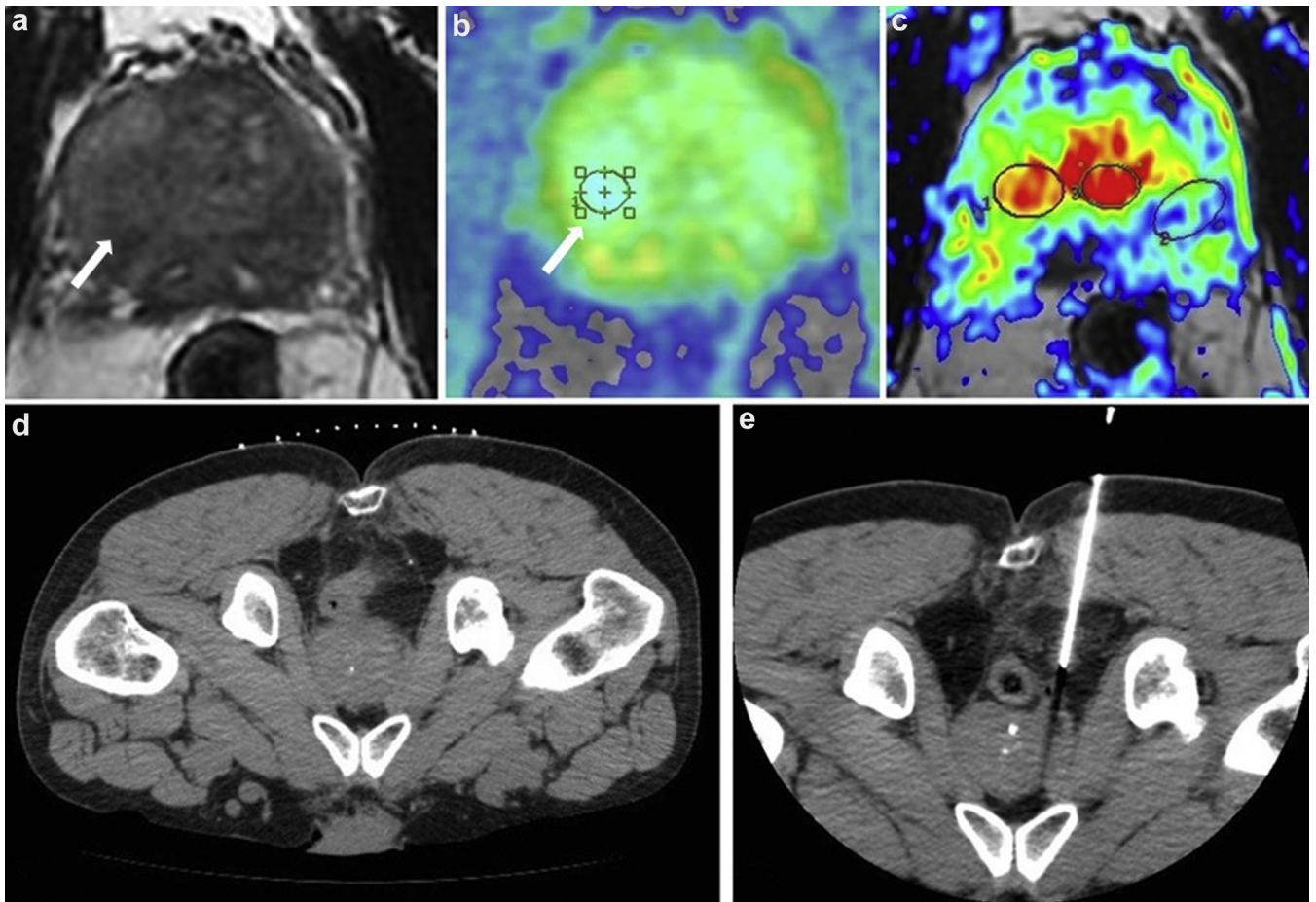


Figure 1. Patient 1. High probability MRI target and targeted CT-guided transgluteal biopsy. a–c: MRI demonstrates a high probability 16×12 mm lesion at the posterior right base peripheral zone with low T2 signal intensity (a), restricted diffusion with low ADC value (b) and an early enhancement pattern on a DCE color map (c). d: CT image of a patient in a prone position with a radiopaque grid applied. Note the thickening and stenosis of the rectum wall. e: CT image of transgluteal biopsy needle guided to this region.

