DIAGNOSIS OF PROSTATE ADENOCARCINOMA THROUGH ULTRASOUND-GUIDED TRANSRECTAL BIOPSY IN PATIENTS WITH PSA LEVELS BELOW 4.0NG/ML - ICONOGRAPHIC ESSAY - CASE SERIES

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ABSTRACT

INTRODUCTION: Currently, the diagnosis of prostate cancer is based on digital rectal examination, prostate-specific antigen (PSA) blood levels, and transrectal ultrasound (TRUS); however, none of them is sensitive and specific enough to be used alone in defining the conduct to be taken in relation to the patient. PSA is a simple diagnostic tool used in prostate cancer screening and TRUS is a method that can detect tumors at earlier stages. Technical advances with the introduction of color Doppler, an important adjuvant factor in the search for prostate cancer, better evaluating nodules and/or suspicious areas, have increased the positive predictive value of this test. The present iconographic essay aimed to illustrate a series of cases diagnosed with prostate adenocarcinoma in patients with PSA levels lower than or equal to 4.0 ng/ml and with abnormal digital rectal examination.

CASE SERIES: Patients undergoing randomized sextant biopsy with conventional technique for diagnostic elucidation. The findings of hypoechoic nodule type in the peripheral zone, diffuse hypoechogenicity, loss of differentiation between the peripheral zone and the internal gland, focal bulges or asymmetry of the peripheral zone, irregularities and interruption of the prostatic capsule were considered as suspicious alterations of cancer on ultrasound.

DISCUSSION: The cases presented confirm the importance of clinical examination through digital touch. All cases presented suspicious focal and/or diffuse B-mode changes associated or not with suspicious changes on Doppler analysis. Ultrasonography is useful, as it allows performing, in addition to random biopsies, biopsies aimed at echographic alterations, which have a greater positive predictive value for carcinoma. Prostatic carcinoma needs tools that are precise enough to promote its early detection, thus allowing adequate treatment, improved survival and lower morbidity.

CONCLUSION: The illustration of cases is a constant need in the training, continuing education and daily practice of urologists and sonographers.

KEYWORDS: ULTRASONOGRAPHY, PROSTATE NODULE, PROSTATE, PROSTATE BIOPSY, PROSTATE SPECIFIC ANTIGEN

INTRODUCTION

Prostate cancer is the most common malignancy in humans, with the exception of basal cell and squamous cell carcinomas of the skin [1]. The world estimate points out prostate cancer as the second most common type of cancer in men. [2]

According to the José Alencar Gomes da Silva National Cancer Institute (INCA), in Brazil, an estimated 65,840 new cases of prostate cancer are estimated for each year of the 2020-2022 triennium. This value corresponds to an estimated risk of 62.95 new cases per 100,000 men. [2]

Without considering non-melanoma skin tumors, prostate cancer ranks first in the country in all Brazilian regions, with an estimated risk of 72.35/100 thousand in the Northeast region; 65.29/100 thousand in the Midwest Region; 63.94/100 thousand in the Southeast Region; 62.00/100 thousand in the South Region and 29.39/100 thousand in the North Region.[2]

The diagnosis is made through the histopathological study of the tissue obtained from the prostate biopsy, and should be indicated when there is a prostate nodule detected on digital rectal examination and/or high PSA levels (generally above 4.0ng/mL). Recently, it is also indicated in younger patients (aged below 55 years) and who have a PSA above 2.5ng/ml, and in those in which the PSA density is greater than 0.15 and the annual growth velocity of PSA greater than 0.75ng/ml. [3]

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Lifestyle factors, including excess body weight, are strongly associated with the risk of developing multiple chronic pathologies (hypertension, diabetes, coronary artery disease, etc.), as well as being related to several types of cancer, among them, prostate cancer.[4]

From the performance of the transrectal ultrasound with histopathology, the findings of the prostatic nodules are obtained. Findings can be benign or malignant. The normal appearance of the prostate gland on ultrasound in the peripheral zone is more homogeneous and echogenic than in the central region. [5]

There is also the possibility of performing color Doppler imaging, which is important for delimiting the vascularization of the gland. However, the finding of hypervascularization on Doppler is not specific to prostate cancer, which can be explained by the increase in the number of vessels due to the histology of the region.[5]

