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Diagnostic Value of Transrectal Ultrasonography In Patients With PSA Values >20 ng/ml

PSA değeri 20 ng/ml Üzerindeki Hastalarda Transrektal Ultrasonografinin Tanı Değeri

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Purpose: It were aimed to evaluate the value of transrectal ultrasonography (TRUS) for the determination of the cancer sites within the prostate gland in patients with prostate-specific antigen (PSA) values >20 ng/ml.

Materials and Methods: Fifty-one patients with PSA values > 20 ng/ml who underwent TRUS examination and TRUS-guided prostate biopsy were included to the study. Under TRUS guidance sextant plus lesion biopsies were taken from each patient. TRUS findings of each biopsy location were correlated with histopathological outcome.

Results: In the analysis of 408 biopsy foci, sensitivity, specificity, positive and negative predicitive values of TRUS were 63.5%, 90.4%, 83.7% and 76.2% respectively. In total, 4 of 51 (7.84%) patients with nonsuspicious TRUS findings had prostate cancer, whereas there were nine (17.64%) patients with cancer foci determined at the contralateral side of the lesion detected by TRUS. In addition, there were 65 (15.9%) locations in which cancer foci were identified altough TRUS detected no lesion.

Conclusions: Diagnostic value of TRUS is not sufficiently high, even in PSA ranges > 20 ng/ml. Therefore, we suggest that systematic biopsies should also be performed in patients with PSA > 20 ng/ml in addition to the lesion biopsies.

Key Words: ***prostate cancer, transrectal ultrasonography, prostate specific antigen, biopsy***

Amaç: Prostat spesifik antijen (PSA) değeri 20 ng/ml 'nin üzerindeki hastalarda transrektal ultrasonografinin (TRUS) prostat glandında kanserli bölgelerin belirlenmesine yönelik değerinin araştırılması amaçlanmıştır.

Gereç ve Yöntem: PSA değerleri 20 ng/ml 'nin üzerinde olan ve TRUS eşliğinde prostat biyopsisi uygulanan 51 hasta çalışmaya dahil edilmiştir. TRUS eşliğinde 6 kadran sistematik biyopsiye ek olarak lezyon biyopsileri alınmıştır. Biyopsi alınan her odağın TRUS bulguları ile histopatolojik sonuçları karşılaştırılmıştır.

Bulgular: 408 biyopsi odağının analizine göre TRUS 'un sensitivite, spesifisite, pozitif ve negatif prediktivite değerleri sırasıyla; 63.5%, 90.4%, 83.7% ve 76.2% bulunmuştur. Tüm çalışma grubunda 51 hastanın 4 'ünde (%7.84) TRUS 'da şüpheli bulgu olmamasına rağmen biyopside prostat kanseri saptanırken, 9 hastada (%17.64) kanser TRUS 'da belirtilen lezyondan farklı tarafta saptanmıştır. Ek olarak, 65 (%15.9) lokalizasyonda TRUS ile saptanan lezyon olmamasına rağmen biyopsi ile kanser saptanmıştır.

Sonuç: TRUS 'un tanısal değeri 20 ng/ml üzerindeki PSA değerlerinde bile yeterince yüksek değildir. Bu nedenle, PSA değeri 20 ng/ml üzerindeki hasta grubunda da lezyon biopsilerine ek olarak sistematik biyopsilerin alınması gereklidir.

Anahtar Kelimeler: ***prostat kanseri, transrektal ultrasonografi, prostat spesifik antijen, biyopsi***

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Prostate cancer is the most common cancer and the second most common cause of death in the elderly male population (1). It is estimated that 40% of men aged between 50 and 70 years will have prostate cancer, 4% of whom will die due to the disease eventually (2). Digital rectal examination as a diagnostic tool with a subjective

nature has high false negative and positive rates. Recently the diagnosis of prostate cancer has relied mainly on ultrasonography and laboratory tests such as prostate-specific antigen (PSA) which is the most sensitive method for the screening for the disease. Although PSA levels higher than 4 ng/ml is accepted as suspicious for prostate cancer, there are several other factors which may also increase serum PSA levels (3,4). Transrectal ultrasonography (TRUS) which has revolutionized prostate biopsy technique plays a crucial role in the diagnosis of prostate cancer. Although it can reveal potentially malignant prostate lesions while they are small and well circumscribed, it is usually quite difficult to differentiate these small tumors from benign focal lesions such as nodular hyperplasia and inflammatory lesions. Therefore, biopsy under TRUS guidance is accepted as necessary for making a definitive diagnosis of prostate cancer (5) and the main role of TRUS has been suggested to be guidance for the needle into the prostate to perform biopsy on specific sites (6). There are various biopsy protocols which include lesion biopsies in addition to systematic sampling. Although the cancer detection rate has been reported to improve with an increase in the number of cores biopsied, an accompanying increase in the associated morbidity and discomfort has been reported as well (7).

Our aim in this study was primarily to evaluate the diagnostic significance of TRUS for patients with PSA levels higher than 20 ng/ml and to reveal whether we should either only biopsy TRUS lesion sites or stick to a regular biopsy schedule.

