

# The utility of 29 MHz resolution Micro-Ultrasound and mpMRI in the management of Gleason 6 Prostate Cancer with Active Surveillance

## INTRODUCTION

The introduction of the PSA test to screen men for prostate cancer (PCa) has led to an increase in the overdiagnosis of indolent PCa that can remain asymptomatic during a patient's lifetime. Active Surveillance (AS) is the recommended management strategy for men with low-risk prostate cancer. We assess the role of micro-ultrasound and multiparametric MRI (mpMRI) in monitoring the progression of prostate cancer in men on AS according to the Prostate Cancer Research International: Active Surveillance (PRIAS) criteria.

## OBJECTIVE

This study seeks to identify the potential of **ExactVu™ Micro-Ultrasound System** (Exact Imaging, Markham, Canada, *Figure 1*) as an additional tool for the management of **Gleason 6** prostate cancer with **Active Surveillance**.

## METHODS:

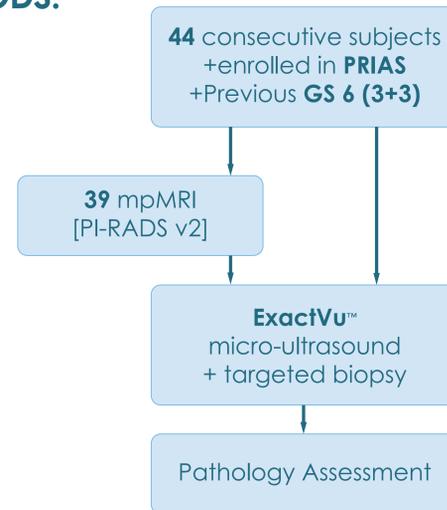


Figure 1: Exact Imaging's ExactVu™ 29 MHz Micro-Ultrasound System

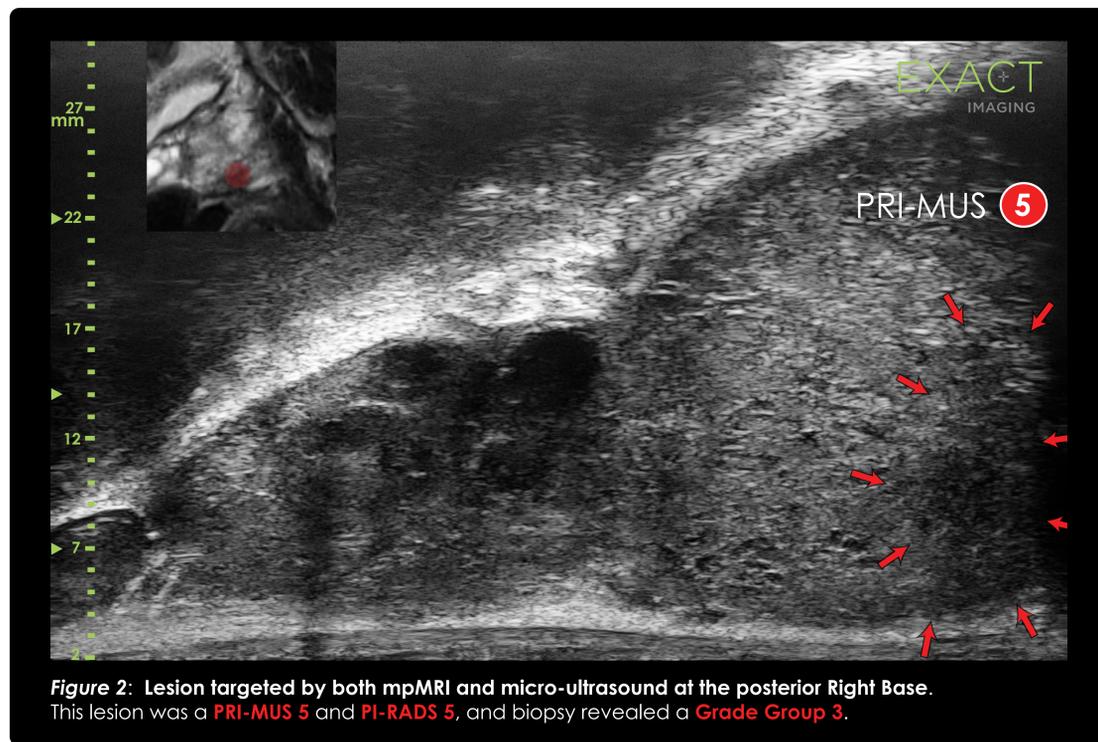


Figure 2: Lesion targeted by both mpMRI and micro-ultrasound at the posterior Right Base. This lesion was a **PRI-MUS 5** and **PI-RADS 5**, and biopsy revealed a **Grade Group 3**.

