Prostate cancer

Case 1

A 65-year-old man is referred to your two-week wait (2WW) clinic with a PSA of 7.0ng/mL. He has no lower urinary tract symptoms (LUTS), no past medical history, no family history of prostate cancer (PCa) and his performance status is 0.

Figure 1 (image used with permission from patient).

1. What is the benefit of a pre-biopsy MRI scan, and what does Figure 1 show?
2. The multi parametric prostate MRI (mpMRI) scan demonstrates a PiRADs 4 lesion in the right peripheral zone. What is the PiRADS score and what is the likelihood of significant cancer with this score?
3. The patient understands the need for a biopsy, but is concerned about post biopsy sepsis, what modality can be used to reduce this risk?
4. His biopsy histology comes back as 40% of 1 core Gleason 3+4; he wants to know if there is a tool that can be used to assist his decision of the best treatment for his disease. How do you advise him?

Case 2

A 70-year-old man presents to his GP with tiredness, LUTS and left hip pain. Digital rectal examination (DRE) is abnormal and his prostate specific antigen (PSA) is 90ng/mL. He had a myocardial infarction six years ago and takes aspirin and ramipril. He is fairly active. He is referred to your 2WW clinic.

1. What other investigation(s) would you arrange for this patient?
2. He enquires about a prostate specific membrane antigen (PSMA) positron emission tomography (PET) scan. What would you include in your discussion with him on this?
3. Radiological investigation demonstrates high volume metastatic disease. The patient is discussed in the multidisciplinary team (MDT) meeting, what treatment options does he have for high volume metastases?
4. How do enzalutamide and abiraterone work?

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Prostate cancer: answers

Case 1

1. Figure 1 is an MRI prostate (T2) showing an area with reduced signal in the right peripheral zone, in keeping with a lesion suspicious for clinically significant PCa. Multi parametric prostate MRI (mpMRI) enables the identification of areas within the prostate that appear suspicious for clinically significant PCa (csPCa), which can be targeted by biopsy. The PROMIS [1] and PRECISION [2] studies reported that prostate biopsies (PBx) directed by mpMRI detected 18% and 12% more csPCa respectively than standard transrectal ultrasound (TRUS) biopsy alone. Using mpMRI to triage men, primary PBx could be avoided in 27% of patients. The National Institute for Health & Care Excellence (NICE) recommends pre-biopsy mpMRI for first-line investigation for those suspected of localised PCa (NG131).
2. The PiRADS (Prostate imaging - reporting and data system) is a structured scoring system for mpMRI prostate used to evaluate potential PCa. Utilising the different modalities of the multiparametric scan, a scale from 1 to 5 is used, with csPCa ranging from highly unlikely to highly likely to be present. With a PiRADS 4 lesion csPCa is highly likely. PRECISION [2] reported an incidence of 60% csPCa for PiRADS 4. The recommendation is therefore for this patient to undergo a targeted Bx of this lesion [2], along with additional systematic Bx, as up to 5% of csPCa is detected in non-targeted regions.
3. Transrectal ultrasound (TRUS) guided PBx has been the standard of PBx for many years. The risk of significant sepsis post-Bx is 1-2%. Recently, the transperineal (TP) route has demonstrated improved cancer detection and reduced sepsis rates. This can be performed under local anaesthetic, utilising different lesion targeting techniques.
4. Predict Prostate is an online tool endorsed by the NHS and NICE, based on the results of multiple trials (https://prostate.predict.nhs.uk/). It helps to demonstrate the effect of radical treatment on prognosis and potential complications in comparison to conservative treatment for intermediate and low risk PCa patients by giving an overall survival difference between the two approaches at 10 and 15 years.

