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ORIGINAL RESEARCH

Evaluation of cases of prostate cancer with ultrasonography

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Abstract

Background: Prostate cancer is the second most common cancer. TRUS remains the first modality of choice for imaging the prostate. The present study was conducted to evaluate cases of prostate cancer with ultrasonography (USG).

Materials & Methods: 50 patients of prostate cancers 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 14, 40-60 years had 12 and 60-80 years had 24 patients. The difference was significant (P< 0.05).Gleason grading was indolent well-differentiated tumour seen in 28, intermediate risk in 12 and clinically aggressive in 10 cases. Complications seen were rectal bleeding in 2, prostatitis in 1 and epididymitis in 1, haematospermia in 3, fever in 5 and urosepsis in 2 patients. The difference was significant (P< 0.05).TRUS had specificity of 88.2%, sensitivity of 92.5%, PPV of 97.6% and NPV of 58%.

Conclusion: USG is an effective aid in detection ofprostate cancer. Results showed high specificity and sensitivity

Key words: Prostate cancer, USG, rectal bleeding

Introduction

Over 35 000 new cases of prostate cancer are diagnosed per annum in the UK and there are over 10 000 deaths annually. It is the most common cancer in males in the UK, and causes 13% of all cancer deaths in males. The lifetime risk of being diagnosed with prostate cancer is one in nine. It has been estimated from post-mortem data that approximately half of all males in their fifties have prostate cancer, which increases to 80% by the age of 80 years, but only 1 in 26 men will die from their disease—supporting the fact that males are more likely to die with prostate cancer than from it.[1]

TRUS remains the first modality of choice for imaging the prostate. 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.[2] 60–70% of cancers are echo-poor but only 17–57% of echo-poor 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%.[3]Before PSA testing

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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.[4] 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.[5]The present study was conducted to evaluatecases of prostate cancer with ultrasonography (USG).

Materials & Methods

The present study comprised of 50 patients of prostate cancers. The consent was obtained from all enrolled patients. Ethical approval was also obtained.

Data such as name, ageetc. was recorded. A thorough physical clinical examination was performed. Patients of prostate cancer were subjected totransrectal 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	14	0.04
40-60	12	
60-80	24	

Table I shows that age group 20-40 years had 14, 40-60 years had 12 and 60-80 years had 24 patients. The difference was significant (P< 0.05).

Table II Assessment of parameters

Parameters	Variables	Number	P value
Gleason grading	Indolent well-differentiated tumour	28	0.05
	intermediate risk	12	
	clinically aggressive	10	
Complications	Rectal bleeding	2	0.02
	Prostatitis	1	
	Epididymitis	1	
	Haematospermia	3	
	Fever	5	
	Urosepsis	2	

Table II, graph I shows that Gleason grading was indolent well-differentiated tumour seen in 28, intermediate risk in 12 and clinically aggressive in 10 cases. Complications seen were rectal bleeding in 2, prostatitis in 1 and epididymitis in 1, haematospermiain 3, fever in 5 and urosepsisin 2 patients. The difference was significant (P< 0.05).

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Graph I Assessment of parameters

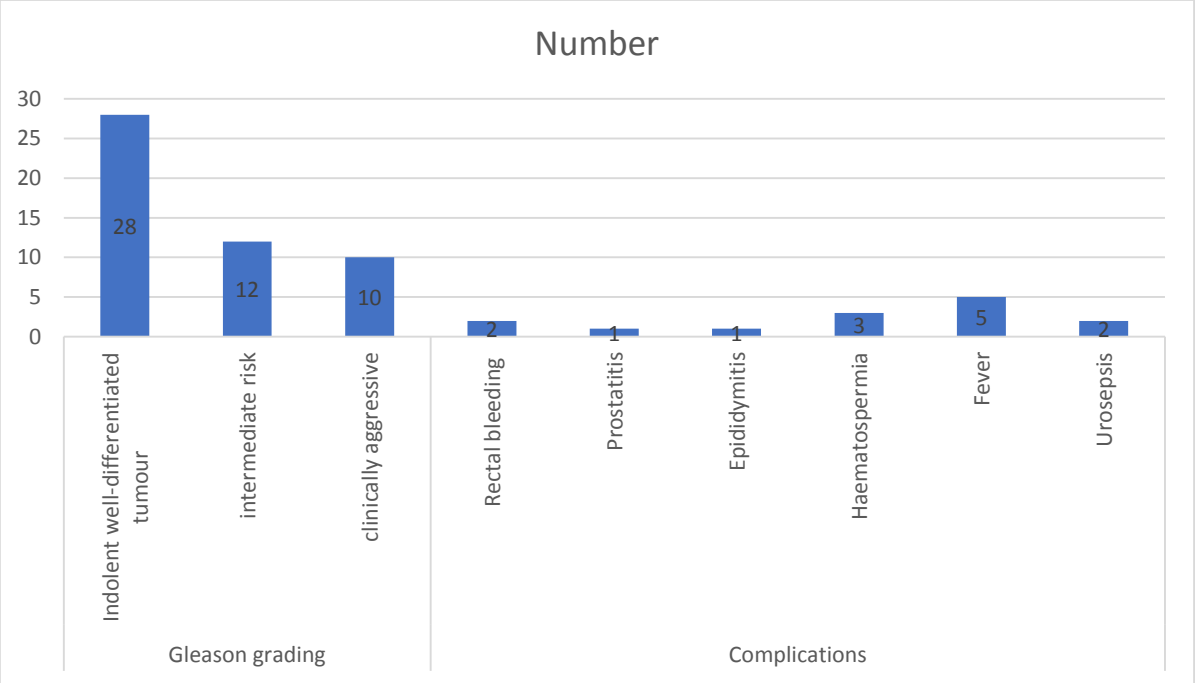

Table III Accuracy of TRUS

Accuracy	Percentage
Specificity	88.2%
Sensitivity	92.5%
PPV	97.6%
NPV	58%

Table III shows that TRUS had specificity of 88.2%, sensitivity of 92.5%, PPV of 97.6% and NPV of 58%.

Discussion

Prostate cancer is the second most common cancer worldwide, with approximately 180,000 new cases diagnosed and 26,000 cancer related deaths projected in the United States in 2016.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.[6] Prostate cancer is a disease of older men, rarely diagnosed before the age of 50 years, with the incidence increasing exponentially after that age. 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% to 46.8% *vs* 16.0%.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.[7] Most prostate cancers (60%–80%) are hypoechoic on TRUS, whereas 30%–40% of prostate cancers are isoechoic, and approximately 1.5% are hyperechoic.[8]The present study was conducted to evaluate cases of prostate cancer with ultrasonography (USG).

We found that age group 20-40 years had 14, 40-60 years had 12 and 60-80 years had 24 patients. Hodge et al[9] 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

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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.

We found that Gleason gradingwas indolent well-differentiated tumour seen in 28, intermediate risk in 12 and clinically aggressive in 10 cases. Complications seen were rectal bleeding in 2, prostatitis in 1 and epididymitis in 1, haematospermia in 3, fever in 5 and urosepsis in 2 patients. Patron R et al[10]evaluated 5000 patients with prostatic symptoms 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 thatTRUS had specificity of 88.2%, sensitivity of 92.5%, PPV of 97.6% and NPV of 58%. Crouzet Set al[11] studied a total of 172 patients scheduled for prostate biopsy for suspected PCA. 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. 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.Mitterberger et al[12]included 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 an effective aid in detection ofprostate cancer. Results showed high specificity and sensitivity.

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