Prostate Cancer Donor Program

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INTRODUCTION

- Prostate cancer is the most commonly diagnosed cancer in Australia.
- Effective, preclinical research relies on robust and accurate models of prostate cancer.
- Patient derived xenografts (PDXs) are human tumour samples grown in mice and allow preclinical studies on prostate cancers similar to those seen in clinical practice.
- Patients die from prostate cancer that has developed resistance to all available treatments.
- PDXs from resistant tumours need to be created to accurately test new therapeutic options to treat prostate cancer.
- Patients often express a desire to be organ donors after death but are unable to due to their cancer diagnosis.
- An alternative is to donate tumour tissue to research.

Aims

1. **To assess the feasibility of collecting cancer samples with a biopsy needle at the bedside from prostate cancer patients immediately after death; and**
2. **Use these samples to create serially-transplantable PDX models.**

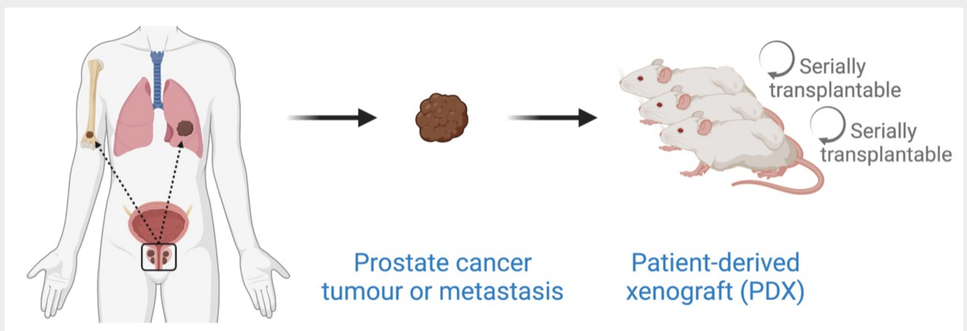
METHODS

SAMPLE COLLECTION

- This pilot study is enrolling prostate cancer patients likely to die in palliative care.
- Eligibility Criteria: 1) Over 18 years of age, 2) confirmed metastatic prostate cancer, 3) lesions amenable to core needle biopsy or bone marrow trephine and 4) not serologically positive for for HIV and Hepatitis B and C.
- Patients were recruited by one of their treating clinicians.
- The patient and their next of kin signed the consent form and were made aware that collection may not be possible.
- Sites of disease were identified on previous imaging.
- The research team were notified when the patient died and arrived at the bedside within six hours of death.
- Bone lesions were biopsied using a Jamshidi 11G Bone Marrow Biopsy/Aspiration needle.
- Soft tissue lesions were biopsied using a Bard Mission 14G Disposable Core Biopsy Instrument Kit.
- Samples were placed into MACS Tissue Storage Solution and kept on ice while transported to the laboratory at Monash University.
- A follow-up phone call was made to the next of kin two weeks after collection to obtain feedback from the family.
- Clinical information was collected from medical records.

XENOGRAFTING

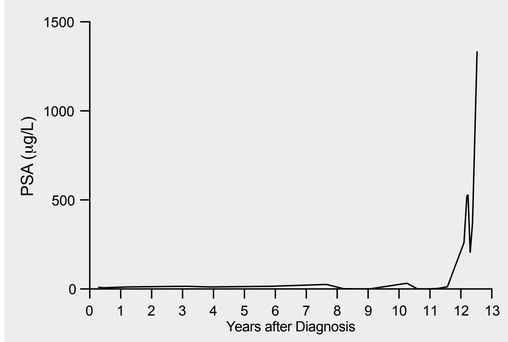
- Patient tissues were grafted into immunocompromised male NSG mice with testosterone implants.
- Samples were grafted under the renal capsule to maximise engraftment rates.
- Grafts will be monitored for up to 12 months to assess *in vivo* tumour growth.
- Actively growing tumours will be regrafted into additional mice to establish serially-transplantable PDXs and will add to the MURAL collection.



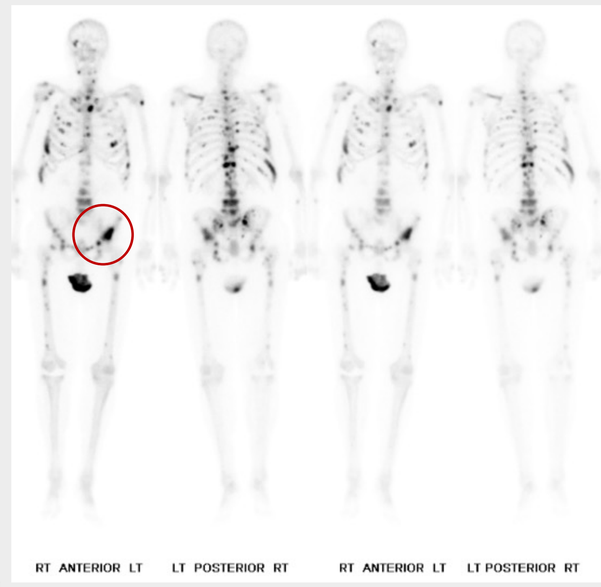
RESULTS

Patient 1 (540D)

