Diagnostic Pathways in Prostate Cancer & Robotic Radical Prostatectomy

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Outline

• Introduction
• PSA Testing and Risk Assessment and Prostate Biopsy
• MRI imaging, prebiopsy MRI and targeted biopsy
• Robotic Surgery for Prostate Cancer
Introduction and Epidemiology

PROSTATE CANCER IS THE SECOND MOST COMMON CANCER IN MEN.

1 IN 8 IRISH MEN WILL DEVELOP PROSTATE CANCER IN THEIR LIFETIME.

PROSTATE CANCER IS THE 6TH MOST COMMON CAUSE OF CANCER DEATH AMONG MEN, ACCOUNTING FOR 13% OF DEATHS.

RISK OF BEING DIAGNOSED WITH PROSTATE CANCER INCREASES WITH AGE.

OVER 3,000 IRISH MEN ARE DIAGNOSED WITH PROSTATE CANCER EACH YEAR.
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Risk factors

- Gender – only affects males
- Age
- Family history – 2x risk if father or brother with prostate cancer <60y
- Race – African, Afro-Caribbean > Caucasian > Asian
- Lifestyle – Poor diet & lack of exercise
Symptoms

• **Often no symptoms, especially if early**
  • Urinary symptoms
  • Blood in urine or semen

• Back / musculoskeletal pain
• Neurological symptoms/signs
• Urinary retention
PSA – to test or not to test?
PSA Screening

• Since the adoption of prostate-specific antigen (PSA) testing > 20 years ago, there has been a marked increase in the 5yr survival from 66% to 92%, between 1994 to 1998 and 2009 to 2013
  • National Cancer Registry Ireland 1994-2014 (2016)

• Despite the improvement in early detection of PCa with PSA testing the precise mortality benefit of early detection is unclear.
PSA Screening

• 2 large randomised controlled trials comparing PSA screening to usual care:
  • 👍 ERSPC = prostate cancer specific survival benefit to screening
  • 👎 PLCO = no cancer specific survival benefit

• Neither trial found a benefit to overall survival with PSA screening

• Controversy remains around the role of PSA screening and which men are likely to benefit from screening.
Testing

- Digital rectal exam
- PSA blood test
Men between 50 and 70 years of age with no symptoms

PSA (Prostate Specific Antigen) should not be considered a routine test, and informed consent should be obtained

Shared decision making
If PSA is being considered then the GP should discuss patient's concerns, benefits/harms/risks of prostate assessment (See Box 1) and provide patient information leaflet

Decision to proceed to prostate assessment – PSA and DRE (Digital Rectal Examination)

Normal age related PSA value and non-suspicious DRE
- Under 50 years of age: <2 ng/L
- 50-59: <3 ng/L
- 60-69: <4 ng/L
- 70+: <5 ng/L

No further action required. A prostate review may be considered in two years

Suspicious DRE irrespective of PSA results

Repeat PSA 6-12 weeks later in the same laboratory

Referral to a Rapid Access Prostate Clinic

Repeated raised age related PSA

Referral to the Rapid Access Prostate Clinic

Repeated PSA within normal age related values

No referral required at this time. A prostate review may be considered in two years

Decision not to proceed to prostate assessment at this time

BOX 1: Items for discussion during shared decision making in men between 50 and 70 years with no symptoms

Potential benefits
- Prostate assessment may lead to early detection of treatable cancer

Potential harms/risks
- Potential false positive and false negative results
- Risk of side effects from investigations and treatment
- Unnecessary anxiety for the patient and their family

Patient groups at higher risk of prostate cancer
- African ethnicity
- Increased risk with number of family members and early age of onset (<50)
- Increased risk of aggressive disease in patients with BRCA1/2 mutations

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“Normal PSA Range” – Age Specific

Normal age related PSA value and non-suspicious DRE

- Under 50 years of age: <2μg/L
- 50-59: <3μg/L
- 60-69: <4μg/L
- 70+: <5μg/L
Asymptomatic men under 50 years of age?

• **Controversial**

• New NCCP guidelines:
  • After appropriate counselling, an asymptomatic man <50yrs with persistent PSA ≥ 2.0 µg/L at least six weeks apart and a normal digital rectal examination (DRE)
  • Suspicious DRE, irrespective of PSA result, should also be referred.

• **Do they have risk factors?**
  • Positive family history PCa
  • African/African-American
  • BRAC1/2 gene
Asymptomatic men over 70 years of age?

• If the patient is fit healthy with life expectancy greater than 10 years
  • PSA counseling/Shared decision making
  • Consider PSA/DRE assessment
  • If PSA >5 or suspicious DRE: refer to urology

• If the patient has life limiting co-morbidities or life expectancy < 10 years
  • No further treatment
Calculating a patients risk after PSA testing

EXAMPLE:

- 59 y/o white male
- PSA 6.2
- Mild LUTS – not bothersome
- No PMed/Surg Hx
- No Family history of PCa

• Qu? What is this man’s risk of having prostate cancer?

