Scientific Research Publishing

Open Journal of Urology, 2025, 15(8), 361-368
https://www.scirp.org/journal/oju
ISSN Online: 2160-5629
ISSN Print: 2160-5440

The Role of Magnetic Resonance Imaging in the Positive Diagnosis of Prostate Cancer in Togo

Edoe Viyome Sewa[1,2*], Komi Hola Sikpa[3], Gnimdou Botcho[3], Essodina Padja[2], Messan Semefa Agbedey[2], Kodjo Tengue[2]

[1]Urology Department, Aneho Prefectoral Hospital, Aneho, Togo
[2]Urology Department, Sylvanus Olympio Teaching Hospital, Lomé, Togo
[3]Urology Department, Kara Teaching Hospital, Kara, Togo
Email: *viyomedoe@gmail.com

How to cite this paper: Sewa, E.V., Sikpa, K.H., Botcho, G., Padja, E., Agbedey, M.S. and Tengue, K. (2025) The Role of Magnetic Resonance Imaging in the Positive Diagnosis of Prostate Cancer in Togo. *Open Journal of Urology*, **15**, 361-368.
https://doi.org/10.4236/oju.2025.158036

Received: June 7, 2025
Accepted: August 2, 2025
Published: August 5, 2025

Abstract

Introduction: Prostate cancer is a major public health issue. Current diagnostic strategies involve MRI. The objective of our study is to assess the usefulness of prostate MRI in our context. **Methods:** This was a descriptive and analytical study involving retrospective data collection over a three-year period in the urology department of the Sylvanus Olympio University Hospital. We included the records of patients suspected of having prostate cancer who had undergone prostate MRI. We performed a comparative analysis between MRI and biopsy results. **Results:** The study included 80 cases of prostate MRI. We reported a frequency of MRI requests of 26 cases/year. Using biopsies as a reference, we found a sensitivity of 86%, a specificity of 39%, a PPV of 66%, and an NPV of 68%. There was a statistically significant difference between the presence of suspicious lesions and histological type. There was a statistically significant positive correlation between the PI-RADS score and histological type ($p = 0.012$). **Conclusion:** Requests for prostate MRI are increasing in Togo. Its good sensitivity would be useful in guiding prostate biopsies toward suspicious areas to ensure early diagnosis. However, MRI remains an essential test to avoid non-contributory biopsies in patients at low risk of developing prostate cancer.

Keywords

Prostate Cancer, Diagnosis, MRI, Togo

1. Introduction

Prostate cancer remains a major public health issue. In West Africa, it accounted for 3.85% of cancers in 2020 [1]. Current diagnostic strategies focus on early de-

tection, enabling curative treatments to be offered to patients. In recent years, magnetic resonance imaging (MRI) of the prostate, previously used to detect extraprostatic extension, has become part of the diagnostic workup for prostate cancer [2] [3]. This increasingly requested test identifies suspicious areas of cancer in the prostate gland and guides biopsies [4] [5]. The detection rate would thus be higher when these biopsies are guided by MRI [6].

In Togo, prostate cancer is often diagnosed late, at a locally advanced or metastatic stage [7]. In order to make early diagnoses and reduce the risk of negative biopsies, MRI has been introduced into the diagnostic protocol for patients. The aim of this study was to evaluate the contribution of this examination to the diagnostic strategy for prostate cancer in Togo and to highlight the benefits of this practice for patients.

2. Material and Methods

The study was conducted in the Urology Department of the Sylvanus Olympio teaching Hospital in Lome. It was a retrospective, descriptive and analytical study that took place over three years, from January 1, 2021, to December 31, 2023.

The study population consisted of patients referred for suspected prostate cancer. The sampling was exhaustive. Patients who underwent prostate MRI were included in our study. Patients who did not undergo prostate MRI and those with a history of open prostatectomy were not included. The MRI was performed at the same center and interpreted by the same team of radiologists. The device used was the Hitachi Vento, a 0.3 Tesla MRI scanner, and the antenna used was a pelvic antenna. All patients underwent a localization sequence, a T2 morphological sequence in three planes (axial, frontal, and sagittal), a T1 sequence, a diffusion sequence, and a perfusion sequence at early and late times. It was considered positive for lesions classified as PIRADS 3 or higher.

The parameters studied were:

- Epidemiological data (age, personal and family medical history);
- Clinical data (general condition, functional signs, and digital rectal examination findings);
- Biological data (total PSA);
- Morphological data (prostate volume on MRI, suspicious areas on MRI, location of the lesion on MRI, PI-RADS score, and associated lesions on MRI);
- Histological data: biopsy results.

