

Longitudinal [¹⁸F]FDG PET/MRI Assessment of Arterial Inflammation in Patients with Prostate Cancer Undergoing Androgen Deprivation Therapy

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target-to-background ratio (TBRmax), calculated by normalising arterial maximum standardised uptake to mean venous blood-pool activity.

During ADT exposure, TBRmax increased significantly in the common carotid arteries (1.54 to 1.75), abdominal aorta (1.89 to 2.19), and common iliac arteries (1.88 to 2.24; all $p < 0.001$), as well as the aortic arch (1.64 to 1.78; $p = 0.005$) and ascending aorta (1.77 to 1.97; $p = 0.020$). The descending thoracic aorta showed a numerical increase that did not reach statistical significance. Composite TBRmax increased across all arteries (1.75 to 1.98), the aorta (1.78 to 1.98), and the carotid-iliac branch group (1.71 to 2.00; all $p < 0.001$), while venous blood-pool activity remained stable.

Longitudinal models indicated progressive increases in TBRmax, with estimated monthly increments of 0.0205 in the iliac arteries, 0.0123 in the carotid arteries, and 0.0098 in the abdominal aorta. Together, these findings suggest that ADT exposure is associated with progressive arterial inflammation, supporting a potential vascular pathway contributing to treatment-associated cardiovascular risk.

SUMMARY OF KEY RESEARCH FINDINGS

Androgen deprivation therapy (ADT) is a cornerstone of prostate cancer treatment, yet its vascular effects remain incompletely understood. This recent retrospective, single-centre study investigated longitudinal changes in arterial inflammation in 43 men with prostate cancer using paired Fluorine-18 fluorodeoxyglucose ([¹⁸F]FDG) PET/MRI examinations, separated by a median of 184 days.¹ Arterial inflammatory activity was quantified using the maximum

WHAT CHALLENGE DOES THIS ADDRESS?

Previous cross-sectional research reported greater arterial inflammatory activity in patients receiving hormonal therapy, but could not determine whether this activity increases over time within individual patients.² This study addresses this evidence gap through paired imaging, documenting longitudinal changes and identifying the vascular territories with the most pronounced progression. These observations also highlight

the challenge of preserving vascular health during effective prostate cancer treatment. Attention to arterial changes can broaden the clinical perspective beyond tumour response and conventional cardiovascular risk factors. Although the findings do not establish causality or predict individual cardiovascular events, they provide a basis for studying vascular health throughout ADT.

RELEVANCE TO EUROPEAN CLINICAL PRACTICE

For HCPs across Europe, these findings highlight vascular health as an integral component of prostate cancer care. The observed progression of arterial inflammation supports sustained attention to cardiovascular risk throughout ADT, consistent with the preventive approach of the European Society of Cardiology (ESC) cardio-oncology guidelines.³ Closer collaboration between urologists, oncologists, cardiologists, and nuclear medicine specialists could help connect cancer treatment with cardiovascular assessment and management. In patients already undergoing clinically indicated [¹⁸F]FDG imaging, assessment of arterial uptake may provide an additional opportunity to characterise vascular changes. However, its value for individual risk prediction and treatment decisions requires prospective validation.

WHAT ARE THE NEXT STEPS FOR THE RESEARCH?

Building on these findings, the authors are preparing to investigate longitudinal

arterial inflammatory changes in patients receiving lutetium-177 prostate-specific membrane antigen (¹⁷⁷Lu-PSMA) radioligand therapy. The survival benefit demonstrated with ¹⁷⁷Lu-PSMA-617 in metastatic castration-resistant prostate cancer provides an important clinical context for extending vascular research to this treatment setting.⁴

Larger multicentre prospective studies with standardised imaging and adjudicated cardiovascular outcomes are needed to validate these observations and establish their prognostic relevance. Where clinically appropriate, multicentre RCTs incorporating vascular imaging could evaluate the effects of treatment strategies or cardiovascular preventive interventions on both arterial inflammation and clinical events. These studies would help determine whether monitoring vascular inflammation can contribute to safer prostate cancer care.

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