

# The Role of Imaging After Irreversible Electroporation for Prostate Cancer

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## Background

Focal therapy (FT) is an emerging and growing field in prostate cancer treatment. However, there is currently no universal consensus for monitoring post-treatment response (1). Given the limitations of current monitoring modalities after FT for prostate cancer, Prostate Specific Membrane Antigen (PSMA) PET emerges as a promising adjunct for assessing treatment response. PSMA PET has also been shown to improve tumour delineation and segmentation, which may ultimately refine patient selection and provide more precise guidance for focal treatment delivery and may have a role in being applied post FT (2).

## Aim

The aim of this study was to evaluate of the accuracy of MRI and PSMA detecting cancer recurrence post irreversible electroporation (IRE) – a form of FT.

## Methods

We analysed a database of 23 men treated with primary IRE (June 2022–July 2023). Post-treatment surveillance included MRI, PSA, PSMA and repeat transperineal biopsy. Images were reviewed by an experienced dual trained radiologist/nuclear medicine specialist, blinded to results. Quantitative PSMA parameters were assessed.

## Results

### MRI

- On pre-treatment MRI, focal lesions had a median dimension of 13mm
- Most lesions were described as a PIRADS 4 or 5 lesion (95.7%).
- No lesions suspicious of cancer were seen on any of the post-treatment MRIs.
- Eighteen patients (78.3%) had fibrosis on post-treatment MRI and ten (43.5%) had a urine cavity.
- Upon correlation against MRI, six patients had false PSMA uptake that was attributed to a urine cavity.

### PSMA

- PRIMARY score 4 was the most common finding reported on pre-treatment PSMA.
- There was quantitative decrease of all PSMA PET variables post-IRE treatment, but only a statistical difference was seen for the change in PRIMARY scores post-treatment.
- Median pre-IRE SUVmax was 3.52 compared to post-treatment SUVmax of 2.74 ( $p=0.15$ ).
- Spearman analysis demonstrated that patients with higher pre-treatment SUVmax values, had a significant pronounced reduction in SUVmax values after treatment (Spearman  $\rho=-0.85$ ,  $p<0.001$ ).



Figure 1: Example of post-IRE urine cavity on PSMA PET and MRI, demonstrating hyperintense region on T2 weighted MRI imaging, correlated against PSMA uptake

## Conclusion

Urine cavities are a novel post-IRE finding that has not previously been described. Furthermore, PRIMARY score downstaging post-IRE and SUVmax reduction support the role of integrating PSMA PET, warranting further validation.

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### References

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