Malignant nodules are usually found in the peripheral zone with hypoechoic areas and hypervascularization within them. In directed biopsy of the nodules, when faced with a prostate cancer, it is possible to perform the classification of the Gleason scale, which allows the understanding of the patient's prognosis. However, benign nodules can also be hypoechoic, as in focal hyperplasia, infarctions, and acute or chronic prostatitis. [5]

PSA sensitivity and specificity vary according to the cut-off point. If we use the 2.5ng/dl cutoff, there is an increase in sensitivity, but with a loss of specificity. (S=91.3% E=14.37% RV+= 1.06 with 95% CI 0.96-1.17). This PSA value increases diagnostic certainty in black men from 9.6% (pre-test prevalence) to only 11%27. When using the 4.0 cutoff, there is a loss of sensitivity and an improvement in specificity, despite maintaining a low likelihood ratio (S=71.73% E=46.25% RV+=1.31 with 95% CI 1.06- 1.64), increasing diagnostic certainty in black men from 9.6% (pre-test prevalence) to 13%.[6]

The association of altered digital rectal exam (DRE) with PSA ≥2.5ng/dl increases diagnostic certainty in black men from 9.6% to 38%; and in white men from 5.6% to 26%. The altered DRE with PSA ≥4.0 increases the diagnostic certainty of adenocarcinoma in black men to 44% and in white men to 31%.[6]

OBJECTIVE

The present iconographic essay aimed to illustrate cases from the authors' own image file, of diagnosis of prostate adenocarcinoma in patients with PSA levels lower than or equal to 4.0ng/ml and with abnormal digital rectal examination; submitted to randomized sextant biopsy with conventional technique, for diagnostic elucidation.

CASUISTRY AND METHODS

Ten patients who underwent randomized sextant biopsy with the conventional technique were evaluated for diagnostic elucidation. Such examinations were performed with a 4-10 MHz intracavitary transducer, by an ultrasonographer with more than five years of experience.

The findings of hypoechoic nodule type in the peripheral zone, diffuse hypoechogenicity, loss of differentiation between the peripheral zone and the internal gland, focal bulges or asymmetry of the peripheral zone, irregularities and interruption of the prostatic capsule were considered as suspicious alterations of cancer on ultrasound.

After the grayscale scan, the study with Amplitude Doppler and Color Doppler followed. Six random fragments were removed from each side of the peripheral zone, in addition to directed biopsies (two fragments) in case of focal alterations detected in the gray scale and/or in the Doppler analysis.

CASES AND DISCUSSION

Currently, the diagnosis of prostate cancer is based on digital rectal examination, prostate-specific antigen (PSA) blood levels, and transrectal ultrasound (TRUS); however, none of them is sensitive and specific enough to be used alone in defining the conduct to be taken in relation to the patient.

PSA is a simple diagnostic tool used in prostate cancer screening and TRUS is a method that detects a greater number of tumors at earlier stages.

Technical advances with the introduction of color Doppler, an important adjuvant factor in the search for prostate cancer, have increased the positive predictive value and sensitivity of this test.

All cases presented suspicious focal and/or diffuse B-mode changes associated or not with suspicious Doppler changes (cases 1-10).
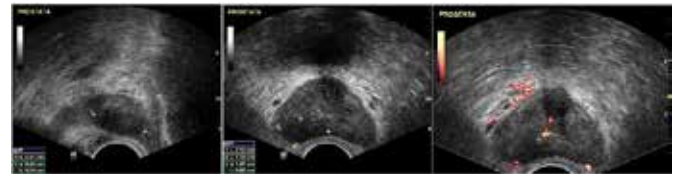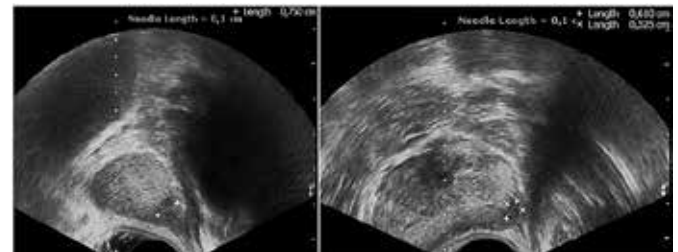

