Role of MRI in the Diagnosis of Prostate Cancer,

A Proposal

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Abstract
Prostate cancer is one of the most common cancers in men. Prostate biopsy is the gold standard to diagnose prostate cancer but is not without complications along with negative biopsies.
We propose that PSA and digital rectal examination not be the arbiters of proceeding to prostate biopsy. Considering MRI as an additional diagnostic tool (in patients with borderline raised PSA, previous negative biopsies and in elderly patients) to diagnose prostate cancer effectively-unnecessary prostate biopsies can be avoided which can be helpful in reducing the morbidity and mortality.

Keywords: Role of MRI, Diagnosis of prostate cancer

Introduction
Prostate cancer is the second most common cause of cancer death among men in the UK after lung cancer (1,2,3). Overall 14% male die every year from prostate cancer. (1, 2, 3) The incidence of prostate cancer has increased over the last two decades. Approximately in UK 37,000 new cases of prostate cancer were diagnosed in 2008
or in other words, one patient was diagnosed with cancer in every 15 minutes. (4, 5, 6, 7)

The actual pathophysiology of prostate cancer is poorly understood. Current available diagnostic tests cannot always predict the behaviour of prostate cancers. There has been a debate that proportion of patients with low volume; low grade tumours will receive unnecessary aggressive treatment which can have potential side effects. There have been recent advancements in new imaging technologies which are helpful for better diagnosis of prostate cancer. Latest studies have shown that MRI can improve the diagnosis of prostate cancer and hence treatment. (8, 9)

**Current investigations in practice**

Prostate cancer is diagnosed by transrectal prostate biopsy in the light of an abnormal PSA or DRE.

**PSA** is an enzyme produced by the prostate gland which can be measured in the blood. This test is useful in following up cancer patients but has low sensitivity to diagnosis prostate cancer. The only practicable screening tool for prostate cancer is PSA, however PSA test itself has limitations, various factors can affect its level in the absence of cancer. These factors are age, infection, recent procedure on urinary tract, heavy exercise, recent ejaculation and the presence of benign prostatic hypertrophy. (10)

Due to the low sensitivity of PSA, its normal levels cannot exclude cancer in a man with certainty and can result in false reassurance (11). Approximately 15% of men with normal PSA level will have prostate cancer. (12) There is no screening programme for prostate cancer in UK. (14, 15)

In a trial 7578 men were screened by PSA and DRE two yearly for 14 years, this gives sensitivity for screening of at least 78%, specificity of 44% and positive predictive value of 21%. (16)

**Prostate biopsy** aims at peripheral zone and can miss 30-40% of cancer in anterior or transition zones. (17) Similarly biopsies form apex area of prostate also depends on performer experience. However cancer picks up rate by prostate biopsy varies form 70-80 % (18). Furthermore biopsies are associated with high morbidity. Considering the risks and benefits patients might not proceed to have this invasive procedure. (19, 20)

**Usefulness of MRI in the diagnosis of prostate cancer**

There is emerging evidence that MRI has shown the improvement in the diagnosis of prostate cancer. It improves the efficacy as well as can be used to biopsy more accurately (21). In further studies, MRI had a prostate cancer detection rate of 41% and clinically 87% were significant. (22)
Multi parameteric MRI has emerged as an improved technique at present which seems to be the best modality to localise, stage, volume of prostate cancer and assessing the aggressiveness, as proved by published evidence.

In another study the positive predictive value of multi parameteric magnetic resonance imaging to diagnose prostate cancer was 98% in peripheral zone and 100% in central zone. Similarly higher sensitivity was recorded for 5mm tumours and higher Gleason score (greater than 7, P<0.05%). One study reported that if T2W is combined with MRSI and sextant TRUS biopsy, the diagnostic yield of prostate cancer diagnosis increases and specificity and sensitivity reaches up to 98% and 94% respectively. In comparison to TRUS biopsy MRI is also a better alternative to detect prostate cancer in patients with previous negative prostate biopsy. (9, 23, 24, 25, 26)

**Discussion**

The diagnosis of prostate cancer and its follow up is challenging dilemma in few cases for urologist. Particularly in patients with borderline raised PSA or patients with negative biopsies but rising PSA or patients with significant co morbidities are difficult scenarios especially during this difficult and tough economic situation for NHS.

Furthermore patients with newly diagnosed prostate cancer have to wait several weeks for MRI to avoid post biopsy artefacts. This may affect them psychologically and it may also delay the treatment of cancer for few months. However we know prostate cancer is slow growing cancer but the exact nature is different in each individual.

We completed an audit recently in our hospital regarding prostate biopsy effectiveness. Total of 213 biopsies were performed in one year. Our institution results showed that, 50% of biopsies were negative for prostate cancer. Few of these patients suffered from complications post biopsy procedure which was an economic burden during this financial crisis.

Role of MRI is emerging as an additional diagnostic tool for prostate cancer. Considering MRI as an additional diagnostic tool (in patients with borderline raised PSA, previous negative biopsies and in elderly patients) to diagnose prostate cancer effectively-unnecessary prostate biopsies can be avoided which can be helpful in reducing the morbidity and mortality. We propose that a multi parameteric MRI should be conducted on all 2 weak wait referrals for suspected prostate cancer and decision of biopsy to be made on the basis of MRI finding. Another point need to be
considered regarding pre biopsy use of MRI in the current practice is the cost and availability of technical expertise.

References


2- General Register Office Deaths Time Series Data, Deaths in Scotland in 2009

3- Northern Ireland Statistics and Research Agency Registrar General Annual Report 2010

4- Northern Ireland Cancer Registry. Cancer Incidence and Mortality. 2010

5- Welsh Cancer Intelligence and Surveillance Unit.2010

6- ISD Online Information and Statistics Division, NHS Scotland. 2010


8- Delongchamps NB, Zerbib M. Role of magnetic resonance imaging before initial biopsy: comparison of magnetic resonance imaging-targeted and systematic biopsy for significant prostate cancer detection. (Eur Urol. 2012 Mar; 61(3):622-3)


11- DC Burford, M Kirby, and J Austoker, Prostate Cancer Risk Management Programme information for Primary Care; PSA testing for asymptomatic men. 2008

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13- American Prostate, Colorectal and Ovarian (PLCO) Cancer Screening Trial,


16- Hugosson, Holmberg et al Gothenburg trial, Lancet Oncology 2010;11:725-32


18- B Djavan et al. Prospective evaluation of prostate cancer detected on biopsies 1, 2, 3 and 4: when should we stop? J. Urol.166, 1679-1683(2001)


Received: June, 2012