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Original Research

Assessment of role of USG in prostate cancer

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ABSTRACT:

Background: Prostate cancer is the second most common cancer worldwide. The present study was conducted to assess role of USG in prostate cancer. **Materials & Methods:** 48 patients of prostate cancers were enrolled.All underwent transrectal ultrasound using transducers end-firing probes scanning at frequencies of 5–10 MHz.Gleason grading was also recorded. Side effects of TRUS was also recorded. **Results:** Age group 20-40 years had 20 and 40-60 years had 28 patients. The difference was significant (P< 0.05). Complications seen with TRUS were haematospermiain 2, fever in 1, urosepsisin 1, rectal bleeding <2 days in 3, prostatitis in 1 and epididymitis in 1 patient. The difference was significant (P< 0.05).TRUS had specificity of 85.2%, sensitivity of 95%, PPV of 98% and NPV of 56%. Gleason gradingwas indolent well-differentiated tumour seen in 32, intermediate risk in 12 and clinically aggressive in 4 cases. The difference was significant (P< 0.05). **Conclusion:** USG is efficient in detection ofprostate cancer.

Key words: Gleason grading, haematospermia, Prostate cancer

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INTRODUCTION

Prostate cancer is the second most common cancer worldwide, with approximately 180,000 new cases diagnosed and 26,000 cancerrelated deaths projected in the United States in 2016.[1] With the introduction of prostate-specific antigen (PSA) screening in the late 1980s, the known incidence of prostate cancer has increased substantially because of earlier detection in asymptomatic men, peaking in 1992. The risk factors for developing prostate cancer include age, ethnicity, genetics, and dietary factors. Prostate cancer is a disease of older men, rarely diagnosed before the age of 50 years, with the incidence increasing exponentially after that age.[2]

Before PSA testing and transrectal ultrasound (TRUS) became widely available, most patients presented with cancer-specific symptoms because of locally advanced disease and the cancers were diagnosed by DRE, so that the majority were diagnosed at stage T2 or more.[3] Nowadays, most cases (>90%) are diagnosed at an asymptomatic early stage (stage T1) because the advent of widespread PSA testing and TRUS-guided biopsy has enabled early diagnosis, with nearly half of all newly diagnosed patients falling into the "favourable risk" group. Over the past 20 years the proportion of males with low- *vs* high-risk disease at diagnosis has shifted significantly from 29.5% *vs* 36.6% (1989–1992) to 46.8% *vs* 16.0% (2000–2002).[4]

Gray-scale TRUS, a cost-effective and readily available imaging modality, is the most commonly used radiologic study for the evaluation of the prostate gland. Most prostate cancers (60%–80%) are hypoechoic on TRUS, whereas 30%–40% of prostate cancers are isoechoic, and approximately 1.5% are hyperechoic.[5]The present study was conducted to assess role of USG in prostate cancer.

MATERIALS & METHODS

The present study comprised of 48 patients of prostate cancers. The consent was obtained from all enrolled patients.

Data such as name, ageetc. was recorded. A thorough physical clinical examination was performed. All underwent transrectal ultrasound using transducers end-firing probes scanning at frequencies of 5–10

MHz.The patient's bladder was made empty before the procedure. Prophylactic antibiotics was administered. The patient was then positioned in the left lateral decubitus or lithotomy position, an endorectal probe with the biopsy guide was inserted and local anaesthetic administered around the prostate.Gleason grading was also recorded. Side effects of TRUS was also recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Age group (years)	Number	P value
20-40	20	0.05
40-60	28	

Table I shows thatage group 20-40 years had 20 and 40-60 years had 28 patients. The difference was significant (P< 0.05).

Table II Complications associated with transrectal ultrasound biopsy

Complications	Number	P value
Haematospermia	2	0.05
Fever	1	
Urosepsis	1	
Rectal bleeding <2 days	3	
Prostatitis	1	
Epididymitis	1	

Table II, graph I shows that complications seen with TRUS were haematospermia in 2, fever in 1, urosepsis in 1, rectal bleeding <2 days in 3, prostatitis in 1 and epididymitis in 1 patient. The difference was significant (P< 0.05).

