

Original Research Article

A study on role of TRUS as diagnostic modality in evaluation of prostatic symptoms

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Abstract

Background: Trans rectal ultrasound has both diagnostic and therapeutic indications in prostatic diseases. Knowledge of use of TRUS in diagnosis and treatment of prostatic diseases is still scant. Hence it was decided to take up this study in this part of the country to evaluate TRUS as diagnostic modality on prostatic symptoms.

Material and methods: A longitudinal observational study was undertaken in the Department of Surgery among 80 patients. All the patients who had prostatic symptoms were subjected to Trans rectal ultrasound. All the parts along with prostate were visualized and pathology was identified.

Results: The mean age of the study group was 66.76 years. This study had shown that, all the patients with nodules had increased frequency. Most of the patients had urgency, incomplete emptying, intermittency, weak stream, straining, dribbling and nocturia. Other less frequent symptoms were Hematuria, Burning micturition, Incontinence and retention of urine. The prostate specific antigen level, volume of prostate by USG and prostate volume by trans rectal ultrasound was statistically significant between with or without nodules. The abscess, Cysts, prostatitis and seminal vasculitis had shown no statistically significant difference with the Serum prostate antigen and prostate volume by USG and TRUS.

Conclusions: Higher number of prostatic symptoms can be effectively evaluated by using Trans rectal ultrasonography.

Key words

Prostatic hypertrophy, Prostate cancer, Trans rectal Ultra sonography, Frequency, Nodule.

Introduction

Lower urinary tract symptoms (LUTS) include storage symptoms; voiding symptoms and pain are common in prostate disease. Most of the LUTS are due to various conditions of the prostate [1].

The disease of prostate are expected to occur at some stage of life among men. A variety of diseases affects prostate. Prostatic carcinoma is the third most common cause of cancer [2]. Benign prostatic hyperplasia is another condition which affects more than 80% of the males. The common age of occurrence of the BPH is 60 years and leads to a number of symptoms which are often termed as Lower Urinary Tract Symptoms (LUTS) [3]. Prostatitis is an inflammatory condition of prostate common in young adults associated with genitourinary infection [4]. Some other conditions like Prostatic cysts may be congenital or acquired can often lead to infertility in men [1, 2].

The introduction of transrectal ultrasonography (TRUS) by Wantabe, et al. in 1968, has become valuable tool in diagnosis of most prostatic diseases [5]. The use of sound waves to detect the distant objects based in their reflective properties became popular after World War II. In medicine, the initial use of ultrasound waves played a major role in detection of brain tumours. In Urology, ultrasound was first used to detect renal stones during surgery. Early studies concentrated on the ultrasonic appearances of prostate abnormalities such as benign prostatic hyperplasia (BPH), carcinoma of the prostate, prostatic abscess, and prostatic calculi [6].

TRUS has both diagnostic and therapeutic indications in prostatic diseases. TRUS has got its own value in diagnosis of Prostate cancer. However some of the possibilities of TRUS are undisputed, such as volume measurement of the prostate and guidance of prostate biopsies to

areas of interest TRUS as a means for early detection of prostate carcinoma is still a point of discussion due to the non – uniform appearance of the malignancy. Even TRUS is widely used in delivery of treatments such as brachytherapy, and also to monitor cryotherapy. The evaluation of the end finding probes has further enhanced urologist's ability to monitor the entire process of prostate biopsy. TRUS is also used planning of treatment with brachytherapy, cryotherapy or minimally invasive BPH therapy (eg. radiofrequency, microwave). In addition, TRUS is also used evaluate prostate volume during hormonal downsizing for brachytherapy. TRUS is also used in the evaluation of men with azoospermia to rule out ejaculatory – duct cysts, seminal vesicle cysts, mullerian cysts or urticular cysts [7].

Hence, it is important to diagnose and differentiate these conditions so that early treatment can be given and eventually reduce mortality and morbidity of the patients. However, the knowledge of use of TRUS in diagnosis and treatment of prostatic diseases is still scant. Hence it was decided to take up this study in this part of the country to evaluate TRUS as diagnostic modality on prostatic symptoms.

Materials and methods

A Longitudinal observational study was undertaken in the Department of Surgery. About 80 patients attending the OPD with prostatic symptoms between August 2017 and December 2018 were included as study sample. All patients coming to Government General Hospital, Nizamabad with prostatic symptoms included in to the study. Patients with known urethral pathology, Anal and Rectal disorders, Patients with bleeding disorders and Patients not willing for investigation/ not given informed consent. Institutional ethical committee approval was taken before starting the study. All the cases

attending the OPD with prostatic symptoms who satisfied the inclusion and exclusion and exclusion criteria were taken an informed bi lingual, written consent.