Case 01
Age: 67 years; PSA: 2.1 ng/ml; Prostatic volume: 28 g;
Ultrasonographic finding: Peripheral zone showing diffuse hypoechogenicity, with a solid hypoechogenic, irregular, imprecise nodule in the right middle third and slight hyperflow on Doppler.
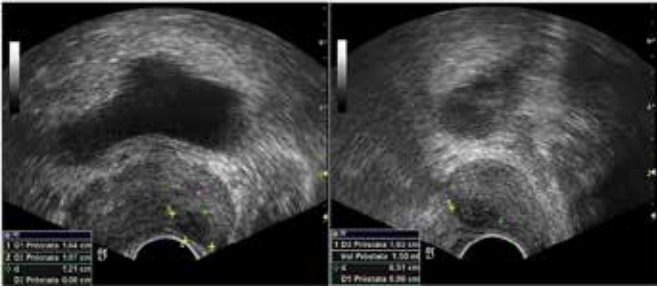**Pathological anatomy (PA): Usual acinar adenocarcinoma of the prostate Gleason 6 (3+3)**

Case 02
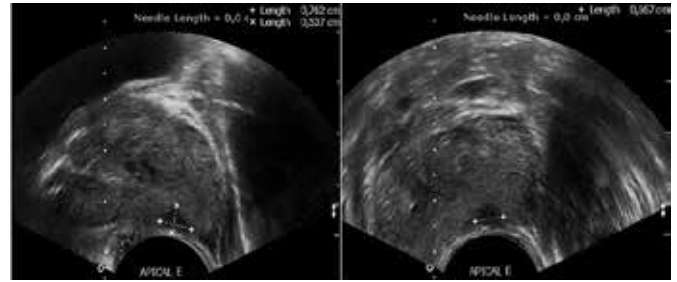**Age: 58 years; PSA: 2.6 ng/ml; prostate vol.: 44 g;**
Ultrasonographic Finding: Peripheral zone with diffuse hypoechogenicity, with a regular, hypoechogenic solid nodule in the left lateral apex
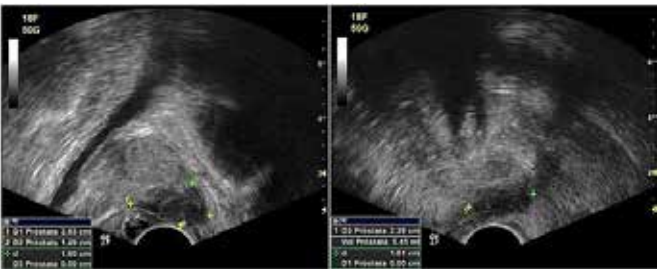**PA: Usual acinar adenocarcinoma of the prostate Gleason 6 (3+3)**

Case 03
Age: 65 years; PSA: 3.0 ng/ml; prostate vol.: 54 g;
Ultrasonographic Finding: Peripheral zone with a regular, hypoechoic solid nodule at the left medial base
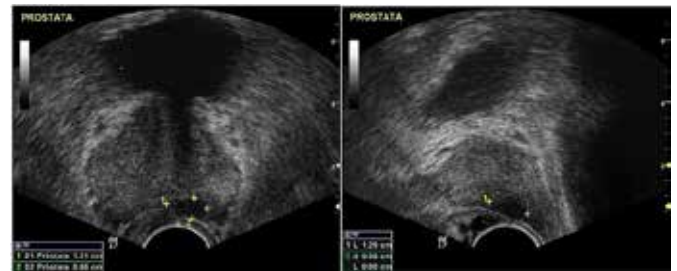**PA: Usual acinar adenocarcinoma of the prostate Gleason 6 (3+3)**

Case 06
Age: 56 years; PSA: 3.1 ng/ml; vol. prostate: 40 g;
Ultrasonographic Finding: Peripheral zone with a regular, hypoechoic solid nodule at the left medial apex
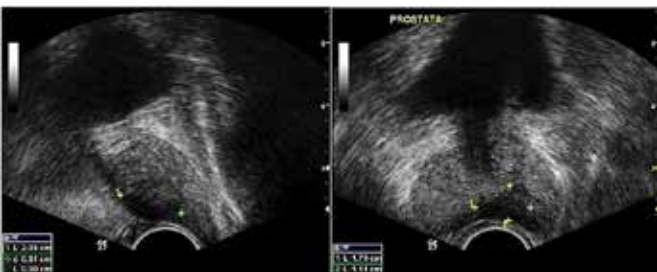**PA: Usual acinar adenocarcinoma of the prostate Gleason 6 (3+3**

