

Diagnosis of prostate cancer with needle biopsy: Should all cases be biopsied before treatment?

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Abstract

Background: The triad of digital rectal examination (DRE), serum prostate specific antigen, and transrectal ultrasound-guided prostate biopsy is used in the detection of prostate cancer (PCa). It is recommended that all cases of PCa should be diagnosed with needle biopsy before treatment. The exclusion criteria for those that may not be suitable have not yet been defined.

Materials and Methods: We reviewed all the patients diagnosed with PCa at the Nnamdi Azikiwe University Teaching Hospital Nnewi, Southeast, Nigeria, from January 2007 to December 2010. Relevant biodata and method of diagnosis of PCa before treatment were reviewed.

Results: A total of 133 patients had bilateral orchidectomy over the period. 120 (90.2%) had their diagnosis confirmed by needle biopsy before bilateral orchidectomy (category 1), while 13 (9.8%) had bilateral orchidectomy before diagnosis was confirmed. The method of diagnosis for category 1 patients was with lower urinary tract symptoms (LUTS), abnormal DRE findings, elevated prostate-specific antigen (PSA), and transrectal needle biopsy. For category 11 patients, diagnosis of PCa was suspected based on LUTS, abnormal DRE findings, and elevated PSA. Of this number, 11 (84.6%) had, in addition, sudden onset paraplegia at presentation, while 2 (15.4%) had severe uncontrolled hematuria at presentation. All the patients in both categories had needle biopsy confirmation of their disease. The sensitivity of PSA was 99.2%.

Conclusion: Needle biopsy of the prostate is the preferred method for the diagnosis of PCa in most cases before treatment is undertaken. There are valid reasons why all PCas will not be diagnosed in this fashion. Elevated PSA when combined with an abnormal DRE finding increases the predictive value for cancer. In areas where pathologists are lacking, abnormal DRE and elevated PSA results can be a guide to proceed to treatment especially, where there is severe compromise of patients' quality of life due to symptoms of advanced PCa while awaiting confirmation.

Key words: Bilateral orchidectomy, needle biopsy, prostate cancer

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Introduction

Prostate cancer (PCa) is the most commonly diagnosed malignancy and the second most common cause of cancer deaths among men.^[1] In countries where prostate-specific antigen (PSA) screening has been adopted, the number of new cases of PCa diagnosed has increased dramatically.^[2] In developing countries like Nigeria, where widespread use of PSA for screening is not routine, most patients present with late disease and as such, the most common form of treatment is primary androgen ablation.^[3-5]

General recommendation for diagnosis of PCa before treatment involves a digital rectal examination (DRE), PSA testing, and biopsy either transrectal ultrasound (TRUS) guided biopsy^[6] or digitally guided biopsy. Needle biopsy allows appropriate surgical treatment for patients whose biopsy specimen is benign, allows better treatment planning, and also helps in grading of the tumor.^[7,8]

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In our centre, we have always preferred diagnosis by needle biopsy whenever feasible. In this report, we review all PCas diagnosed in our centre, to determine the percentage of cases that were diagnosed by needle biopsy or not and why?

Materials and Methods

We reviewed the case notes of patients who were diagnosed with PCa at the Nnamdi Azikiwe University Teaching Hospital, Nnewi, Southeast, Nigeria, from January 2007 to December 2010. Relevant biodata and method of diagnosis of PCa before treatment were reviewed. Patients were then categorized into two groups based on whether a diagnosis was made before treatment or after treatment. Sensitivity of PSA was calculated using the formula TP/TP+FN (TP - true positive and FN - false negative). Results were analyzed using Microsoft Office Excel® 2007.

Results

A total of 133 patients had bilateral orchidectomy over the period. The mean age of the patients was 70.0 ± 10.1 years, range 50–96 years. Most patients were in the seventh and eight decades of life. Of this number, 120 (90.2%) had their diagnosis confirmed by needle biopsy before bilateral orchidectomy (category 1), while 13 (9.8%) had transrectal biopsy for diagnosis at the time of bilateral orchidectomy (category 11).

The method of diagnosis for category 1 patients was with lower urinary tract symptoms (LUTS), abnormal DRE findings, elevated PSA, and transrectal needle biopsy. For category 11 patients, diagnosis of PCa was suspected based on LUTS, abnormal DRE findings, and elevated PSA. Of this number, 11 (84.6%) had in addition, sudden onset paraplegia at presentation, while 2 (15.4%) had severe uncontrolled hematuria at presentation [Table 1]. All the patients in both categories had needle biopsy confirmation of their disease. The reason for not having a needle biopsy confirmation before therapy was mainly that of the surgeon. The average duration of presentation for patients with sudden onset paraplegia was 7.0 ± 3.8 days, range 2–14 days. The average follow-up period for patients with paraplegia was 15.3 ± 6.4 months, range 6–24 months. Nine (81.8%) of the paraplegic patients regained the use of their limbs at a mean follow-up period of 48.7 ± 27.6 days, range 21–96 days. The requirement for blood transfusion was also significantly reduced after bilateral orchidectomy in patients with severe uncontrolled hematuria. All the patients in this study had an abnormal DRE on clinical examination (sensitivity of 100%). Only 1 (0.8%) had PSA levels less than 4 ng/ml [Table 2]. All the patients with paraplegia and severe hematuria had markedly elevated PSA. The sensitivity of PSA in this study was 99.2%.