Transgluteal CT-guided prostate biopsy technique

Written consent was obtained. Patients followed a standard CT-guided biopsy protocol, with biopsies performed in the prone position. No prophylactic antibiotics were administered as the needle was not expected to pass via the rectum. The procedure was conducted by an experienced interventional radiologist, in cooperation with a uro-radiologist to ensure the optimal cognitive fusion. A single-puncture percutaneous transgluteal approach was

used, with an aseptic technique and 1% lidocaine as local anesthesia. A Chiba co-axial needle (Cook Medical, Bloomington, IN, USA) was introduced under direct CT guidance and cognitively positioned to the target point in the prostate. Four biopsy specimens were taken through coaxial needle system using 22 mm, 18G Bard Magnum (Bard biopsy systems, Tempe, AZ, USA). After acquiring the first sample the trocar was tilted slightly for subsequent passes to ensure a larger sample area. Tissue samples were sent for histopathological examination. A post-biopsy CT of pelvis

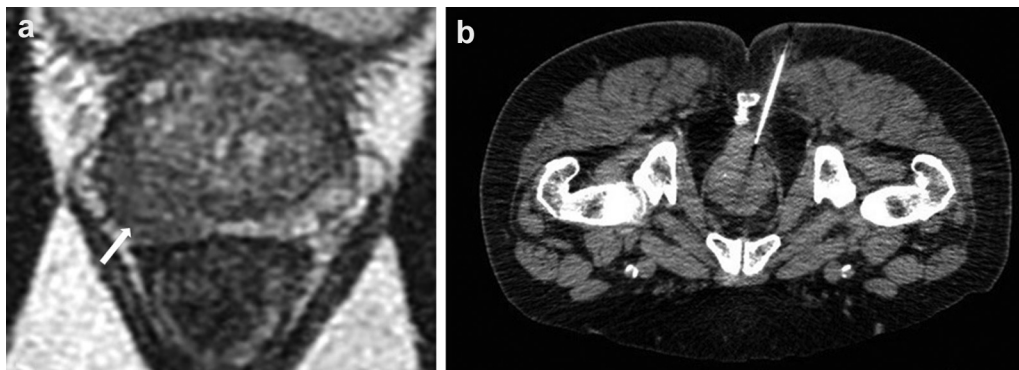


Figure 2. Patient 2. High probability MRI target and targeted CT-guided transgluteal biopsy. a: MR T2w image demonstrates a high probability 20×10 mm lesion at the posterior right mid-gland peripheral zone shows low T2 signal intensity. b: CT image of transgluteal biopsy needle guided to this region. Note the absence of rectum between the prostate and the sacrum.

was performed to exclude immediate complications. The biopsies were well tolerated, with an overall procedure time was approximately 15 min, and both patients being discharged 3 h post-procedure.

Results

Both biopsies were positive for prostatic adenocarcinoma, patient 1: Gleason Grade 4 + 3 = 7 in 4/4 cores involving up to 50%; patient 2: Gleason Grade 3 + 5 = 8 in 4/4 cores, with total surface area involved 70%.

Discussion

Patients with previous APR and suspected prostate cancer require a different diagnostic approach due to the lack of rectal access. We report a lesion-targeted CT-guided transgluteal biopsy of the prostate following prebiopsy MRI. In our two cases it has proven to be a safe and reliable diagnostic approach with high detection rate in selected patients without rectal access.

Various approaches to this diagnostic dilemma have been previously described and the decision on which to use may in part depend on the local experience and the type of equipment available. Prostate punctures are performed by urologists in our institution, exclusively by under TRUS guidance. The equipment required to perform more sophisticated in-bore MRI-guided punctures is not available. The axial imaging planes of MRI and CT are almost identical, making orientation/cognitive fusion straightforward and reliable in the hands of an experienced radiologist. Given this, and considering the local experience, a lesion-targeted CT-guided biopsy with transgluteal approach was chosen.

A number of recent studies have suggested that targeted sampling of prostate lesions identified by MRI yields better results than systematic biopsies alone. Conversely, a recent large prospective study showed that combining systematic biopsy to targeted cores does not necessarily improve biopsy yields.⁵ We therefore decided to acquire targeted cores alone, using one entry site with four cores only which was less invasive and well tolerated by the patients. Additionally, this approach allowed us to perform the procedure under local anesthesia cover.

The histopathology results confirmed a high success rate, with all 8 biopsy cores positive for cancer. However, it is worth emphasizing that both index lesions measured >15 mm, which may have helped to minimize the risk of targeting error. In order to calculate the true sensitivity and accuracy, and to evaluate the cost-benefit of this diagnostic method, larger studies or data from multicentric studies would be required. One drawback of this technique is the radiation exposure, however, the alternative approaches using a transperineal US-guided approach or in-bore MRI-guidance entail their own disadvantages.

We believe that the described method is feasible and could be quickly applied at almost no extra cost in hospitals that are already performing CT-guided procedures but lack state of the art MRI compatible biopsy devices.

Conclusion

To our knowledge, this is the first report of lesion-targeted CT-guided transgluteal biopsy of prostate in combination with pre-biopsy MRI. In our two cases it has proven to be a safe approach with a high diagnostic yield.

Conflict of interest

The authors declare no conflict of interest.

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