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Prostate Cancer Risk Calculator

- [www.prostatecancerrisk.com](http://www.prostatecancerrisk.com)

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Prostate Cancer Prevention Trial Risk Calculator Version 2.0

Disclaimer

The original Prostate Cancer Prevention Trial (PCPT) Prostate Cancer Risk Calculator (PCPTRC) posted in 2006 was developed based on 5519 men in the placebo group of the Prostate Cancer Prevention Trial. All of these 5519 men initially had a prostate-specific antigen (PSA) value less than or equal to 3.0 ng/ml and were followed for seven years with annual PSA and digital rectal examination (DRE). If PSA exceeded 4.0 ng/ml or if an abnormal DRE was noted, a biopsy was recommended. After seven years, all men were recommended to have a prostate biopsy, regardless of PSA or DRE findings. PSA, family history, DRE findings, and history of a prior negative prostate biopsy provided independent predictive value to the calculation of risk of a biopsy that showed presence of cancer.

In 2012, the updated PCPTRC 2.0 was released with the added capability to provide prediction of low-grade (Gleason grade < 7) versus high-grade prostate cancer via a new more user-friendly display of results. PCPTRC 2.0 was based on re-analysis of an expanded set of 6864 biopsies from 5826 patients from the PCPT placebo arm. Characteristics of the patients and biopsies forming PCPTRC 2.0 are similar to those used for the original PCPTRC, but the new PCPTRC 2.0 generally provides lower risk estimates due to the inclusion of multiple prior negative biopsies per individual rather than just one biopsy per person. The original PCPTRC is still available for research purposes on the right-hand side of the calculator page, along with prior updates for incorporating other markers for prostate cancer.

The results of the PCPTRC may not apply to different groups of individuals. As about 80% of men had a prostate biopsy with six cores, if more than six cores are obtained at biopsy, a greater risk of cancer may be expected. Most men in this study were white and results may be different with other ethnicities or races. The calculator is in principle only applicable to men under the following restrictions:

- Age 55 or older
- No previous diagnosis of prostate cancer
- DRE and PSA results less than 1 year old

The PCPTRC is applicable for men who are undergoing prostate cancer screening with PSA and DRE as it was derived from a group of men in the PCPT who underwent annual PSA and DRE screening. The risk estimate from the calculator does not reflect an endorsement of either PSA or DRE for screening for prostate cancer. This calculator is designed to provide a preliminary assessment of risk of prostate cancer if a prostate biopsy is performed. Additional clinical information may modify this risk. No specific level of risk is recommended for prostate biopsy and this decision should be an individual choice based upon a physician-patient relationship.

Continue to Calculator
Prostate Cancer Risk Calculator

- 59 y/o white male
- PSA 6.2
- DRE: normal
- No FHx
- No previous Bx
Prostate Cancer Risk Calculator

Risk of prostate cancer if biopsy were to be performed

Based on the provided risk factors a prostate biopsy performed would have a:

- 7% chance of high-grade prostate cancer,
- 19% chance of low-grade cancer,
- 74% chance that the biopsy is negative for cancer.

About 2 to 4% of men undergoing biopsy will have an infection that may require hospitalization.

Please consult your physician concerning these results.

Click here to watch a video overview of these results.
The Role of Multiparametric MRI In the Diagnosis of Localised Prostate Cancer
Imaging in PCa continues to change

- TRUS - first reported in 1968 using a chair device
- MRI
- mpMRI
- PSMA – PET/CT
TRUS Biopsy of the prostate
Clinical Goals of Imaging in CaP

• Assessment of primary tumour within the gland
• Assessment for presence/extent of metastatic disease
• Allow for image guided interventions
  • Prostate Biopsies
  • Fusion biopsies
MRI

• Provides more information than U/S
• Assessment of lymph nodes

• Multi-parametric MRI:
  • Anatomical sequences (T2 weighted)
  • Diffusion weighted imaging
  • Dynamic Contrast-Enhanced Imaging
Diffusion Weighted Imaging

- Measures movement of H2O molecules
- Increased restriction in prostate cancer
- PCa appears bright hyperintense area
Figure 1. Flowchart showing the PI-RADS version 2 assessment categories. DCE = dynamic contrast-enhanced MR imaging, T2-WI = T2-weighted MR imaging.
MRI Guided Biopsies

• Various strategies available for targeted biopsy of lesions on MRI
  • MRI-TB
  • FUS-TB
  • COG-TB

• Increased detection of csPCa compared with standard TRUS Bx

• Currently no consensus exists on which type of targeted biopsy is better.
Robotics and Prostate Cancer Surgery

Robotic Assisted Laparoscopic Prostatectomy (RALP)
Basic Principles of Radical Prostatectomy

Presurgical anatomy

Postsurgical anatomy

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Incision
Advantages of Robotic Surgery

To the Patient:
• Shorter hospitalization
• Reduced pain + discomfort
• Faster recovery time + return to normal activities
• Smaller incisions/scars
• Reduced blood loss + transfusions

For the Surgeon:
• Greater visualization
• Enhanced dexterity
• Greater precision

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Robotic Theatre
RALP - Urethral Anastomosis
Thank You

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