

Prostatic intraepithelial neoplasia-like ductal prostatic adenocarcinoma: A case suitable for active surveillance?

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Abstract

In contrast to typical prostatic ductal adenocarcinoma, prostatic intraepithelial neoplasia (PIN)-like ductal adenocarcinoma is a rare variant of prostate cancer with low-grade clinical behavior. We report a case of a 66-year-old African-American male with an elevated serum prostate-specific antigen who underwent multiparametric prostate magnetic resonance imaging (MRI) and MRI/ultrasound fusion-guided biopsies. Pathology demonstrated low-volume Gleason score 3 + 3 = 6 (Grade Group 1), acinar adenocarcinoma involving one core and PIN-like ductal adenocarcinoma on a separate core. Herein, we discuss the potential role of active surveillance for patients with this rare variant of prostate cancer found in the era of advanced imaging with multiparametric MRI for prostate cancer.

Key Words: Active surveillance, fusion biopsy, magnetic resonance imaging, multiparametric magnetic resonance imaging, prostate cancer

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INTRODUCTION

Prostate cancer is the most common noncutaneous malignancy diagnosed in American men.^[1] Advances in multiparametric magnetic resonance imaging (MP-MRI), incorporating both anatomic and functional imaging sequences, allow for identification of concerning lesions within the prostate gland suspicious for harboring prostate cancer. When targeted for biopsy, suspicious lesions delineated by MP-MRI have been shown to improve detection of prostate cancer, especially higher grade disease areas.^[2,3] Adoption of MP-MRI and MRI-ultrasound (US) fusion-guided biopsy has been demonstrated to play a potentially integral role in active

surveillance (AS) for appropriately chosen patients with low-risk, clinically indolent prostate cancers.^[4,5] Specifically, targeted biopsies of MRI-detected lesions within the prostate have increased confidence in safely selecting patients appropriate for AS due to the improved risk stratification. Herein, we present a case of MRI/US fusion-guided biopsy with pathology demonstrating low-volume Gleason score 3 + 3 = 6 (Grade Group I), prostatic adenocarcinoma involving one core and a separate core with prostatic intraepithelial neoplasia (PIN)-like ductal adenocarcinoma. To date, the report of MRI-targeted biopsy and PIN-like ductal

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adenocarcinoma of the prostate has not been reported in the context of potentially selecting AS as a method of clinical management.

CASE REPORT

A 66-year-old African-American male presented for a prostate biopsy prompted by an elevated screening serum prostate-specific antigen (PSA) level. Before biopsy, he underwent MP-MRI, which demonstrated two intraprostatic lesions suspicious for harboring prostate cancer suitable for targeted biopsy. Both lesions were classified as low-suspicion for harboring clinically significant prostate cancer. Following the diagnostic MP-MRI, the patient underwent targeted biopsies through MRI/US fusion-guidance using the UroNav software fusion platform (InVivo, Philips, Gainesville, FL, USA) in addition to standard 12-core extended sextant biopsy. On fusion biopsy, pathology showed low-volume Gleason score $3 + 3 = 6$ (Grade Group I), acinar adenocarcinoma involving one core as well as PIN-like ductal adenocarcinoma involving a separate core. We questioned whether this patient could be considered a safe candidate for AS given the presence of PIN-like ductal adenocarcinoma.

DISCUSSION

Ductal adenocarcinomas comprise 0.4%–0.8% of all diagnosed prostate cancers and are characterized by atypical tall columnar cells arranged in a variety of patterns (cribriform, papillary, single cell, solid, or PIN-like).^[6,7] PIN-like ductal adenocarcinoma can be distinguished from high-grade PIN based on morphologic features more characteristic of ductal adenocarcinoma and by the absence of basal cells in the atypical glands [Figures 1-3].^[7,8] It is important to recognize PIN-like ductal adenocarcinoma as a separate entity from other variants

of ductal adenocarcinoma due to its clinical behavior. Although ductal adenocarcinomas are generally comparable to Gleason score $4 + 4 = 8$ (Grade Group 4) prostatic carcinoma, the PIN-like pattern of ductal adenocarcinoma often behaves similar to Gleason score $3 + 3 = 6$ (Grade Group I), acinar prostatic carcinoma offering a much more favorable prognosis.^[8] In a clinicopathologic study of 28 cases of PIN-like ductal adenocarcinoma, only one of the PIN-like ductal adenocarcinomas at the time of radical prostatectomy was associated with extraprostatic extension, which was noted focally.^[8] Patients with this variant, hence, may potentially be safely selected candidates for AS.

