



## Original article

## Central zone lesions on magnetic resonance imaging: Should we be concerned?

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## Abstract

**Introduction and objective:** The Prostate Imaging Reporting and Data System (PI-RADS) score was developed to evaluate lesions in the peripheral and transition zone on multiparametric magnetic resonance imaging (mpMRI) of the prostate. We aim to determine if the PI-RADS scoring system can be used to evaluate central zone lesions on mpMRI.

**Materials and methods:** A retrospective review of 73 patients who underwent mpMRI/ultrasound (US) fusion-guided biopsy of 143 suspicious lesions between February 2014 and October 2015 was performed. All patients underwent a 3 T mpMRI. Indications for mpMRI included an abnormal digital rectal examination, PSA velocity > 0.75 ng/dl/y, and patients on active surveillance. The mpMRI sequence involved T2-weighted imaging, diffusion-weighted imaging, and dynamic contrast enhancement. Using 3-dimensional model software (Invivo Corporation, Gainesville, FL, USA), a minimum of 3 magnetic resonance imaging (MRI)/US fusion-guided biopsy samples were taken from each prostate lesion seen on mpMRI irrespective of PI-RADS score, using local anesthesia in an outpatient clinic setting.

**Results:** A total of 73 patients underwent MRI/US fusion-guided biopsy of 85 peripheral zone lesions, 31 transitional zone lesions, and 27 central zone lesions. Only 2 (7%) of central zone lesions were positive for prostate cancer. Both patients had lesions which were graded as PI-RADS 3. Both the patients had multifocal lesions that encompassed  $\geq 50\%$  of the central and transition zones on the sagittal view MRI images. Both patients previously had transrectal US-guided biopsy of the prostate which was negative for cancer. Both patients underwent a robotic-assisted laparoscopic prostatectomy, each revealing high-grade cancer.

**Conclusions:** Lesions involving only the central gland/zone seen on MRI are less concerning for malignancy and should not be given equal weight as peripheral zone lesions. In this series, no lesions involving solely the central gland/zone, regardless of PI-RADS score, was positive for malignancy on MRI/US fusion-guided biopsy. Consideration of a modified PI-RADS scoring system should be given to help identify central zone lesions with malignant potential. © 2016 Elsevier Inc. All rights reserved.

**Keywords:** Multiparametric magnetic resonance imaging; Prostate cancer; PSA; Central zone lesion; MRI/US biopsy

## 1. Introduction

The prostate is divided into 3 general anatomic zones: peripheral zone, transition zone, and central zone. Prostate cancer most commonly originates from the peripheral zone [1]. Sextant biopsy with the aid of a transrectal ultrasound

(US) continues to be performed up to this day since it was described in 1989 [2]. The technique initially described obtaining 6 biopsies from the peripheral zone of the prostate. Since then, it has evolved and currently entails sampling in a more systematic manner, with 10 to 12 cores to achieve higher detection rates [3,4].

Over the ensuing 2.5 decades, magnetic resonance imaging (MRI) of the prostate has been used for non-invasive evaluation of the prostate gland and surrounding

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Fig. 1. Central zone lesion as seen on T2 MRI sequence. Sagittal view of (A) the prostate, (B) patient 1, and (C) patient 2. AFS = anterior fibromuscular stroma; CZ = central zone; PZ = peripheral zone; TZ = transition zone; US = urethra. Figure 1A reproduced with permission [5].

structures. The initial technique for MRI of the prostate involved T1-weighted and T2-weighted pulsed sequences and was primarily used for locoregional staging in patients with biopsy-proven cancer. Further advances in the technology has led to the development of multiparametric magnetic resonance imaging (mpMRI), which combines T1/T2-weighted images with diffusion-weighted imaging (DWI) and dynamic contrast-enhanced (DCE) sequences for MR image acquisition [5,6].