A detailed history of all the patients was obtained and complete physical examination was conducted including general, systemic and local examination (Per rectal) examination. Biological and radiological investigations including renal function tests, serum PSA level, Per abdomen ultrasonography for prostate were conducted before subjecting the patients for ultrasound.

The patients were given enema before subjecting the patient for trans rectal ultrasound. An empty bladder was ensured before the procedure. The patients were instructed to lie on their left side with knees bent towards chest. A Lignocaine gel was used as lubricant. A tranducer was carefully introduced into the rectum. The transducer directs the high frequency sound waves at the prostate. A computer was used for analyzing the echoes created by the sound waves and to display the image of the prostate gland.

On tranrectal ultrasound examination, seminal vesicles were identified bilaterally, with the ampulla of the vas deferens on either side of the midline. The base of the prostate was visualized after this. The peripheral zone forms most of the gland and echoes are described as isoechoic and closely packed. The transition zone is the central part of the gland and is hypoechoic. The junction of the peripheral zone and the transition zone is distinct posteriorly and is characterized by a hyperechoic region, which results from prostatic calculi or corpora amylacea. The transition zone is often filled with cystic spaces in patients with benign prostatic hyperplasia (BPH).

Several hypoechoic rounded structures can be identified around the prostate gland which was prostatic venous plexi. The position of the neurovascular bundles can often be identified by the vascular structures. Imaging in the sagittal plane allows visualization of the urethra. The median lobes of the prostate are often visualized.

An ellipsoid formula was used for calculation of the prostatic volume. The transverse dimension, antero-posterior dimension a at the estimated point of the widest transverse dimension in the axial plane, longitudinal dimension in the sagittal plane just off the midline and prostate volume was calculated by using following formula.

$$\text{Volume} = \text{height} \times \text{width} \times \text{length} \times 0.52$$

All the particulars were entered in predesigned proforma. The data thus collected was compiled and analyzed by using Statistical Package for Social Services (SPSS vs 18). Frequency counts proportions and chi square test was used for analyzing the categorical variables and Measures of central tendency including mean, standard deviation, Z test were used for analysis of quantitative variables.

Results

The mean age of the study group was 66.76 years. About 40% of the patients had hypertension and 22.5% of the patents had diabetes mellitus as co morbidity. Per rectal examination had shown that, there was difficulty in reaching the upper border of prostate. Trans rectal ultrasound examination of the study group had shown that, nodules were present in 28.8% of the patients, abscess in 8.8% of the patients, cyst in 13.8% of the patients, prostatitis in 7.5% of the patients and seminal vasculitis in 3.8% of the patients (**Table – 1**).

This study had shown that, all the patients with nodules had increased frequency. Most of the patients had urgency, incomplete emptying, intermittency, weak stream, straining, dribbling and nocturia. Other less frequent symptoms were Hematuria, Burning micturition, Incontinence and retention of urine. The patients with prostatic abscess had increased frequency of urine and straining compared to the patients without prostatic abscess. The frequent symptoms were increased frequency, urgency and straining in the patients with cysts. Prostatitis was associated with increased frequency, urgency, Hematuria,

burning micturition and retention of urine. The symptoms suggestive of seminal vasculitis in this study were increased frequency, urgency, burning micturition, retention of urine and incomplete emptying of the bladder (Table – 2).

Table – 1: Clinical characteristics of the study group.

		Frequency	Percent
Co morbidities	Hypertension	32	40.0
	Diabetes mellitus	18	22.5
Per rectal examination	Normal prostate	4	5.0
	Difficulty in reaching upper border	69	86.3
	Not possible to reach upper border	7	8.8
TRUS findings	Nodules	23	28.8
	Abscess	7	8.8
	Cyst	11	13.8
	Prostatitis	6	7.5
	Seminal Vasculitis	3	3.8

Table – 2: Relation between symptoms and TRUS findings in the study group.

