Journal Club – August–October 2025 PIRAS-BERTINI

La Radiologia Medica

Zhong J, Davey A, Frood R, McWilliam A, Shortall J, Reardon M, Reaves K, Swinton M, Hulson O, West C, Buckley D, Brown S, Choudhury A, Hoskin P, Henry A, Scarsbrook A. *Combining MRI radiomics, hypoxia gene signature score and clinical variables for prediction of biochemical recurrence-free survival after radiotherapy in prostate cancer.* Radiol Med. 2025 Aug;130(8):1139-1148. doi: 10.1007/s11547-025-02037-4. Epub 2025 Jul 2. PMID: 40601075; PMCID: PMC12367909.

This retrospective two-center study evaluated whether the combination of MRI-derived radiomic features, hypoxia gene signatures, and clinical parameters could improve the prediction of biochemical recurrence-free survival (BCRFS) in high-risk prostate cancer patients treated with radiotherapy and androgen deprivation therapy. Radiomic features were extracted from pre-treatment T2-weighted MRI images and integrated into multivariate models along with clinical data such as ISUP grade, stage, and age. The results showed that incorporating MRI radiomics improved model performance compared with clinical variables alone, while the addition of hypoxia gene signatures did not significantly enhance predictive accuracy. The identified radiomic features reflected textural heterogeneity within the tumor, suggesting their potential role as non-invasive biomarkers of tumor aggressiveness. This study reinforces the value of radiomics in refining risk stratification and personalizing treatment approaches in prostate cancer, paving the way for image-guided prognostic models in modern radiotherapy.

Radiotherapy and Oncology

Francolini G, Cataldo VD, Caini S, Jereczek-Fossa BA, Marvaso G, Mastroleo F, Cammareri E, Alterio D, Miszczyk M, Majewski W, Hasterok M, Matrone F, Donofrio A, Triggiani L, Morelli V, Belgioia L, D'angelo E, Mazzola R, Ingargiola R, Fontana A, Cacciola A, Scipilliti E, Bardoscia L, Ciccarelli S, Allegra AG, Alongi F, Masi L, Doro R, Loi M, Simontacchi G, Garlatti P, Aquilano M, Bertini N, Valicenti RK, Livi L. *Re-irradiation in patients affected by prostate cancer and relapsing after previous definitive or postoperative radiotherapy. An international registry based study on behalf of Italian association of radiotherapy and clinical oncology (AIRO). (RE-START).* Radiother Oncol. 2025 Sep 13;212:111138. doi: 10.1016/j.radonc.2025.111138. Epub ahead of print. PMID: 40953707.

The RE-START registry study represents one of the largest multicenter analyses on prostate cancer re-irradiation after previous definitive or postoperative radiotherapy. The study included 433 patients with local recurrence confirmed by PET-CT or MRI and treated either with stereotactic body radiotherapy (SBRT) or brachytherapy. With a median follow-up of

54 months, the results demonstrated that re-irradiation is a safe and feasible option, with no treatment-related deaths and a low incidence of severe late toxicity. Late grade ≥2 genitourinary and gastrointestinal toxicities were reported in 16.2% and 5.3% of patients, respectively. Notably, the use of PSMA imaging for patient selection was associated with improved biochemical control, highlighting the importance of modern imaging in guiding retreatment. These findings confirm the growing role of precision re-irradiation as a viable salvage strategy for localized relapse, offering meaningful disease control with acceptable morbidity.

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Conventional Fractionated Elective Nodal Irradiation Preserves Early Antitumor Immunity and Efficacy Compared With Hypofractionated Protocols

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This study explores how ENI fractionation shapes antitumor immune responses in murine models. Conventional ENI (2 Gy × 8) preserved lymphocyte function and early CD8+ T cell infiltration, whereas hypofractionated ENI (9.8 Gy × 1), despite a similar BED, compromised immune cell viability. While long-term tumor control was ultimately similar, early immune preservation was notably superior with conventional ENI. These findings highlight the significance of treatment timing and suggest that conventional fractionation may better support antitumor immunity during radiotherapy.