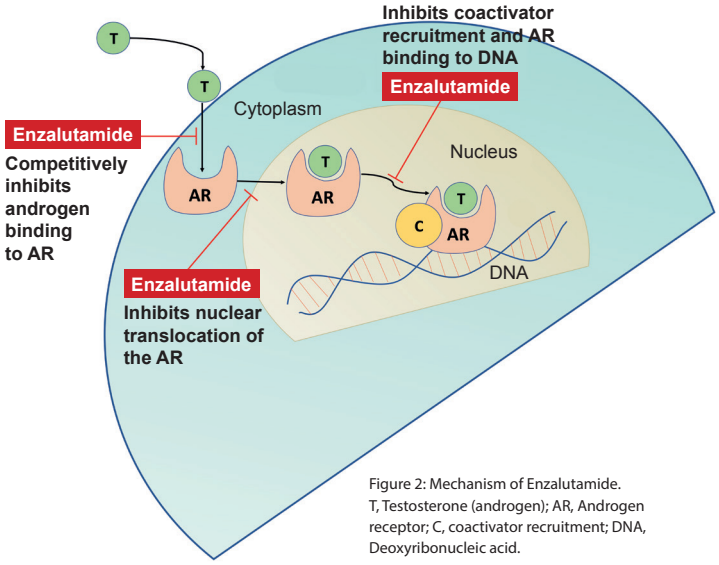

Figure 2: Mechanism of Enzalutamide. T, Testosterone (androgen); AR, Androgen receptor; C, coactivator recruitment; DNA, Deoxyribonucleic acid.

Case 2

1. A CT abdominal / pelvis and whole-body nuclear medicine bone scan (BS). A PBx should be considered if he is deemed suitable for systemic treatment, as the oncologist would wish to know if there is histological variant in this patient's cancer (i.e. neuroendocrine).
2. PSMA PET / CT utilises a nuclear medicine scan in which a radiological tracer is bound to a ligand for PSMA which is overexpressed in PCa. The proPSMA study reported a 27% better detection rate to conventional CT / BS for metastatic disease, with better sensitivity and specificity [3], changing the management for 27% of patients. Trials are ongoing to evaluate its use in the diagnostic pathway for treatment naïve patients and as yet, it has not been recommended in guidelines.
3. In addition to androgen deprivation treatment (ADT), current NICE guidance recommends docetaxel chemotherapy for patients with newly diagnosed metastatic PCa (mPCa). Along with a number of trials, the STAMPEDE trial has provided evidence for additional therapies in mPCa. It is a multi-arm randomised controlled trial (RCT) comparing multiple treatment agents against standard care (ADT), in which one facet demonstrated improved survival with docetaxel in patients with high volume disease. Additionally, new anti-androgen agents have improved survival rates compared to standard ADT, these include enzalutamide and abiraterone [4]. In a patient with a known cardiac history, enzalutamide therapy may be preferred over abiraterone.
4. Enzalutamide is an androgen receptor antagonist, preventing its translocation to the cell nucleus impacting its effect at causing proliferation of prostate cancer PCa cells (Figure 2). Abiraterone inhibits the cytochrome P450 17 alpha-hydroxylase, blocking androgen production in the testes, adrenals and prostate tumour tissue. It is administered with prednisolone.

References

1. Ahmed HU, El-Shater Bosaily A, Brown LC, et al. Diagnostic accuracy of multi-parametric MRI and TRUS biopsy in prostate cancer (PROMIS): a paired validating confirmatory study. *Lancet* 2017;**389(10071)**:815-22.
2. Kasivisvanathan V, Rannikko AS, Borghi M, et al. MRI-Targeted or Standard Biopsy for Prostate-Cancer Diagnosis. *N Engl J Med* 2018;**378(19)**:1767-77.
3. Hofman MS, Lawrentschuk N, Francis RJ, et al. Prostate-specific membrane antigen PET-CT in patients with high-risk prostate cancer before curative-intent surgery or radiotherapy (proPSMA): a prospective, randomised, multicentre study. *Lancet* 2020;**395(10231)**:1208-16.
4. James ND, de Bono JS, Spears MR, et al. Abiraterone for Prostate Cancer Not Previously Treated with Hormone Therapy. *N Engl J Med* 2017;**377(4)**:338-51.