Symptoms	Nodules n (%)	Abscess n (%)	Cyst n (%)	Prostatitis n (%)	Seminal vasculitis n (%)
Increased frequency	23 (100)	6 (85.7)	9 (81.8)	5 (83.3)	3 (100)
Urgency	19 (82.6)	3 (42.9)	7 (63.6)	4 (66.7)	2 (66.7)
Incomplete emptying	22 (95.7)	2 (28.6)	1 (9.1)	0	0
Intermittency	19 (82.6)	1 (14.3)	1 (9.1)	0	0
Weak stream	22 (95.7)	1 (14.3)	1 (9.1)	0	0
Straining	20 (87.0)	4 (57.1)	1 (9.1)	0	1 (33.3)
Dribbling	22 (95.7)	0	1 (9.1)	0	0
Nocturia	21 (91.3)	0	1 (9.1)	0	0
Hematuria	5 (21.5)	2 (28.6)	0	4 (66.7)	0
Burning micturition	3 (13.0)	2 (28.6)	4 (36.4)	4 (66.7)	2 (66.7)
Incontinence	8 (34.8)	0	0	0	0
Retention	4 (17.4)	2 (28.6)	2 (18.2)	3 (50.0)	1 (33.3)

The prostate specific antigen level, volume of prostate by USG and prostate volume by trans rectal ultrasound was statistically significant between with or without nodules. The abscess, Cysts, prostatitis and seminal vasculitis had shown no statistically significant difference with the Serum prostate antigen and prostate volume by USG and TRUS.

Discussion

TRUS has both diagnostic and therapeutic indications in prostatic diseases. TRUS has got its own value in diagnosis of Prostate cancer.

However some of the possibilities of TRUS are undisputed, such as volume measurement of the prostate and guidance of prostate biopsies to areas of interest TRUS as a means for early detection of prostate carcinoma is still a point of discussion due to the non – uniform appearance of the malignancy [7].

The mean age of the patients in this study was 66.76 years. In study of prostate cancer by Augustin, et al. [8], the mean age of impalpable prostate cancers which were visible on TRUS was 62.1 years. Ahmed, et al. [9] have noticed

the mean age of 66.3 years in a group of advanced prostate cancer. Hypertension and Diabetes mellitus were the common co morbidities in this study.

TRUS had shown nodules in 28.8% of the patients, abscess in 8.8% of the patients, cyst in 13.8% of the patients, prostatitis in 7.5% of the patients and seminal vasculitis in 3.8% of the patients in this study. All the patients with prostatic nodules had higher rate of symptoms. Increased frequency of urine and straining were the symptoms of prostatic abscess in this study. The patients with prostatic cysts had symptoms of increased frequency, urgency and straining. The symptoms prostatitis in this study were increased frequency, urgency, Hematuria, burning micturition and retention of urine. The patients with seminal vasculitis in this study had increased frequency, urgency, burning micturition, retention of urine and incomplete emptying of the bladder as the symptoms.

The prostate specific antigen level, volume of prostate by USG and prostate volume by trans rectal ultrasound was statistically significant between with or without nodules. The abscess, Cysts, prostatitis and seminal vasculitis had shown no statistically significant difference with the Serum prostate antigen and prostate volume by USG and TRUS.

A study by Clark, et al. [10] revealed that more than half of patients with PSA of level of more than 10 ng/mL had prostate cancer. TRUS findings at the time of biopsy were a strong predictor of cancer of the PSA level was abnormal. DRE results were not correlated with positive biopsy results regardless of PSA levels of TRUS findings.

In another study by Kim, et al. [11], the prevalence of cystic lesions of the prostate was 5.0% in prostate cancer screening population. In contrast, these abnormalities were present in 17.0% of the “at risk” infertile men who had TRUS.

In another study of correlation of TRUS findings with histopathology, Singh, et al. [12] had noticed benign prostatic hypertrophy in 62% of the patients, Chronic prostate in 5%, suspicious carcinoma in 23% of the cases with prostatic symptoms. They also found DRE with increased PSA levels in 20% of the cases who had suspicious carcinoma of prostate and DRE with increased PSA and TRUS findings in 16% of the cases.

In a study by Meshref, et al. [13] have found that the abnormalities of seminal duct were found in 83% of the patients of Hemospermia. Abnormalities of the prostate, the ejaculatory duct and seminal vesicles were found in 24.4%, 41.5% and 39% of the patients respectively. The prostate abnormalities included prostatitis in 5 patients, prostatic calculi in 4 and multiple cysts in 1 case.

Conclusion

This study was mainly undertaken to study the usefulness of Transrectal ultrasound in diagnosis of prostatic diseases. Nodules, cysts, abscess, inflammatory conditions of the prostate and seminal vasculitis were the common conditions which can be diagnosed by using TRUS.

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