Case 04
Age: 67 years; PSA: 3.0 ng/ml; prostate vol.: 46 g;
Ultrasonographic Finding: Peripheral zone with diffuse hypoechogenicity, with irregular, hypoechogenic solid nodule in the left apex and middle third
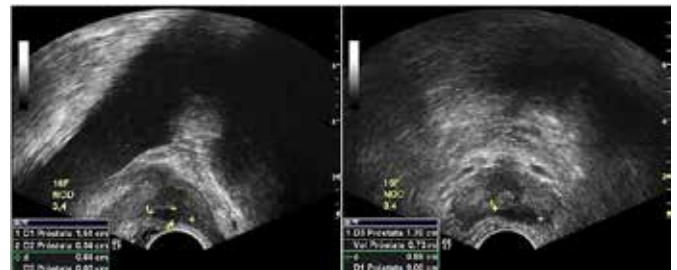**PA: Usual acinar adenocarcinoma of the prostate Gleason 8 (4+4)**

Case 07
Age: 73 years; PSA: 3.4 ng/ml; prostate vol.: 48 g;
Ultrasonographic Finding: Peripheral zone with a regular, hypoechoic solid nodule between the middle third and left medial apex
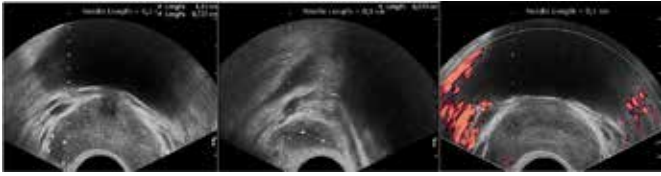**PA: Usual acinar adenocarcinoma of the prostate Gleason 8 (4+4)**

Case 05
Age: 67 years; PSA: 3.0 ng/ml; prostate vol.: 34 g;
Ultrasonographic Finding: Peripheral zone presenting diffuse hypoechogenicity, with a solid hypoechogenic, irregular nodule in the left medial third and base
PA: Usual acinar adenocarcinoma of the prostate Gleason 6 (3+3)

Case 08
Age: 77 years; PSA: 3.4 ng/ml; prostate vol.: 17 g;
Ultrasound Finding: Peripheral zone with regular, imprecise, hypoechoic solid nodule in the left middle third
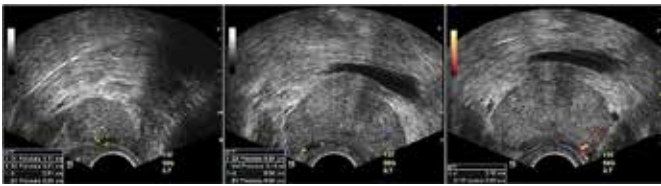**PA: Usual acinar adenocarcinoma of the prostate Gleason 7 (4+3)**

Case 09
Age: 61 years; PSA: 3.7 ng/ml; prostate vol.: 64 g;
Ultrasonographic Finding: Peripheral zone with diffuse hypoechogenicity, with a regular, hypoechogenic solid nodule in the right medial third and slight flow on Doppler
AP: Usual acinar adenocarcinoma of the prostate Gleason 7 (3+4)

Case 10
Age: 74 years; PSA: 4.0 ng/ml; prostate vol.: 29 g;
Ultrasonographic Finding: Peripheral zone with diffuse hypoechogenicity, with a solid hypoechogenic, irregular nodule in the left lateral apex and hyperflow on Doppler
PA: Usual acinar adenocarcinoma of the prostate Gleason 6 (3+3)

CONCLUSION

Ultrasonography is useful, as it allows performing, in addition to random biopsies, biopsies aimed at echographic alterations, which have a greater positive predictive value for carcinoma. Prostatic carcinoma needs tools that are accurate enough to promote its early detection, thus allowing adequate treatment, improved survival and lower morbidity. The illustration of cases is a constant need in the training, continuing education and daily practice of urologists and sonographers.

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