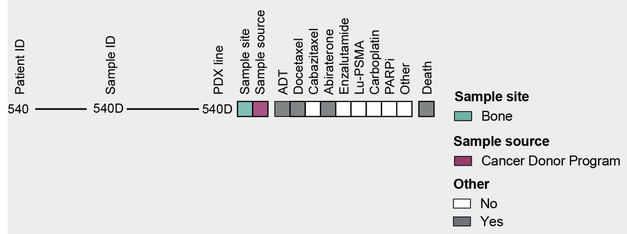
A) PSA From diagnosis to death



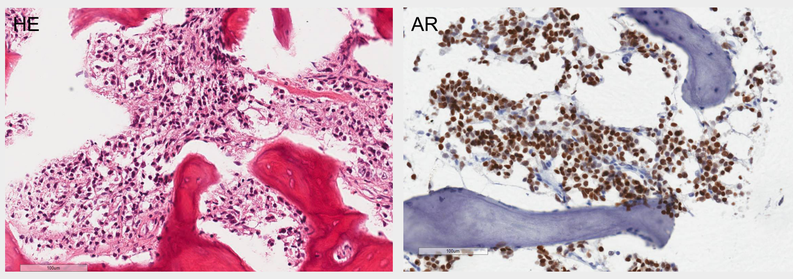
B) Whole body bone scan with biopsied site shown



C) Summary of treatment history



D) Histopathology of tumour biopsy showing the presence of AR+ tumour cells



E) Next of kin response from questionnaire

Q1. How do you feel about your family's involvement in the cancer donor program?
R1. *Smooth process*

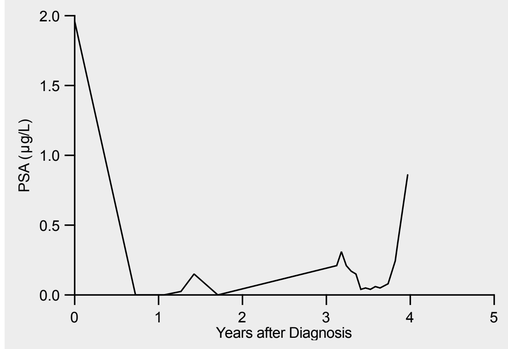
Q2. Do you have any suggestions to improve the process of cancer donation?
R2. *No, easy as already in hospital.*

Q3. Do you have any concerns that you feel the research team should be aware of?
R3. *No*

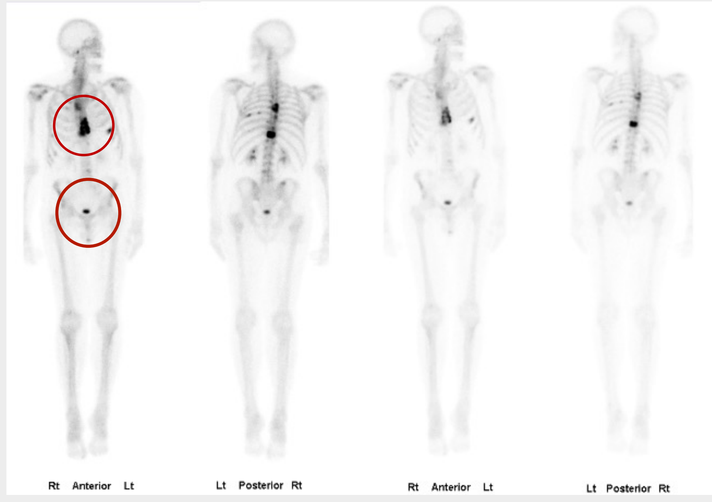
Q4. Do you have any other feedback?
R4. *Keen to be updated on future outcomes*

Patient 2 (543D)

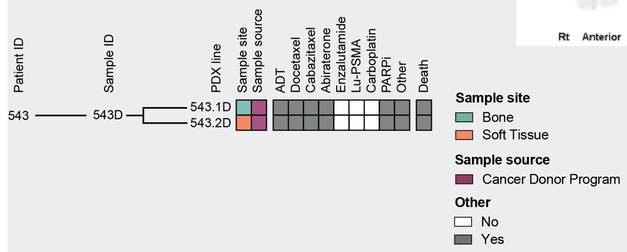
A) PSA From diagnosis to death



B) Whole body bone scan with biopsied site shown



C) Summary of treatment history



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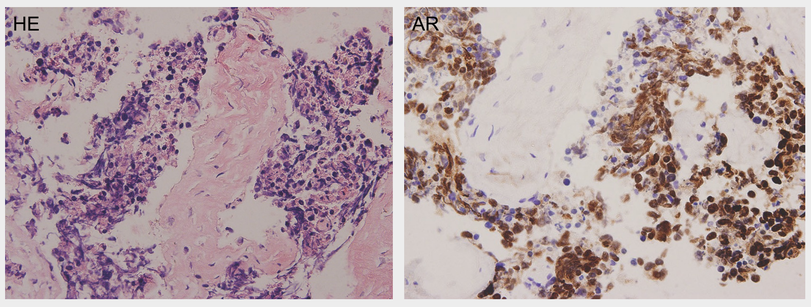

E) Next of kin response from questionnaire

Q1. How do you feel about your family's involvement in the cancer donor program?
R1. *Ok, it is what the patient wanted which was important to the family.*

Q2. Do you have any suggestions to improve the process of cancer donation?
R2. *No, was an easy process.*

Q3. Do you have any concerns that you feel the research team should be aware of?
R3. *No*

Q4. Do you have any other feedback?
R4. *No, happy to have followed through with patient's wishes.*

CONCLUSION & FUTURE DIRECTIONS

- Prostate cancer donation performed post-mortem at the bedside appears to be a feasible approach to collect valuable cancer samples.
- Viable cancer was present in both patient biopsies and has been grafted into mice.
- Patients from some ethnic and religious backgrounds are unable to donate cancer samples if this delays funeral arrangements.
- This has been reported as a positive experience for patient families.

Future directions

1. **Assess PDX take rate on collected tissue**
2. **Continue to monitor family and staff experience of donation process**
3. **Consider expanding protocol to different tumour types**

REFERENCES

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