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Case Report

Dramatic cessation of gross sustained treatment resistant hematuria after [^{177}Lu]Lu-PSMA-617 therapy: A case report

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ABSTRACT

We report a patient with locally invasive metastatic castration resistant prostate adenocarcinoma, which had massive invasion to the bladder and caused frequent gross hematuria. The patient had received more than 10 units of packed cell at the time he was referred for [^{177}Lu]Lu-PSMA-617 therapy, but despite frequent transfusions his serum hemoglobin level had been under 8 g/dl most of the time. He had received first generation androgen deprivation therapy (ADT) from 3 years previously and the second generation since 1 year ago and had undergone multiple procedures for cessation of hematuria, such as multiple cystoscopies, bladder irrigations and angioembolizations. We performed [^{99m}Tc]Tc-PSMA whole body and SPECT/CT scan, which demonstrated a large PSMA avid prostate mass invading the urinary bladder wall. All components of the locally invasive tumor were present demonstrating high PSMA avidity, so he was scheduled for [^{177}Lu]Lu-PSMA-617 therapy. One week after the diagnostic scan, therapeutic dose of [^{177}Lu]Lu-PSMA-617 was administered. The patient reported no hematuria 4 days after the [^{177}Lu]Lu-PSMA-617 administration. In the follow up, no recurrent hematuria was reported, too. The PSA level also declined from 40.5 ng/ml to 18.7 ng/ml, 1 month after the first treatment.

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CASE PRESENTATION

We report a 78 years old man, with history of biopsy proven prostatic adenocarcinoma (Gleason score 4+5) since three years previously, who was diagnosed as a case of locally invasive metastatic castration resistant prostate adenocarcinoma, which had massive invasion to the bladder wall, presenting with frequent gross hematuria. The patient had received more than 10 units of pack cell at the time he was referred for [^{177}Lu]Lu-PSMA-617 therapy, but despite frequent transfusions his hemoglobin level remained under 8 g/dl most of the time.

He had received first generation ADT from 3 and subsequently second generation ADT from 1 year ago and had undergone multiple procedures for cessation of hematuria, such as multiple cystoscopies, bladder irrigations and angioembolizations attempts at the urology department.

His bone scan showed widespread skeletal metastasis and his serum PSA value was 40.5 ng/ml. We performed [^{99m}Tc]Tc-PSMA whole body and SPECT/CT scan to confirm the PSA avidity of the metastatic sites. PSMA scan showed multiple PSMA avid skeletal and abdomino-pelvic lymph node metastasis, as well as intense uptake in the prostatic bed (Figure 1).

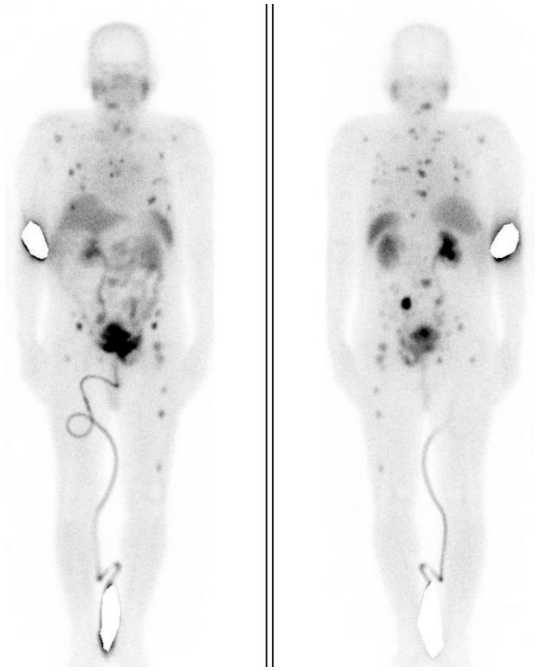

Fig 1. Whole body images of [^{99m}Tc]Tc-PSMA scan showing multiple PSMA avid metastasis throughout the body

Pelvic [^{99m}Tc]Tc-PSMA SPECT/CT scan demonstrated a large PSMA avid prostate mass with evidence of massive invasion to the bladder wall which seemed responsible for severe sustained gross hematuria (Figures 2 and 3). All components of the locally invasive tumor showed high PSMA avidity, so he was scheduled for [^{177}Lu]Lu-PSMA-617 therapy.