Graph I Complications associated with transrectal ultrasound biopsy

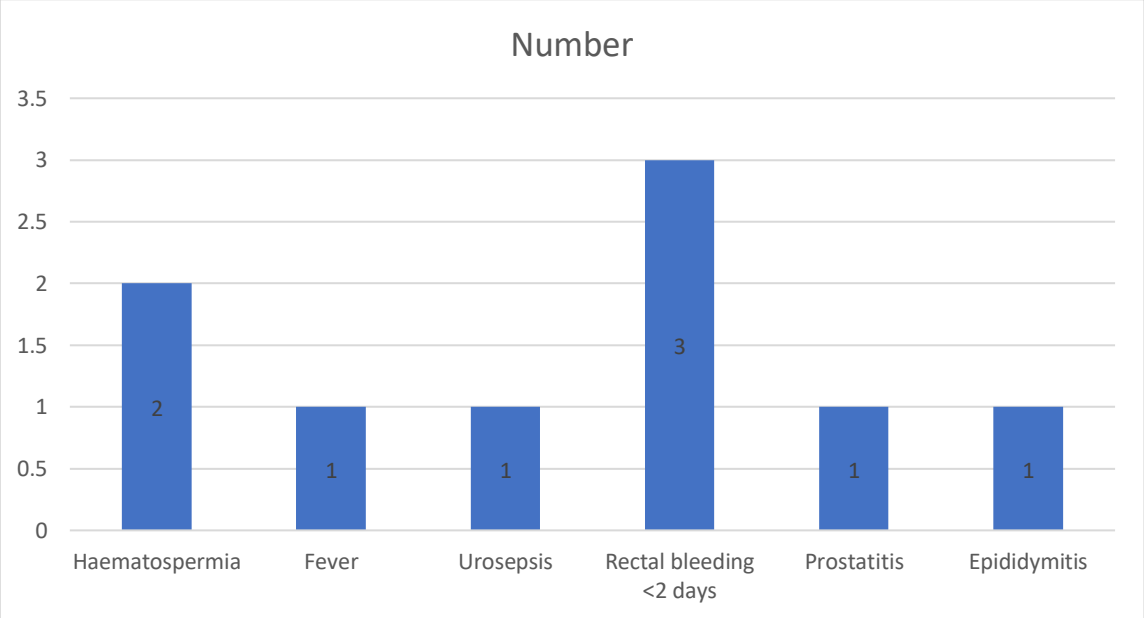

Table III Accuracy of TRUS

Accuracy	Percentage
Specificity	85.2%
Sensitivity	95%
PPV	98%
NPV	56%

Table III shows that TRUS had specificity of 85.2%, sensitivity of 95%, PPV of 98% and NPV of 56%.

Table IV Gleason grading

Gleason grading	Number	P value
Indolentwell-differentiated tumour	32	0.02

intermediate risk	12	
clinically aggressive	4	

Table IV shows that Gleason grading was indolent well-differentiated tumour seen in 32, intermediate risk in 12 and clinically aggressive in 4 cases. The difference was significant (P< 0.05).

DISCUSSION

TRUS remains the first modality of choice for imaging the prostate. Yet, despite technological advances in high-frequency wideband probes, greyscale ultrasound has an accuracy of only 50–60% with a positive predictive value as low as 6% for the detection of prostate cancer. Its accuracy for local staging is also relatively poor.Classically 70% of cancers originate from the PZ, 10% from the CZ and 20% from the TZ.[6] 60–70% of cancers are echopoor but only 17–57% of echopoor foci are malignant. 30–40% of cancers are isoechoic and a small percentage are echogenic. Of sonographically visible cancers 30% appear as a focal nodule, whereas a focal lesion is accompanied by an infiltrative component in 50% and an infiltrative pattern predominates in approximately 20%.[7]The present study was conducted to assess role of USG in prostate cancer.

We found that age group 20-40 years had 20 and 40-60 years had 28 patients. used grayscale values and evaluated their usefulness in predicting prostate cancer (PCA).CrouzetSet al[8] in their study a total of 172 patients scheduled for prostate biopsy for suspected PCA. Patients underwent 12 core target biopsies for hypoechoic lesions in 12 areas of the prostate and two additional target biopsy cores for two hypoechoic lesions. They estimated the grayscale value of the image using a red/green/blue scoring method through a function embedded in the picture archiving and communication system. Of the 127 patients (median age = 68.5 years, median prostate-specific antigen level = 6.19 ng/mL), 67 (52.8%) had PCA. Of 1778 biopsy lesions, 327 (18.4%) were PCA lesions. No differences in the grayscale values were found between PCA and benign lesions; however, the grayscale value between 28.0 and 57.0 for hypoechoic lesions was identified as a significant factor for predicting PCA in multivariable analysis (p=0.008). Multivariable analysis indicated a grayscale value between 34.0 and 48.0 as a predicting factor for clinically significant PCA (cs-PCA: Gleason grade group ≥2) (p=0.001). The area under the curve (AUC) for predicting cs-PCA was higher for combined clinical and grayscale value parameters than for TRUS grayscale values (0.780 vs. 0.561, p<0.001).