Materials and Methods

Fifty-one patients with a mean ± standard deviation (SD) age of 63.3 (range, 53.-77) and mean ± (SD) value 32.7 ng/ml for total PSA value (range, 20-100 ng/ml) who underwent TRUS examination and TRUS guided prostate biopsy were included to the study. All patients received 500 mg ciprofloxacin starting the night before the procedure and continued twice daily for the following 3 days. TRUS examinations and prostate biopsies under TRUS guidance were performed by means of an ultrasound machine with a a biplanar (6 MHz end-fire sector, 7 MHz linear) transrectal probe (Toshiba, Tokyo, Japan). In regard to the analysis of the parenchymal integrity and echotexture of the peripheral zone of the prostate, hypoechoic lesions and heterogenous echo pattern of were accepted as (+) findings for TRUS examination. Sextant plus lesion biopsies were taken from each patient. Sampling of the prostate gland was performed with an 18-gauge 20 cm spring-loaded biopsy needle. The biopsy procedures were performed by the same radiologists (E.Ö, A.T.T) who were specialized in uroradiology. TRUS findings for each biopsy location were correlated with the histopathological outcome. The presence of a suspicious TRUS finding for a specific location was accepted as true positive if histopathological examination for the relevant biopsy specimen was consistent with prostate cancer whereas true negativity was defined as a benign histopathological outcome for the same location. Each patient gave informed consent before undergoing the biopsy procedure.

Results

In total, 54.9% (28/51) of the patients were diagnosed as prostate cancer histopathologically. The histopathological outcome for the total of 23 patients who were diagnosed not to have cancer included prostatatis and normal prostate tissue for 17 and 6 patients respectively. During the sampling, a total of 408 cores (306 systematic sextant biopsy cores plus 102 lesion biopsies) were biopsied in 51 patients. Statistically, sensitivity, specificity, positive and negative predicitive values of TRUS for the detection of prostate cancer were calculated to be 63.5%, 90.4%, 83.7% and 76.2% respectively.

Out of 102 lesion biopsies, 94 were diagnosed to have prostate cancer histopathologically (positive predictive value; 92.1%). On the other hand, there were 65 (15.9%) locations in which cancer foci were identified histopathologically although no suspicous lesion was detected by TRUS examination. In total, 4 of 51 (7.8%) patients with nonsuspicious TRUS findings were determined to have prostate cancer histopathologically. In 9 (17.6%) patients, cancer foci were detected by histopathological analysis of the biopsy specimes from the contralateral side of the lesion determined by TRUS examination.

Discussion

The risk of prostate cancer is known to increase with increasing levels of PSA. In a previous study by Scattoni et al.(4), cancer detection rate was calculated to be 18% with sextant (+) lesion biopsies, when PSA levels were under 4 ng/ml whereas the same rate was determined to be 42% for PSA levels

within the range of 4 to 10 ng/ml. For PSA levels higher than 10 ng/ml, the value for the relevant ratio was found to be as high as 66%.

Our findings revealed that sensitivity and specificity of TRUS for the detection of prostate cancer were 63.5% and 90.4% respectively. Theses rates seem to be higher than the reported diagnostic value of TRUS in the literature for patients with PSA levels above 4 ng/ml (8). However, it is obvious that rates exceeding 64%, 76% and 83% for the sensitivity, negative predictivity and positive predictivity respectively can not be accepted as sufficient to exclude systematic biopsies. If we evaluate only the lesion biopsies, the calculated positive predictive value rises to 92.1% (94/102), but the negative predictive value of TRUS determined in this study is only 76.2% and we think that this is not adequate for excluding systematic biopsies. Our results showed that 65 of the 408 (15.9%) biopsy foci were histopathologically diagnosed as prostate cancer even though no lesions were visualized at these sites by TRUS.

Although TRUS is the standard method for monitoring the prostate gland, it is known to have a low sensitivity and specificity for the diagnosis of prostate cancer (5, 9). Despite being not specific enough, prostate cancer is generally visualized as a hypoecoic lesion by TRUS (5,10). Moreover, it has been reported that only %20 of the hypoecoic lesions detected by TRUS are confirmed to be prostate cancer histopathologically (11). On the other hand, about 30-50% of peripheral zone (PZ) cancers are determined to be isoechoic and hence they cannot be visualized by TRUS (12). Therefore, the precise diagnosis of hypoecoic lesions is only possible by sampling of the prostate tissue by biopsy (5). Although several sampling protocols have been proposed, it is generally suggested that 6 or more cores should be biopsied (13). However, it has been reported that the associated morbidity and the discomfort of the patients increase as well with increasing number of biopsy cores (7). This inevitably necessitates the sampling of the least number of biopsy cores during TRUS-guided prostate biopsy. In this study, we have investigated the value of TRUS imaging for the detection of prostate cancer foci in patients with high PSA values, and our findings helped us to reveal whether the number of biopsy cores can be lessened by sampling only the suspicious areas detectable by TRUS or not.

By a patient based evaluation, we have determined that no lesion was detectable by TRUS in 4 of 51 patients (7.8 %) who had prostate cancer histopathologically. In addition, there were 9 patients (17.6%) in whom cancer foci were also detected at the contralateral side of prostate where a suspicious lesion was detected by TRUS. These findings reveal that 15.9% of prostate cancer foci and 7.8% of patients with prostate cancer would remain undetected if only suspicious areas were to be biopsied.

In summary, the diagnostic value of TRUS imaging is not sufficiently high even for high PSA values. We conclude that systematic sampling in addition to the lesion biopsies should be performed in patients with PSA levels higher than 20 ng/ml.

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