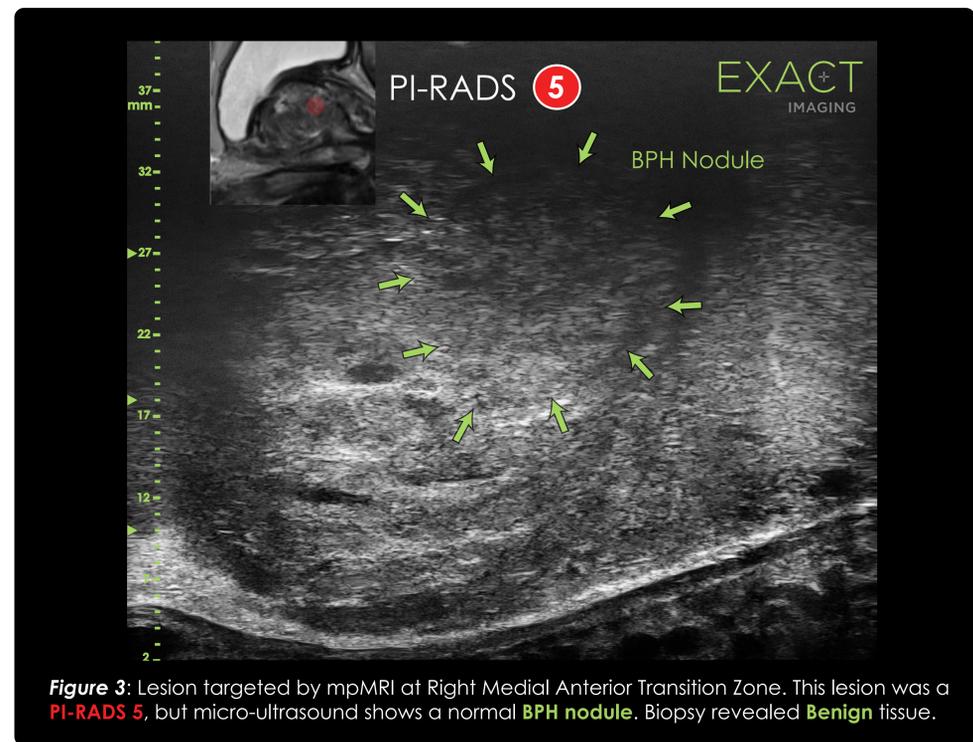


Figure 3: Lesion targeted by mpMRI at Right Medial Anterior Transition Zone. This lesion was a **PI-RADS 5**, but micro-ultrasound shows a normal **BPH nodule**. Biopsy revealed **Benign** tissue.

## RESULTS:

- For all PCa **micro-ultrasound sensitivity** was **84%** and mpMRI was 72%.
- csPCa was found in **6/39** (15%) subjects with **GS 3+4** or greater, targets from either modality alone would have found 5/6 of these with 1 small volume (3mm) discovered systematically near the Micro-ultrasound and MRI target (*Table 1*).
- 13/19** subjects were confirmed in **GS 3+3** pathology by **micro-ultrasound** targets, while **9/19** were confirmed by **MRI** (*Figure 4*).
- 17/39** (44%) of subjects had non-suspicious imaging on at least one modality. No significant cancer was found in this population, suggesting biopsy may be avoidable (*Figure 5*).

Pathology Result	Number of Patients	Micro-Ultrasound Match	MRI Match
Benign	14	-	-
Gleason 6 (3+3)	19	13	9
Gleason 7 (3+4)	3	2	2
Gleason 7 (4+3)	3	3	3
<b>Total</b>	<b>39</b>	<b>18</b>	<b>14</b>

Table 1: Summary of Pathology for patients receiving both MRI and Micro-ultrasound. Micro-ultrasound targets were equally sensitive compared to MRI for **GG 2-3** cancer and more sensitive to **GG 1**, suggesting the ability to track low grade cancer over time.