We found that complications seen with TRUS were haematospermiain 2, fever in 1, urosepsisin 1, rectal bleeding <2 days in 3, prostatitis in 1 and epididymitis in 1 patient. Rodríguez-Patrón R et al[9]analyzed the utility of ultrasound in the evaluation and treatment selection of patients with benign prostatic hyperplasia (BPH).A total of 5000 patients older than 50 years and with prostatic symptoms were evaluated with abdominal ultrasound and in selected cases with transrectal ultrasound.The first ultrasonographic sign of BPH is the increase of anteroposterior and longitudinal diameters. Prostatic volume is measured with a safety of 80%, post-void volume and indirect signs of bladder obstruction are also determined by ultrasound. Upper urinary tract pathological conditions can be also detected.Ultrasound associated with PSA and urinary flow are adequate to evaluate and select treatment in patients with BPH.

We found that TRUS had specificity of 85.2%, sensitivity of 95%, PPV of 98% and NPV of 56%. Hodge et al[10] introduced the use of TRUS to guide sextant biopsy of the prostate gland, which involves sampling of the parasagittal apex, midzone, and base of the right and left sides of the prostate gland. However, the sextant biopsy strategy has since been superseded by extended 10- to 12-core biopsy protocols, which involve performing the standard sextant biopsy plus additional biopsies of the far lateral and apical zones. Extended 10- to 12-core biopsy protocols increase cancer detection rates up to 30%, increase negative predictive value, have a more accurate tumor grade concordance with radical prostatectomy, and do not increase the likelihood of detecting insignificant cancers. However, increasing the biopsy cores to more than 12 samples has not been shown to significantly increase cancer detection rates or negative predictive value but may increase the detection of insignificant cancers.

We found that Gleason gradingwas indolent well-differentiated tumour seen in 32, intermediate risk in 12 and clinically aggressive in 4 cases. Aigner et al[11] compared contrast-enhanced ultrasound targeted biopsies with 10-core systematic biopsies in 44 patients. Contrast-enhanced ultrasound targeted biopsies were positive in 47% with false positives in 20% of patients, compared with positive biopsies in 9% of systematic biopsies. There was no difference in Gleason score. Mitterberger et al[12] studied 690 patients comparing contrast-enhanced ultrasound targeted biopsies with systematic biopsies and found significantly higher Gleason scores in the targeted group (Gleason score 6.8 *vs* 5.4).

CONCLUSION

Authors found that USG is efficient in detection ofprostate cancer.

REFERENCES

1. Turgut A, Olcucuoglu E, Kosar P, Geyik PO, Koşar U, Dogra V. Power Doppler ultrasonography of the feeding arteries of the prostate gland: a novel approach to the diagnosis of prostate cancer? J Ultrasound Med 2007;26:875–83.

2. Pallwein L, Mitterberger M, Pelzer A, Bartsch G, Strasser H, Pinggera GM, et al. Ultrasound of the prostate cancer: recent advances. EurRadiol2008;18:707–15.
3. Bigler SA, Deering RE, Brawer MK. Comparison of microscopic vascularity in benign and malignant prostate tissue. Hum Pathol1993;24:220–6.
4. Padhani AR, Harvey CJ, Cosgrove DO. Angiogenesis imaging in the management of prostate cancer. Nat Clin PractUrol2005;12:596–607.
5. Wijkstra H, Wink M, de laRosette J. Contrast specific imaging in the detection and localisation of prostate cancer. World J Urol2004;22:346–50.
6. Leen E, Averkiou M, Arditi M, Burns P, Bokor D, Gauthier T, et al. Dynamic contrast enhanced ultrasound assessment of the vascular effects of novel therapeutics in early stage trials. EurRadiol2012;22:1442–50.
7. Harvey CJ, Pilcher J, Eckersley R, Blomley MJK, Cosgrove DO. Advances in ultrasound. Clin Radiol2002;57:157–77.
8. Crouzet S, Chapelon JY, Rouviere O, et al. Whole-gland ablation of localized prostate cancer with high-intensity focused ultrasound: oncologic outcomes and morbidity in 1002 patients. Eur Urol. 2014;65:907–914.
9. Rodríguez-Patrón R. Diagnosis and follow-up of benign prostatic hyperplasia by ultrasound. Archivosespanoles de urologia. 2006 May 1;59(4):353-60.
10. Hodge KK, McNeal JE, Stamey TA. Ultrasound guided transrectal core biopsies of the palpably abnormal prostate. J Urol. 1989;142:66–70.
11. Aigner F, Pallwein L, Mitterberger M, Pinggera GM, Mikuz G, Horninger W, et al. Contrast-enhanced ultrasonography using cadence-contrast pulse sequencing technology for targeted biopsy of the prostate. BJU Int 2009;103:458–63.
12. Mitterberger M, Pinggera GM, Horninger W, Bartsch G, Strasser H, Schäfer G, et al. Comparison of contrast enhanced color Doppler targeted biopsy to conventional systematic biopsy: impact on Gleason score. J Urol 2007;178:464–8.