

# Southampton experience of prostate specific membrane antigen (PSMA) therapy for metastatic prostate cancer

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## Introduction

Prostate specific membrane antigen (PSMA) therapy involves the administration of the radiopharmaceutical Lutetium-PSMA, which targets PSMA avid bone and soft tissue metastases in advanced prostate cancer patients. PSMA therapy consists of 6 cycles of IV Lutetium-PSMA, delivered in 6 weekly intervals.

## Our Service

Following participation in clinical trials and early access program, the Department of Nuclear Medicine at University Hospital Southampton NHS Foundation Trust (UHS) set up a private PSMA therapy service in November 2021. We have received regional and extra-regional referrals. Over a 30-month period, 10 patients have been referred and commenced PSMA therapy at UHS. These patients had disease progression following a range of prior therapies including prostatectomy, radiotherapy, chemotherapy, enzalutamide and abiraterone. All patients had baseline PSMA PET positivity. To date, 47 treatment cycles have been administered.

## Patient Cohort

The mean age of patients referred and treated was 73 years (range 48 – 84 years). Of the 10 patients commencing PSMA therapy, 3 have completed the recommended 6 cycles of treatment. The mean number of cycles completed was 3.9.

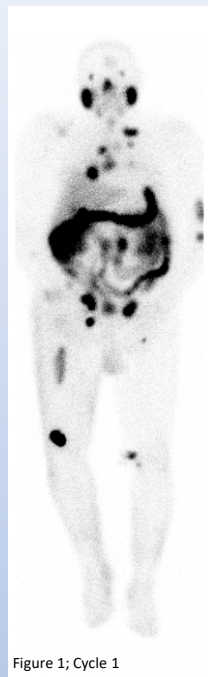


Figure 1; Cycle 1



Figure 2; Cycle 3

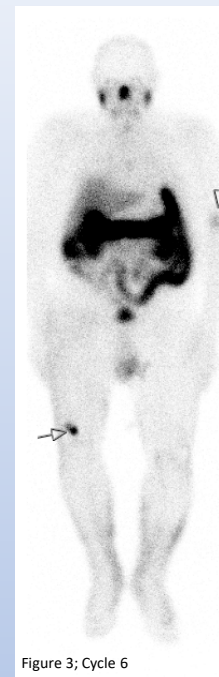


Figure 3; Cycle 6

Figures 1-3. Serial post therapy whole body images at 24 hours post administration of Lutetium-PSMA. Images show fewer and also resolution of some PSMA avid foci. Appearances are consistent with a very positive response to treatment and correlates well with a significant PSA response from 204ug/L to 5.7ug/L.

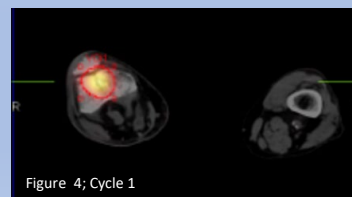


Figure 4; Cycle 1



Figure 5; Cycle 6

Figures 4 and 5. Fused SPECT CT images demonstrate reducing uptake in the distal right femoral condyle. SUVmax 20 (cycle 1) to SUVmax 2.54 (cycle 6), consistent with a very positive response to treatment.

## Administration

Lutetium-PSMA therapy is delivered as a planned day case treatment in the Nuclear Medicine department. Patients receive a pre-medication antiemetic prior to the administration of 7.4GBq Lutetium-PSMA, given as a slow IV injection, over 1 minute. Patients remain in the department until radiation levels are at a safe level for discharge. Personalised and tailored radiation guidelines are provided following administration. Patients undergo whole body planar and SPECT/CT imaging at 24 hours post administration. In addition, dosimetry calculations are completed by the Nuclear Medicine Medical Physics team. Interim PSMA PET scans are also planned in the management pathway to assess response to treatment.

## Outcomes

All 10 patients had variable PSA response to treatment. The 3 patients who completed the recommended 6 cycles of PSMA therapy had relatively favourable PSA response, with 1 patient having significant PSA response. 7 patients did not complete the 6 cycles due to disease progression and care was transferred back to the referring Consultant Oncologist.

## Conclusion

From our experience, PSMA is simple to administer and is well tolerated with minimal side effects. Our patient cohort have demonstrated relatively favourable PSA and imaging response to therapy, in concordance with the current literature.

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