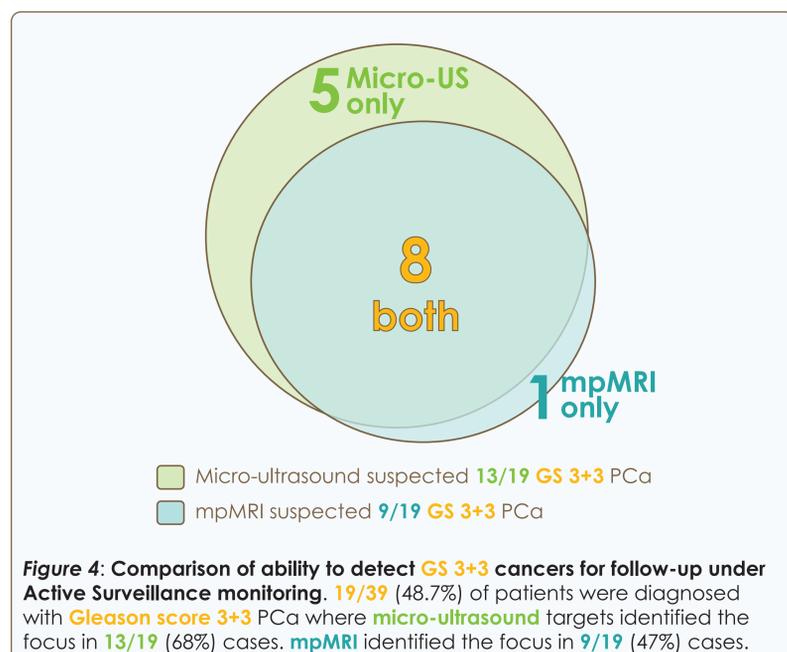


Figure 4: Comparison of ability to detect **GS 3+3** cancers for follow-up under Active Surveillance monitoring. **19/39** (48.7%) of patients were diagnosed with **Gleason score 3+3** PCa where **micro-ultrasound** targets identified the focus in **13/19** (68%) cases. **mpMRI** identified the focus in **9/19** (47%) cases.

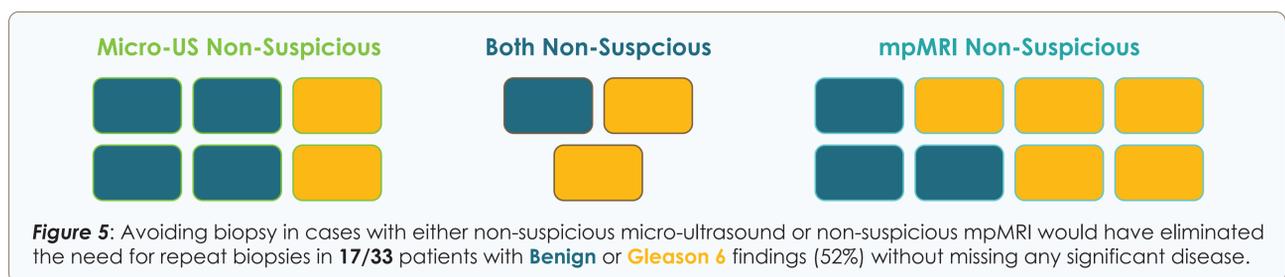


Figure 5: Avoiding biopsy in cases with either non-suspicious micro-ultrasound or non-suspicious mpMRI would have eliminated the need for repeat biopsies in **17/33** patients with **Benign** or **Gleason 6** findings (52%) without missing any significant disease.

## CONCLUSIONS:

- Micro-ultrasound** and **mpMRI** evaluations performed **similarly** in the **detection of csPCA**, with **Micro-ultrasound** detecting more **Gleason 6** PCa.
- Incorporation of **micro-ultrasound** or **mpMRI** in **Active Surveillance** protocol could **reduce** the number of **unnecessary repeat biopsies**:
  - Eliminating the need for biopsy in patients with benign findings
  - Increase yield of csPCA detection in fewer biopsies

## REFERENCES

1. Ghai S, Eure G, Fradet V, et al: *Assessing Cancer Risk on Novel 29 MHz Micro-Ultrasound Images of the Prostate: Creation of the Micro-Ultrasound Protocol for Prostate Risk Identification*. J. Urol. 2016; 196: 562-569.