

Targeted alpha therapy shows impressive results for metastatic prostate cancer patients

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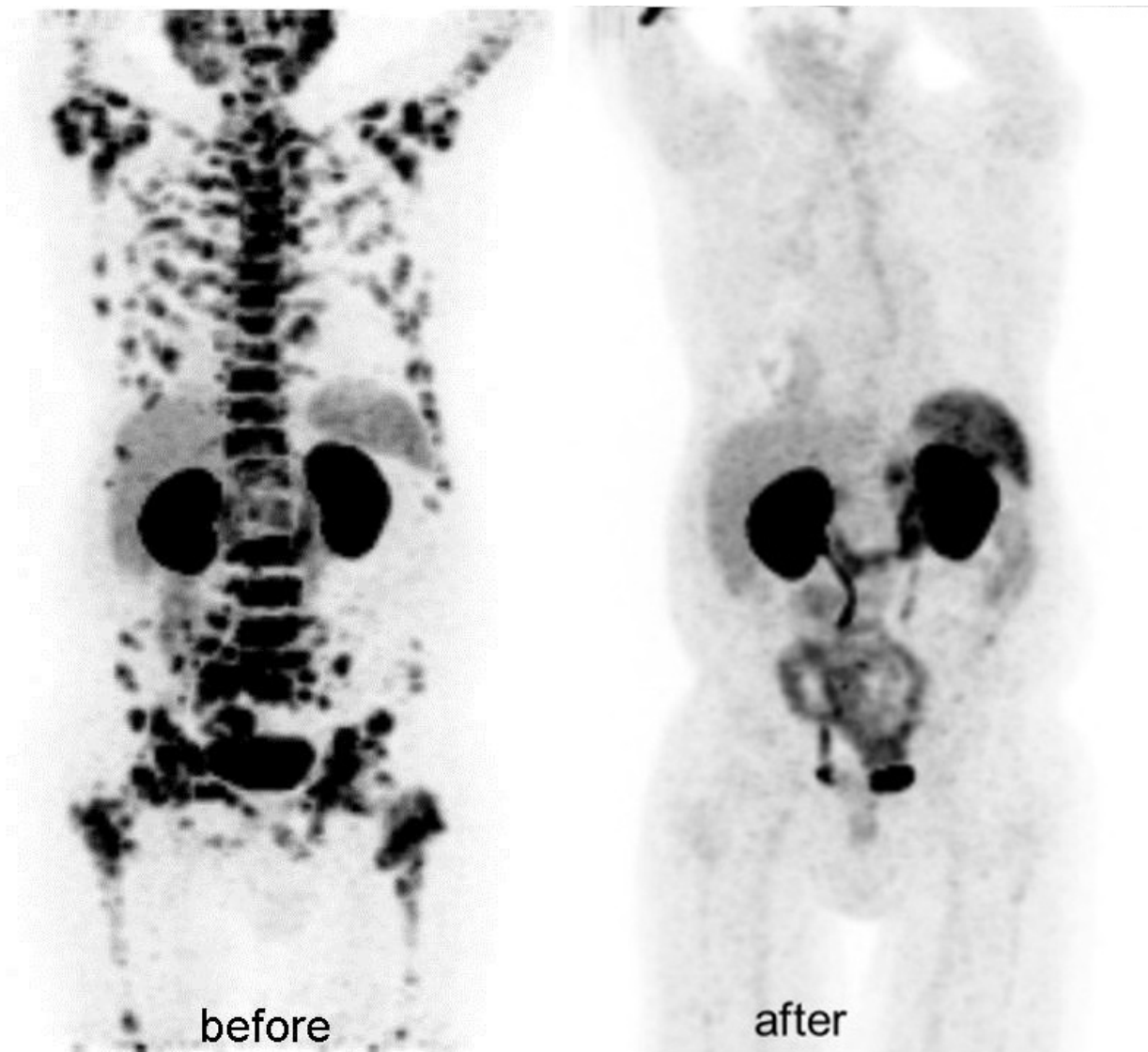


Figure 1: PET/CT images of patient with extensive metastatic disease before (left, Dec 2014) and after therapy (right, Sep 2015) with ²²⁵Actinium-

PSMA-617 showing complete imaging response. The PSA (prostate specific antigen) value dropped from >3000 ng/ml to

Nearly three years of research have brought about remarkable results for the majority of 80 patients subjected to targeted alpha therapy of metastatic prostate cancer. The first assessments – describing a full response in two patients in critical clinical condition with extensive metastases – are published in the December issue of the *Journal of Nuclear Medicine (JNM)*, which has displayed images depicting the improvements on its cover page.

The tumour has completely disappeared in the two [patients](#) after three to four treatments (Figs. 1 and 2) and can no longer be detected neither by PET/CT imaging nor by the tumour marker PSA (Prostate-specific antigen), whose blood level is often elevated in men with [prostate cancer](#). PET/CT (positron emission tomography–computed tomography) is a technique used in oncology that combines the use of two devices to provide a highly accurate picture of the spread of cancer.

Targeted alpha therapy (TAT) of prostate cancer has been developed through joint efforts of the University Hospital Heidelberg, the German Cancer Research Center (DKFZ) and the JRC. The paper is co-authored by the three institutions and the RWTH University Hospital Aachen.

Two patients that had previously not responded to available standard treatments, including surgery, external radiation, hormonal and chemotherapy, have received 225Actinium-PSMA-617 as experimental therapy. Several months into the therapy, PSA values have dropped below the detection limit (0.1 ng/ml) from values initially surpassing 3000 ng/ml and 419 ng/ml respectively. To date, 23 and 15 months after their respective treatments, both patients remain in very good condition. Prior to the treatment, their life expectancy was of 2-4 months.

