

Nodular Hypertrophy of Prostate in Digital Rectal Examination: Confrontation Ultrasonography-Pathology

F Kouandongui Songrou Bangue^{1*}, Danaï², E Tapiade³ and T Mobima⁴

¹Department of Radiology and Imaging of the Mother University Hospital Elizabeth Domitien (Chumed), Central African Republic

²Department of Urology and Andrology of the Hospital of Friendship (Central African Republic)

³Department of Radiology and Imaging at the Bangui Community Hospital, Central African Republic

⁴Head of Department of Radiology and Imaging of the Hospital of Friendship (Central African Republic)

***Corresponding Author:** Kouandongui Bangue Songrou Francky, Department of Radiology and Imaging of the Mother University Hospital Elizabeth Domitien (Chumed), Central African Republic.

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Summary

Objective: The objective of this work is to compare the performance of ultrasound to that of pathology in the detection of prostate cancer in patients with nodular hypertrophy of the prostate in the digital rectal examination.

Patients and Methods: This was a cross-sectional study conducted between the periods of 2nd, January 2016 to 2nd, January 2017 (12 months) in the Department of Radiology and Imaging, at the Hospital of Friendship in Bangui, Central African Republic. Included in this study were all records of patients who had nodular hypertrophy from the prostate to digital rectal examination, who had performed an ultrasound of the prostate and had surgery. The results of the ultrasound were compared to those of the pathological examination.

Results: 91 prostate ultrasound were performed in total. 69 cases or 75.8% were in favor of benign prostatic hypertrophy. A representation of 24.2% or 22 cases of prostate compatible with cancer were detected. The comparison between ultrasound and pathological examination in terms of detection of prostate cancer revealed 07 true positives, 15 false positives, 63 true negatives and 06 false negatives. Ultrasound did not detect all prostate cancers, and some benign prostatic hypertrophies were considered cancers of the prostate. The sensitivity of ultrasound in the detection of prostate cancer was 53.8% and its specificity was 80.8%.

Conclusion: The ultrasound of the prostate finds its place in the realization of echo-guided biopsies of the abnormal zones. The recommended techniques for the detection of prostate cancer are the assay of PSA combined with digital rectal examination. Only the pathological examination remains the confirmation examination of prostate cancer.

Keywords: Prostate; Hypertrophy; Ultrasound; Biopsy; Cancer

Introduction

Diabetes mellitus and hypertension (HTN) are two of the most common diseases affecting both developed and developing countries and occur at a higher prevalence in the older age group and result from both genetic and environmental etiological factors [1-3]. HTN is an extremely common comorbidity in patients with diabetes, affecting approximately 20-60% of patients, depending on age, ethnicity, and body weight [4]. The prevalence of HTN in diabetic individuals appears to be approximately twofold that in the non-diabetic population. This is clearly the case for type I diabetes (T1DM) and is probably valid for type 2 diabetes (T2DM) as well, although the relation is somewhat more controversial with regard to the latter.

Patient and Methods: This was a cross-sectional study conducted within the periods of January 2nd, 2016 to January 2nd, 2017 (12 months), in the Department of Radiology and Imaging unit at the Hospital of Friendship in Bangui, Central African Republic. Included in this study were all records of patients who had nodular hypertrophy of the prostate in the digital rectal examination, who had performed an ultrasound of the prostate for this purpose, who had undergone surgery (adenomectomy) and whose operative specimen had been analysed.

The ultrasound examinations were divided into two groups (prostates compatible with benign prostatic hypertrophy and prostates compatible with prostate cancer). The results of the ultrasound were compared with those of the pathological examination. The criteria for prostate malignancy on ultrasound were; rounded area, irregular contours, hypoechoic, generally developed in the peripheral zone; visualization of a hypo-echoic nodule, vascularized of the peripheral zone, rupture of the prostatic capsule. In favour of benign hypertrophy, any hypertrophy of the cranial prostate realizing a variable nodular appearance, maybe accompanied by small cystic formation or calcification, which repressed and laminated the peripheral prostate. This hyperplasia could lift the bladder floor. The contours of the prostate remained regular [5,6].

Results

Characteristics of the population

From January 02, 2016 to January 02, 2017, 91 files met our inclusion criteria. The average age was 67.7 years old, with the extremes of 52 and 93 years old. The most represented age group was 60 to 69 years old.

Ultrasound data

A total of 91 ultrasounds of the prostate were performed endo-rectally. 69 cases or 75.8% were in favor of benign prostatic hypertrophy and were distributed as follows: 31 homogeneous prostates with no focus of color Doppler vascularization (34.1%), 13 prostates with hypoechoic nodules non-vascularized (14.3%) and 25 prostates were the site of non-vascularized echogenic nodules (27.5%). Prostases compatible with cancer were represented at 24.2% or 22 cases. 7 cases (7.7%) corresponded to homogeneous prostases with a focus of Doppler color vascularization, 4.4% of prostate (4 cases) included non-vascularized hypoechoic nodules, with fuzzy contours, 9 prostases (9.9%) had vascularized hypoechoic nodules and 2 cases or 2.2% had vascularized echogenic nodules.

Pathological findings

The analysis of the 91 surgical specimens revealed 13 cases of prostate cancer and 78 cases of benign prostatic hypertrophy.

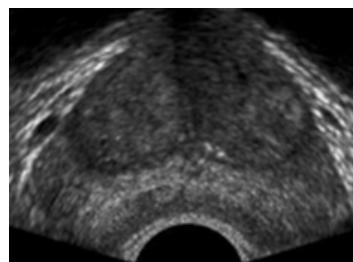


Figure 1: (True positive case of adenoma) Homogeneous prostate in favour of adenoma in ultrasounds, it has been confirmed in pathology.