The technique allows for identification of any lesion which would then be assigned a grade using the Prostate Imaging Reporting and Data System (PI-RADS) scoring system [7]. With the use of MRI, central zone lesions that were typically missed on a standard 12 core sextant biopsy can now be identified. However, the PI-RADS scoring system was only developed to evaluate peripheral zone and transitional zone lesions [7]. In this study, we aim to determine if the PI-RADS scoring system can be used to evaluate central zone lesions on mpMRI.

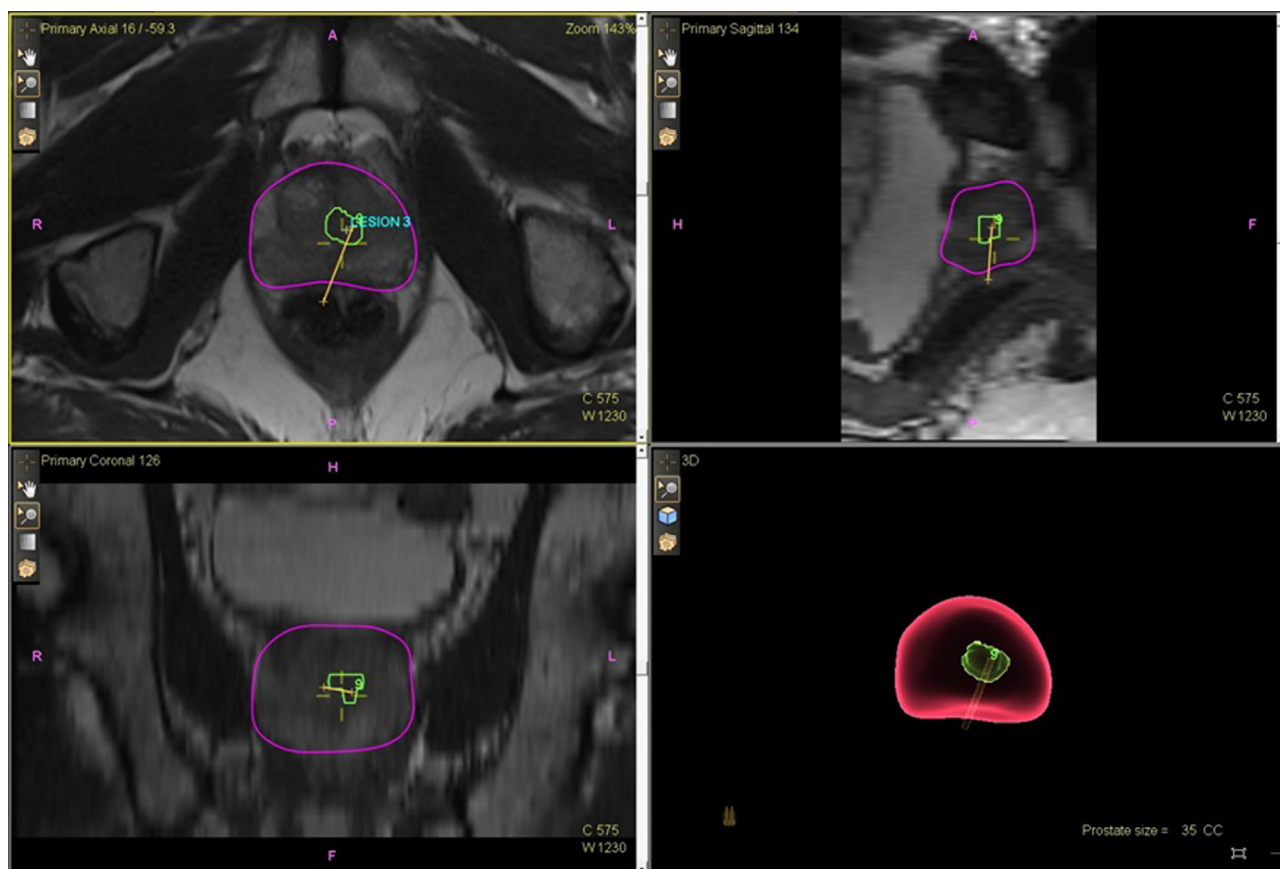


Fig. 2. Axial, sagittal, and coronal views of the prostate and the central zone lesion.

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