

Role of Trans Rectal Ultrasonography in Evaluation of the Prostate

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ABSTRACT

Introduction: The biopsy rate for both TRUS and DRE was available only in the study done by Lee et al. They reported that a biopsy was recommended in 3.7% (29 out of 784) of the men tested by DRE and in 7.9% (62 out of 784) of the men tested by TRUS. Thus, both the detection and biopsy rate were approximately twice as high with ultrasonography. Objective of the research was to study the role of trans rectal ultrasonography in evaluation of the prostate

Material and Methods: This hospital based cross sectional study was conducted for a period of 18 months. 40 patients of age 35 to 80 years were evaluated by transrectal ultrasonography using a 7.5 MHz endorectal probe. Institutional Ethics Committee permission was obtained and informed consent was taken from the patients before they were recruited in the study.

Results: Five patients showed evidence of hypoechoic lesions in the peripheral zone and were diagnosed as prostatic carcinoma. One patient had irregularly enlarged prostate gland. One out of 40 patients were diagnosed as chronic prostatitis.

Conclusion: transrectal ultrasonography was found to be more sensitive than the digital rectal examination.

Keywords: Evaluation, Trans rectal ultrasonography, Sonograms

INTRODUCTION

Watanabe and associates have proposed diagnostic criteria for the purpose of differentiating the prostatic disorders which were later approved as the official criteria of the Japan Society of Ultrasonics in Medicine and the Japanese Urological Association.¹

In 1985, Lee and associates established the Hypoechoic lesion as a sign of the cancer focus and this had great impact on the advancement of early cancer detection by transrectal ultrasonography.²

In 1988, Watanabe and associates have undertaken a mass screening program for prostatic disease with transrectal ultrasonography. They have screened 6529 men over the age of 55 years detecting 42 cases of prostatic carcinoma (0.6%) and 1405 cases of benign prostatic hyperplasia - 21.5%.³

Lee and associates conducted the largest published screening trial with transrectal ultrasonography and co-workers who screened 784 self-referred men using both digital rectal examination and transrectal ultrasonography. Overall 77 biopsies were done, 83% initiated by transrectal ultrasonography and 38% by digital rectal examination. Cancer was detected

in 22 patients or 2.8% of the men screened. Digital rectal examination detected 10 tumors and transrectal ultrasonography detected 20 tumors (2.6% of the men screened). They suggested that transrectal ultrasonography (TRUS) is twice as sensitive as digital rectal examination (DRE) in detecting small prostatic cancers.⁴

The biopsy rate for both TRUS and DRE was available only in the study done by Lee et al. They reported that a biopsy was recommended in 3.7% (29 out of 784) of the men tested by DRE and in 7.9% (62 out of 784) of the men tested by TRUS. Thus, both the detection and biopsy rate were approximately twice as high with ultrasonography.²

MATERIAL AND METHOD

This hospital based cross sectional study was conducted for a period of 18 months. 40 patients of age 35 to 80 years were evaluated by transrectal ultrasonography using a 7.5 MHz endorectal probe. Institutional Ethics Committee permission was obtained and informed consent was taken from the patients before they were recruited in the study.

Patients presenting with symptoms of prostatism either in the form of irritative symptoms or obstructive symptoms, patients with abnormal digital rectal examination in the form of asymmetry of the gland, tenderness and presence of hard nodules were included in the study.

All the patients were investigated on WiproGE Logic 400 MD Ultrasound machine. The transducer used for the study is an end-viewing transducer with variable frequency ranging from 5-7.5 MHz that allows for multiplanar imaging in semi-coronal and axial projections. The transducer is provided with a stainless steel biopsy guide and attachments for TRUS guided biopsies of the prostate. Data was entered in the Microsoft Excel Sheet and analyzed.

RESULTS

Out of 40 patients who underwent trans rectal ultrasonogra-

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TRUS Observation	Number	%
Normal TRUS morphology	13	32.5
Benign prostatic hyperplasia	20	50
Prostatic carcinoma	06	15
Chronic prostatitis	01	2.5
Total	40	100

Table-1: Results of trans rectal ultrasonography

Studies	Prostate cancer detection by DRE*	Prostate cancer detection by TRUS#
Lee et al ²	1.3% (10 out of 784 patients)	2.6% (20 out of 784 patients)
Present study	2.5% (1 out of 40 patients)	15% (6 out of 40 patients)

*Digital rectal examination, #Trans rectal ultrasonography

Table-2: Comparison of results of carcinoma of prostate

phy of the prostate 13 patients showed normal zonal anatomy of the prostate, with no evidence of any focal lesions and the size of the gland in all these patients was below 25 grams. These patients were reported as normal trans rectal ultrasonography of the prostate gland. Digital rectal examination was also normal in all the patients. None of these patients were subjected to biopsy or PSA level estimation.

Five patients showed evidence of hypoechoic lesions in the peripheral zone and were diagnosed as prostatic carcinoma. All these patients showed no evidence of any palpable nodules of Digital rectal examination. All these patients had serum PSA levels of more than four ng/ml. All these five patients were subjected to trans rectal ultrasound guided biopsy and the diagnosis was confirmed on histopathological examination.