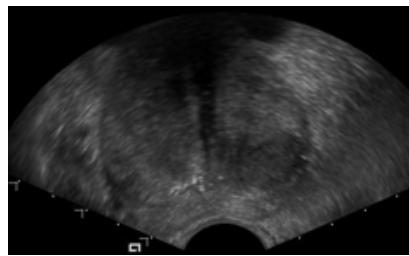


Figure 2: (True positive case of cancer) hypo echoic nodule compatible with cancer, anatomopathological examination showed prostate cancer.

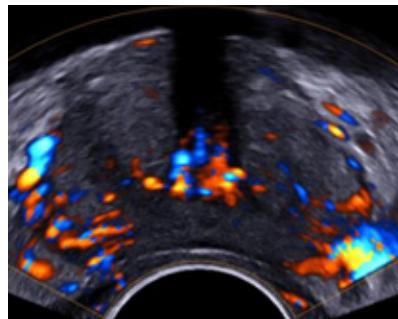


Figure 3: Detection of a color-coding in prostate compatible with cancer, anatomopathological examination showed adenoma (false positive case of cancer in ultrasound diagnosis).

	Prostate in favor of HB		Prostate for cancer	
	Number	Frequency	Number	Frequency
Homogeneous without color Doppler vascularity focus	31	34,1%	00	00
Homogeneous with color Doppler vascularity focus	00	00	07	07,7%
Non-vascularized hypoechoic nodule	13	14,3%	04	04,4%
Nodule hypoechoic vascularized	00	00	09	09,9%
Vascularized echogenic nodule	00	00	02	02,2%
Non-vascularized echogenic nodule	25	27,5%	00	00
Total	69	75,8%	22	24,2%

Table 1: Ultrasound results.

	Prostate Cancer	Prostate Adenoma	Total
Prostate compatible with cancer	True positives	False positives	
	07	15	22
Prostate compatible with an adenoma	False negatives	True negatives	
	06	63	69
Total	13	78	91

Table 2: Comparison between ultrasound and pathological treatment expressed as true positive, true negative, false positive and false negative.

Expressed as true positives, true negatives, false positives and false negatives

Comparison in terms of false positives and true positives

The comparison between ultrasound and pathological examination in terms of detection of prostate cancer revealed 07 true positives, 15 false positives, 63 true negatives and 06 false negatives. Ultrasound did not detect all prostate cancers, and some benign prostatic hypertrophies were considered cancers of the prostate. The sensitivity of ultrasound in the detection of prostate cancer was 53.8% and its specificity was 80.8%.

Discussion

Benign prostatic pathologies are frequent and dominate the prostatic pathologies subject for more than 40 years [7,8]. In our series, they represent 85.7%, equal to the 86.3% of Traore., CB., *et al.* 2006 [9] and above the 57.5% of Costa P., *et al.* 2004 [10]. Ultrasound-pathology comparison reveals that ultrasound is not sensitive in the detection of prostate cancer. Its sensitivity is 53.8% and its specificity is 80.8%. Stamey., *et al.* 1989 [11] in their series reported 52% sensitivity. In the detection of cancer, several prostate cancers escape ultrasound. Despite all the improvements of ultrasound (mode B, Doppler mode), this technique cannot be considered as a screening and detection technique for prostate cancer.

It does not detect non-palpable cancer in half of the cases [12]. There is no specific aspect of prostate cancer on ultrasound, even endo-rectally. Normal ultrasound does not rule out prostate cancer [13]. According to Descotes JL [14], the role of endo-rectal ultrasonography in the diagnosis of prostate cancer remains limited, apart from the indispensable help it provides for the randomization of biopsies. In the field of early diagnosis, the limits of imaging are linked to the multi-focal function of prostate cancer in 85% of cases, to the non-specific nature of prostatic ultrasound anomalies, to the great variability of the ultrasound images of these tumours that can present themselves in the form of hypo echoic nodules, hyper echoic or iso-echogenic difficult to distinguish benign tissue. The proposed prostate cancer screening tests are the prostate specific antigen (PSA) assay coupled to the digital rectal examination [2,15,16]. Nevertheless, it has been shown that hypo echogenic lesions are twice as cancerous at biopsy as ischemic lesions [17,18].

The echography-anatomopathologie comparison of prostates with a focus of color Doppler hyper-vascularization showed that 3 times out of 4, the results of the ultrasound were consistent with those of the anatomopathological examination on the cancerous nature of the prostate. According to Master., *et al.* 2006 [13] the detection of a color-coding (hyper vascularized nodule) within a nodule or hypoechoic area significantly increases the risk of this lesion being cancer.

Sauvain., *et al.* 2000 [19] obtained the same results, the color Doppler according to them, improves the positive predictive value of ultrasound diagnosis of prostatic cancers in cases of hypoechoic nodules or a hypoechoic area within the prostate.

The discrepancy of results between ultrasound and pathology shows that ultrasound has its limits. This diagnostic means remains primarily an orientation test. Certainly, a diagnostic tool can detect non-palpable adenocarcinoma. However, also and above all a technical element allows biopsy hypo echoic nodules and ideally position the biopsy needle. Confirmation of the benign or malignant character of hypertrophy is the result of anatomopathological examination [17,18,20].

Conclusion

Prostate ultrasound finds its place in performing echo-guided biopsies of the abnormal areas it has previously allowed to highlight. The recommended techniques for the detection of prostate cancer are the assay of PSA combined with digital rectal examination. Only the pathological examination remains the confirmation examination of prostate cancer.

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