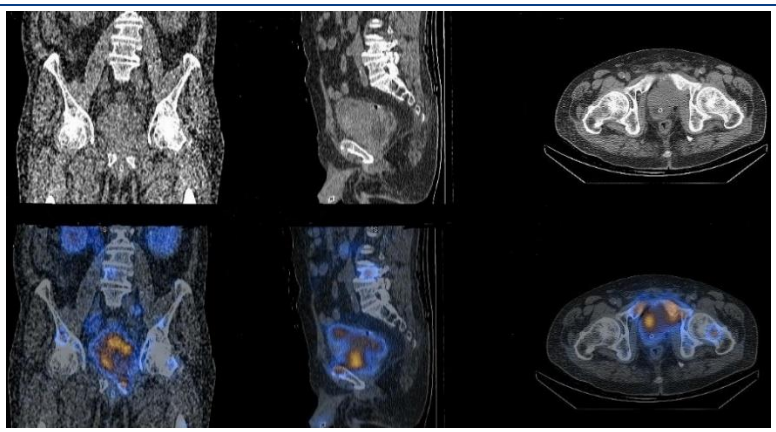

Fig 2. Pelvic SPECT/CT images demonstrate a large PSMA avid prostatic mass

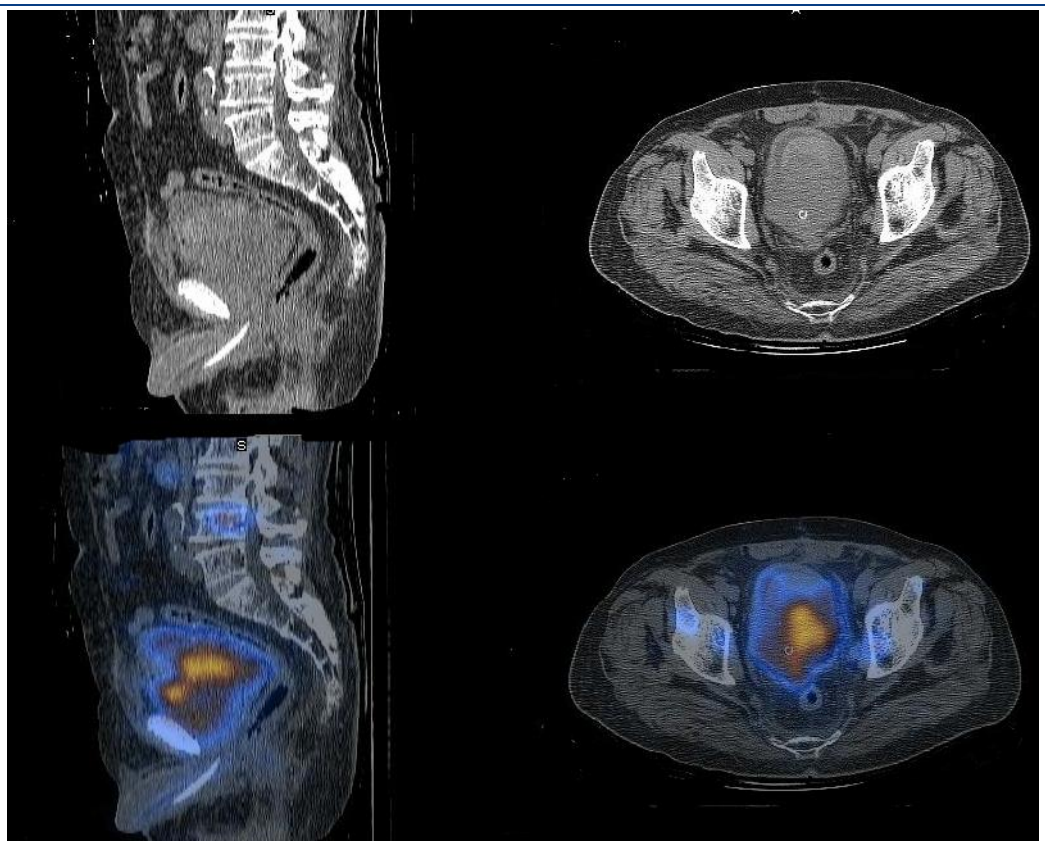

Fig 3. Pelvic SPECT/CT images demonstrate invasion to the posterior bladder wall

The laboratory data including serum CBC, LFT and serum creatinine level were within normal limits, except for severe anemia (hemoglobin 8 g/dl at the time of first visit). The therapeutic dose was administered following packed cell transfusion.
After IV hydration by 500 cc normal saline infusion, 210 mCi of [^{177}Lu]Lu-PSMA-617 was injected and whole body scan was also performed after 24 hours. The scan showed excellent uptake in the metastatic sites, as well as the prostate tumor and also the intra-vesical component of the tumor (Figure 4).

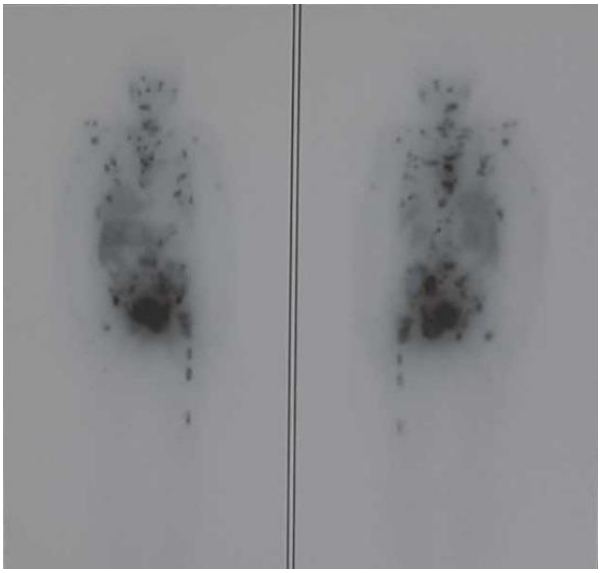

Fig 4. Whole body post ablation scan 24 hour after administration of 210mCi, [^{177}Lu]Lu-PSMA-617, shows tracer avidity in the widespread metastatic sites

Surprisingly, the patient reported complete cessation of gross hematuria 4 days after [^{177}Lu]Lu-PSMA-617 therapy and in the subsequent follow ups. Serum PSA declined from 40.5 ng/ml to 18.7 ng/ml, 1 month after treatment.

DISCUSSION

[^{177}Lu]Lu-PSMA-617 therapy is currently the treatment of choice for metastatic castration resistant prostate cancer patients. Many trials has been conducted to evaluate the efficacy and safety of this treatment modality [1, 2]. The treatment with [^{177}Lu]Lu-PSMA-617 has been demonstrated to be a safe and effective method for the therapy of castration-resistant prostate cancer patients. The fractionation regime and therapeutic doses that enables the longest duration of tumor control and overall progression free survival, need to be evaluated in future studies [3, 4].

CONCLUSION

Our case introduces an interesting therapeutic effect of [^{177}Lu]Lu-PSMA-617, leading to cessation of gross hematuria just a few days after administration of the 1st therapeutic dose.

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