Table 1: Method of diagnosis of prostate cancer before treatment

Method	No of patients	Percentage
LUTS/abnormal DRE/Elevated PSA	120	90.2
Needle biopsy		
LUTS/paraplegia/Abnormal DRE/Elevated PSA	118.3	
LUTS/severe hematuria/Abnormal DRE	2	1.5
Elevated PSA		
Total	133	100

PSA = Prostate specific antigen, DRE = Digital rectal examination

Table 2: Predictive value of abnormal DRE and PSA in the diagnosis of PCa

Method of diagnosis	PSA (ng/ml)		
	<4 n (%)	4–100 n (%)	>100 n (%)
Diagnosis before treatment	1 (0.8)	115 (95.8)	4 (3.3)
Diagnosis confirmed after treatment			
With paraplegia	-	4 (36.4)	7 (63.6)
With hematuria		2 (100)	-

PSA = Prostate specific antigen, DRE = Digital rectal examination, PCa = Prostate cancer

Discussion

The triad of DRE, serum PSA, and TRUS-directed prostate biopsy is used in the detection of PCa. DRE and serum PSA are the most useful first-line tests for assessing the risk of PCa.^[9,10] In our centre, routine evaluation for patients presenting with LUTS due to PCa, usually involves a medical history, clinical examination including a DRE, laboratory and radiological assessments including a PSA. PSA increases the predictive value of DRE for cancer.^[9,11] However, PSA can also be elevated in other diseases of the prostate or following prostate manipulation (prostatic massage and prostate biopsy).^[12] Therefore, any patient with a suspicious DRE and an elevated PSA should undergo prostate biopsy.

Prostate biopsy can be performed under digital or TRUS guidance. TRUS provides an excellent visualization of the prostate.^[13] This and the ability to direct the biopsy needle precisely into regions of interest clearly gives it more advantage to digitally guided biopsies which are blind.^[13] Weaver *et al.*^[14] in comparing the cancer yield from digitally and ultrasound guided prostate biopsy in 51 men with palpable prostate abnormality, noted carcinoma in nine of the patients with digitally directed biopsy. In contrast, 23 men had carcinomas detected when biopsy was performed under ultrasound guidance. Each of the men, who had positive digitally guided biopsy results, had carcinoma also detected on ultrasound-guided procedure. Lippman *et al.*^[15] observed carcinoma on TRUS biopsy in 9% of men with negative digitally guided biopsy results. All the patients in this study had digitally guided prostate biopsy.

There are clearly many advantages of needle biopsy. For those whose biopsy specimens are benign, appropriate early treatment can be applied. For those with cancer, preoperative diagnosis allows better treatment planning and improved patient education regarding the alternative treatment options.^[16]

In patients with PCa, surgical castration or the use of other methods that lead to a decrease of testicular androgen production and of plasma testosterone levels usually results in a favorable response.^[17] This form of therapy is commonly applied to either locally advanced or metastatic PCa.^[18] This explains the reason for the control of symptoms of PCa in patients with metastatic disease after surgical castration. In our environment, the absence of routine screening with PSA to detect early cases of PCa implies that most of our patients present late, therefore, the commonest mode of therapy in most cases is surgical castration. The data presented in this report suggest a few situations in which diagnosis with needle biopsy may not be necessary before treatment. This decision may become necessary in centres where PSA results as well as biopsy results take long period of time to be issued or places where trained pathologists are lacking. It also seems plausible that timely hormone ablation appears to reverse progression of paraplegia to an irreversible state. Also early hormone ablation appears to control severe bleeding from PCa and so reduce the requirements for blood transfusion. These hypotheses will require a randomized control trial for confirmation.

In this review, an abnormal DRE is usually associated with significant elevations in the PSA probably due to late presentation. This significantly increases the sensitivity of PSA (99.2%). Sensitivity is the ability of a test to give a positive result for a condition when the person tested truly has that condition. It is a measure of the rate of positive results among diseased persons.^[19] Specificity is the ability of a test to give a negative result when the person tested is truly free of the condition being tested for.^[19] From this study, the decision to recommend treatment without needle biopsy is a matter of surgeon's choice. This choice may be influenced by availability of trained pathologist and laboratory support. Despite the medicolegal implication of this method of treatment, the decision to proceed to treatment without needle biopsy may become pertinent under certain situations to improve patients' quality of life.

Conclusion

The medicolegal implication of a missed diagnosis of PCa implies that all patients must have a PSA and a TRUS-guided or finger-guided needle biopsy before treatment. In places where trained pathologists are lacking or there is lack of an

adequate laboratory support, DRE and PSA can guide the surgeon's decision to proceed to treatment while awaiting confirmation of the diagnosis in cases where there is severe compromise of patients quality of life.

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