PSA Density and Treated-Volume PSA Density as Predictors of Biopsy-Proven Recurrence After High-Intensity Focused Ultrasound for Localised Prostate Cancer: Results From a Single High-Volume Registry

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PURPOSE / OBJECTIVES

High-Intensity Focused Ultrasound (HIFU) is a minimally invasive option for localised prostate cancer, yet recurrence remains heterogeneous. PSA density (PSAd) may serve as a pragmatic marker of residual oncological risk. We assessed the predictive value of global PSAd and treated-volume PSAd (PSAd-treated) for biopsy-proven recurrence after HIFU.

MATERIAL & METHODS

This prospective series of 1**87** men treated with Focal One® HIFU (focal, hemi-ablation, whole-gland) between 2018 and 2024 was extracted from a single-centre registry (>1,900 patients). Baseline parameters included PSA, MRI-derived prostate and treated volumes, and ISUP grade. Recurrence was defined as **biopsy-positive disease** and stratified by Grade Group (GG1 vs GG2–3) and by management (salvage vs none). Follow-up ranged **16–93 months** (median 35). PSA density variables were evaluated using ROC and Chi-square tests to identify clinically useful cut-offs. Ethics approval was obtained.

RESULTS

Overall, **81.3%** had no recurrence; **35/187 (18.7%)** recurred. Regarding management, **89.3% required no second treatment**, while **5.9%** underwent repeat HIFU; remaining salvage comprised EBRT±ADT.

By recurrence grade, **87.7%** had **no recurrence beyond ISUP-1**, while **8.6%** recurred as GG2–3.

Median pre-HIFU PSA was **6.7 ng/mL**; median **PSAd 0.14** and **PSAd-treated 0.40 ng/mL/cm³.** Higher **PSAd (prostate)** was associated with recurrence (**mean 0.25 vs 0.15;** χ^2 p=0.019; AUC 0.643, 95%CI 0.531–0.755, p=0.012). **PSAd-treated** showed stronger discrimination (**mean 0.69 vs 0.57;** χ^2 p=0.006; AUC 0.682, 95%CI 0.542–0.823, p=0.011). Using the **predefined cut-off 0.47** for PSAd-treated, **83% of recurrence events occurred in patients with PSAd-treated ≥0.47** (10/12 recurrences), versus **17%** with <0.47; conversely, recurrence rates were **~32%** above cut-off (10/31) and **~6%** below (2/34). Neither age nor baseline ISUP independently correlated with recurrence.

AT A GLANCE

BEFORE HIFU, PSA DENSITY HELPS STRATIFY RECURRENCE RISK

TREATED-VOLUME PSA DENSITY IDENTIFIES PATIENTS AT HIGHER RISK OF BIOPSY-PROVEN RECURRENCE

PSAd-treated ≥ 0.47

32%

Biopsy-proven recurrence

10 / 31 patients

PSAd-treated < 0.47

6%

Biopsy-proven recurrence

2 / 34 patients

0.47 ng/mL/cm³

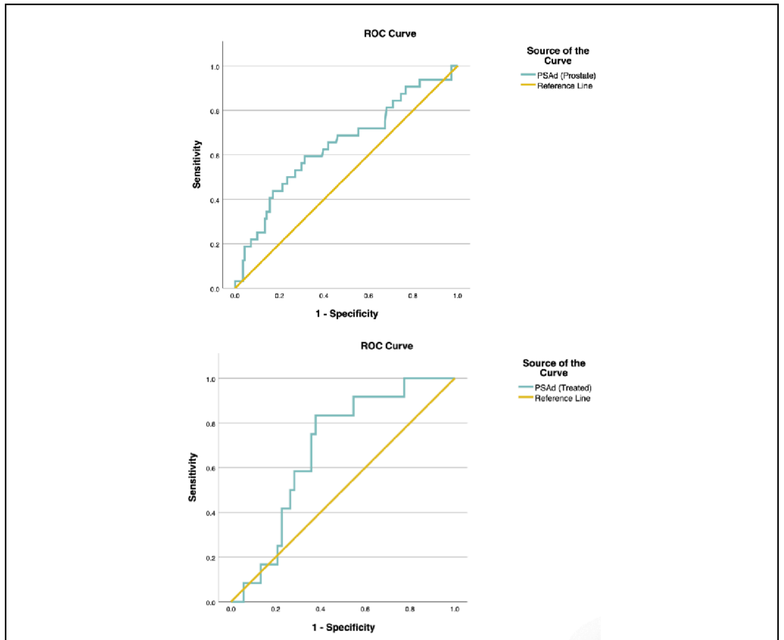
IDENTIFIES A HIGHER RISK GROUP

Threshold from ROC analysis

Treated-volume PSA density shows promising risk discrimination (AUC 0.682), potentially helping **refine HIFU candidate selection and surveillance.**

Evaluable subgroup (n = 65) · 10/31 vs 2/34

RESULTS



SUMMARY / CONCLUSION

Both **global** and **treated-volume** PSA density significantly predict **biopsy-proven recurrence** after HIFU. A **PSAd-treated ≥0.47 ng/mL/cm³** pragmatically enriches for relapse risk and may refine **patient selection** and **post-HIFU surveillance** strategies.

The robust follow-up supports the oncologic durability of HIFU in appropriately selected men.