One patient had irregularly enlarged prostate gland. Without any evidence of hypo echoic or hyper echoic lesion and was diagnosed as prostatic carcinoma (iso echoic). Prostate was palpable in this patient by digital rectal examination. He also had PSA level of 16 ng/ml. This patient was subjected to trans rectal ultrasound guided biopsy and the diagnosis was confirmed by histopathological examination. This patient had evidence of extra capsular extension with involvement of bladder base and seminal vesicles.

One out of 40 patients were diagnosed as chronic prostatitis based on ultrasonographic features described in the literature. Trans rectal ultra sonography of this patient showed irregular calcific densities both in the central gland and peripheral zone. This patient had tender prostate gland on digital rectal examination and experienced some degree of pain during the trans rectal ultrasonography procedure.

We found that the detection rate of prostate cancer by Trans rectal ultrasonography WAS 15% compared with only 2.5% of detection rate with Digital rectal examination. Lee et al² also found that the detection rate for prostate cancer was only 1.3% by Digital rectal examination compared to an almost double i.e. 2.6% of detection rate for prostate cancer by Trans rectal ultrasonography method. Thus Trans rectal ultrasonography is superior to the digital rectal examination method.

DISCUSSION

The present study was conducted on patients with age group ranging from 35 to 80 years. All these patients presented with urologic symptom and were referred to the Radiology department for evaluation of the prostate by Trans rectal ultrasonography.

All the patients were subjected to thorough digital rectal examination prior to being subjected Trans rectal ultrasonography.

Of the six patients who were confirmed of having prostate cancer, one patient showed hard indurated prostatic gave a value of 2.5% cancer detection rate for digital rectal examination. In the study conducted by Lee et al² the cancer detection rate for digital rectal examination was 1.3% (10 out of 784 patients studied).

Trans rectal ultrasonography had detected five patients with hypo echoic lesions and one patient with iso-echoic lesion in the peripheral zone; and all of them were diagnosed as prostatic carcinoma or surgical biopsy in the present study giving the cancer detection rate of 15% (6 out of 40 patients). In the study conducted by Lee et al² the cancer detection rate by Trans rectal ultrasonography was 2.6% (20 out of 784 patients studied). In another study conducted by Wanatabe et al³ who screened 6529 men over the age of 55 years, 42 cases were diagnosed as prostatic carcinoma with a cancer detection rate of 0.6%. In the study carried out by Lee et al² the cancer detection rate by Trans rectal ultrasonography was twice as that of digital rectal examination. In the present study, the cancer detection rate was 2.5% (1 out of 40 patients studied) and by Trans rectal ultrasonography it was many time more i.e. 15% (6 out of 40 patients studied).

Of the six prostatic cancers diagnosed in the present study, five patients showed hypo echoic lesion and one patient showed iso echoic lesion comprising of 83% and 17% respectively. In a study conducted by Shinohara et al⁵ on 98 patients of prostatic carcinoma, 67% were found to have hypo echoic lesions and 32% were identified as having iso echoic lesions where as only one percent showed evidence of hyper echoic lesion.

Kelly IM et al⁶ in their study on 456 patients with possible prostate cancer found that The frequency of malignancy was 47% (75 of 158). Of 136 TRUS-positive cases, 72 were malignant and 64 benign. Of 84 CDI-positive cases, 65 were malignant and 19 benign (chi 2 = 12.18, P < .001). Thirteen percent of histopathologically proved cases (10 of 75) were normal at CDI. TRUS alone had a sensitivity of 96% and a positive predictive value (PPV) of 0.53. The addition of CDI increased the PPV to 0.77 but reduced the sensitivity to 87%. In only one case out of 158 did CDI suggest the diagnosis of malignancy independently of TRUS.

TRUS alone has limited potential to identify PC because of frequent multifocality of cancer within the prostate, the variable sonographic appearance of prostatic tumors, the poor specificity of focal US abnormalities, and the substantial

percentage of isoechoic PC. Over the past decade, the sextant biopsy technique has emerged as the standard of care in the detection of PC. However, limitations in cancer detection have been appreciated, particularly a false-negative rate approaching 20%. This high failure rate has led investigators to refine biopsy techniques to improve cancer detection and to increase the total number of cores. Currently, recommendations include increasing the biopsy number to a minimum of 10-12 cores, including sampling of the lateral prostate. Refinements in imaging technologies (power Doppler sonography, microbubble intravenous sonographic contrast agents, and MR spectroscopy or dynamic contrast MR imaging) should eventually improve targeting of prostate needle biopsy and reduce false-negative biopsies.⁷

Tang J et al⁸ found that Transrectal ultrasonographically guided biopsy of the hypoechoic lesions revealed prostate cancer in 30 patients and benign prostatic diseases in 36.

Tayib AM et al⁹ observed that Out of the 45 patients who underwent TRUS guided biopsy; cancer of the prostate was detected in 13 (28.8%). The cancer detection rate in patients presented with abnormal DRE alone was 7.6%, and was 15.3% in the group with elevated

Ukimura O et al¹⁰ in their study concluded that MR-TRUS fusion-image-guided biopsies outperformed systematic biopsies. TRUS-visibility of a MR-suspicious lesion facilitates image-guided biopsies, resulting in higher detection of significant cancer.

Maxeiner A et al¹¹ reported that Real-time MR/US fusion increases detection rates of PCa in patients undergoing repeat biopsy. Especially, clinically significant PCa with a Gleason score ≥ 7 were almost exclusively detected by MR/US fusion-guided biopsy.

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