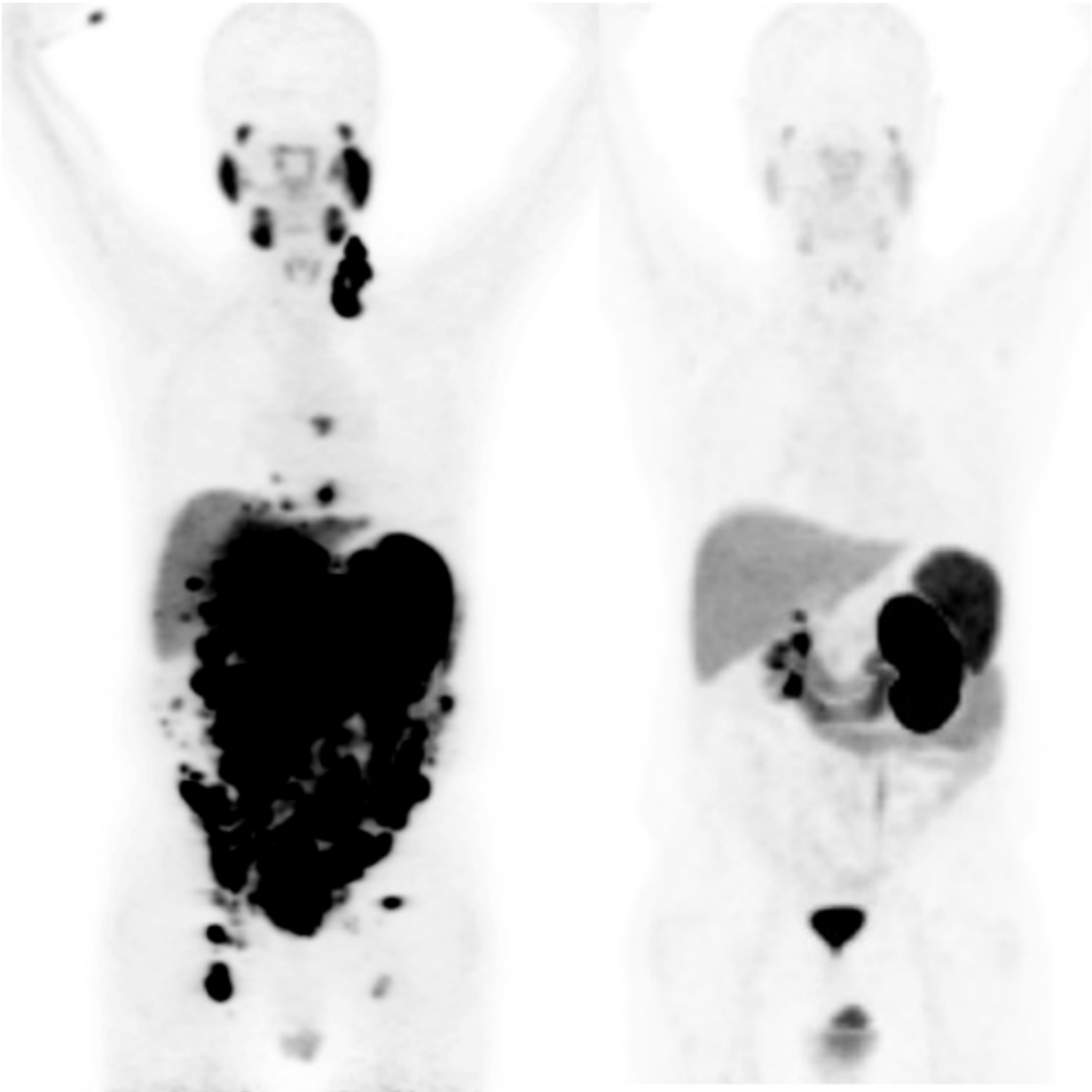


Figure 2: PET/CT images of patient with extensive tumour spread before (left, June 2015) and after therapy (right, April 2016) with 225Actinium-PSMA-617 showing complete imaging response. The PSA (prostate specific antigen) value dropped from 419 ng/ml to

Insights from a three-year research

So far, a total of 80 patients have received the therapy through the collaboration of the University Hospital Heidelberg and the JRC. Many of the patients are expected to relapse

after a certain time. However, the scientists have seen several long-lasting full responses, among which one case surpassing two years without relapse. The therapeutic responses observed in the majority of patients to date indicate that TAT with 225Actinium-PSMA-617 has the potential to change the future treatment of [metastatic prostate cancer](#).

The results following nearly three years of research show that a dose of 100 kBq/kg body weight is safe and effective with the only side effect being xerostomia, i.e. dryness in the mouth. The therapy has greatly helped the majority of the patients, most of whom had undergone heavy treatments before and had prognoses with a median survival time (without the TAT therapy) of 2-4 months. The response rate 24 weeks after therapy has been at 75% – not only most patients still lived after six months, but 75% had their tumour shrunk and had lower PSA.

Targeted alpha [therapy](#) of prostate cancer uses PSMA-617, an anti-PSMA (*Prostate Specific Membrane Antigen*) peptide that specifically binds to prostate cancer cells, but not to normal, healthy cells. The peptide is labelled with the alpha-emitting radionuclide 225Actinium that generates four high-energy alpha particles during its decay. With the range of alpha particles in human tissue nearing 0.1 mm, the method allows selective irradiation, killing the tumour cells with minimal damage to healthy tissue.

More information: C. Kratochwil et al. 225Ac-PSMA-617 for PSMA-Targeted -Radiation Therapy of Metastatic Castration-Resistant Prostate Cancer, *Journal of Nuclear Medicine* (2016). [DOI: 10.2967/jnumed.116.178673](https://doi.org/10.2967/jnumed.116.178673)

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