MP-MRI and MRI/US fusion-guided prostate biopsies have shown optimized detection of clinically significant prostate cancers in large series compared to the standard 12-core extended sextant biopsy.^[3] Prostate imaging with MRI and targeted biopsy has also been utilized to confirm safe AS candidacy, allowing for detection of otherwise occult cancer foci or areas of higher grade or higher volume disease.^[4,9] Furthermore, serial MRI for continued AS has been reported by several centers who have been early adopters and developers of the MRI fusion biopsy techniques.^[5,10]

To date, reports of prostatic ductal adenocarcinoma and imaging features seen on MP-MRI have been reported, but never in the setting of MRI/US fusion-guided biopsy with detection of the rare variant of PIN-like ductal adenocarcinoma.^[11] With the confidence that MRI and targeted biopsy did not find any intermediate or high-grade acinar adenocarcinoma, we questioned whether this patient would be considered a safe candidate for AS given the caveat of the small focus in a single biopsy core of PIN-like ductal adenocarcinoma. Given the nonaggressive clinical behavior of PIN-like ductal

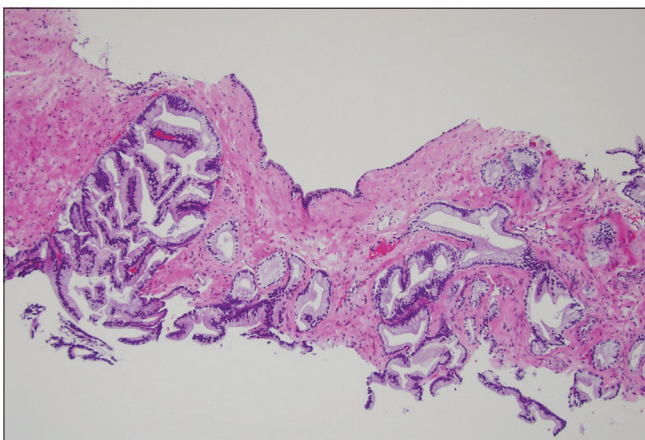


Figure 1: Low magnification H and E stain of a prostate needle core biopsy showing architecturally benign glands with luminal infolding and pseudostratified, hyperchromatic nuclei, morphologically typical of high-grade prostatic intraepithelial neoplasia

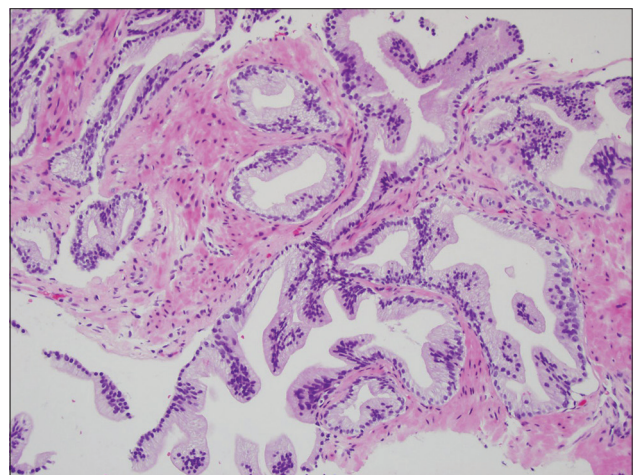


Figure 2: High magnification of prostate needle core biopsy showing prostatic intraepithelial neoplasia-like glands with pseudostratified, hyperchromatic nuclei, and prominent nucleoli

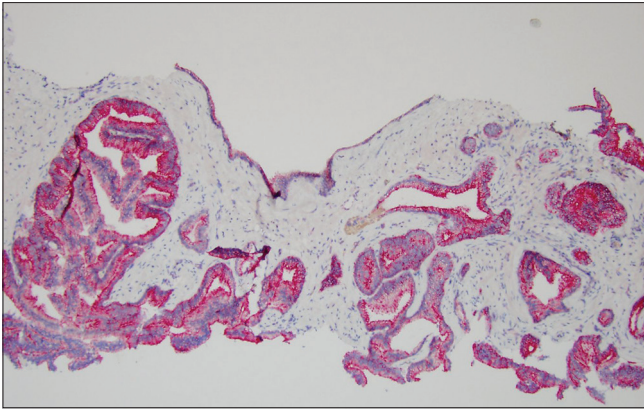


Figure 3: Immunohistochemical stain for p63, high molecular weight cytokeratin, and AMACR. The prostatic intraepithelial neoplasia-like malignant glands are negative for p63 (brown nuclear staining) and high molecular weight cytokeratin (brown cytoplasmic staining), demonstrating the lack basal cells. AMACR (pink staining) is positive, highlighting the malignant glands. The morphology and immunohistochemistry are diagnostic of prostatic intraepithelial neoplasia-like ductal adenocarcinoma

adenocarcinoma, we proposed that AS would be a safe option in this case. The patient elected to pursue AS, which entailed serial clinical examinations, serum PSA assessment, MP-MRI evaluating for dynamic change, and follow-up biopsy to ensure timely assessment of grade or stage increase to allow for early definitive treatment with curative intent. As with other patients pursuing AS at our institution, we find great value in the use of MP-MRI for serial imaging and targeted biopsy to confirm safe AS eligibility.

Further investigation with larger patient series and longer follow-up, potentially in the setting of multi-institutional efforts due to the rarity of this diagnosis, is necessary to determine the safe eligibility for AS for patients with this histopathologic finding.

CONCLUSIONS

PIN-like ductal adenocarcinoma behaves similar to Gleason score 3 + 3 = 6 (Grade Group I), prostatic carcinoma. In the setting of MRI/US fusion-guided biopsy with Gleason score 3 + 3 = 6 (Grade Group I), acinar prostatic carcinoma

involving one core and a separate focus of PIN-like ductal adenocarcinoma found on another core, AS is considered a safe management option. Close clinical follow-up, integrating serial biomarker evaluation, imaging, and biopsy are recommended in this case.

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Conflicts of interest

There are no conflicts of interest.

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