The data were processed using SPSS software.

3. Results

We collected 80 files. The annual frequency of prostate MRI scans averaged 26 cases (**Figure 1**).

The average age of patients was 64.7 ± 7.5 years, with extremes of 42 and 88 years. The 60 - 70 age group was the most represented (**Figure 2**).

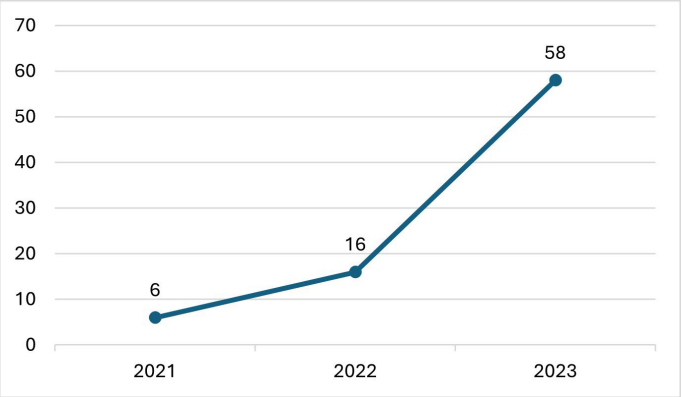

Figure 1. Annual number of prostatic MRI scans performed.

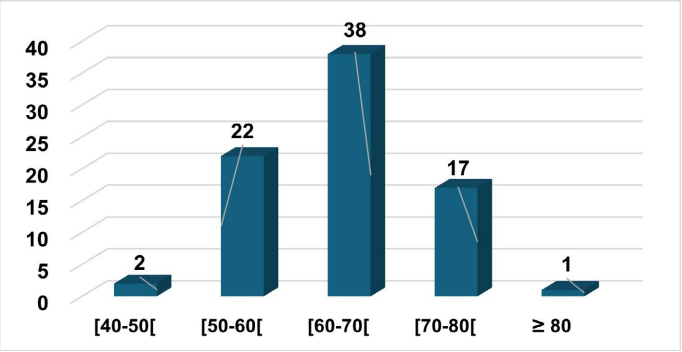

Figure 2. Patients age distribution.

A family history of prostate cancer was noted in 16 patients, or 13.8%. On digital rectal examination, the prostate was suspected of malignancy in 66 patients, or 82.5%, and 28 patients had an irregular prostate surface, or 15.3%.

The mean total PSA was 24.7 ± 17 ng/ml, with extremes of 2 and 100 ng/ml. Forty-three patients had a total PSA greater than 20 ng/ml (**Figure 3**).

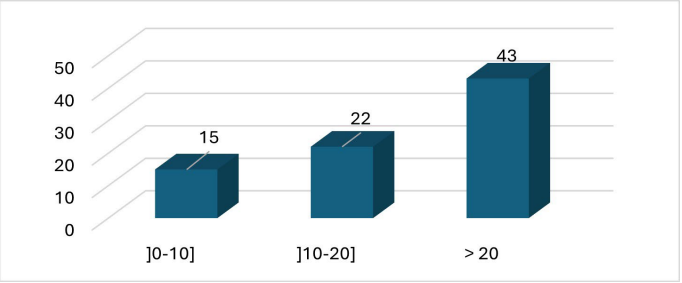

Figure 3. Distribution of patients by total PSA.

The mean prostate volume was 58.6 ± 36.3 ml, with extremes of 17 and 210 ml. Prostate MRI detected areas suspected of malignancy in 59 patients (73.8%). Among the signs found on MRI, T2 hypo signal was the most common in 53 patients (37.1%). The suspicious lesion was most commonly observed in zone 4p with 22 cases, or 18.2%, followed by zone 10p with 15 cases, or 12.4%. In terms of

classification, 42 patients had a PI-RADS score of IV, or 52.5% (Table 1).

Table 1. Distribution of patients by PI-RADS score.

	n	%
PI-RADS III	13	16.3
PI-RADS IV	42	52.5
PI-RADS V	17	21.2
No lesion	8	10

Among the 80 patients studied, 27 had capsular contact without breach and two had distant metastases (Table 2).

Table 2. Distribution of patients according to MRI-associated lesions.

	n	%
Capsular contact	27	33.8
Infiltration of fat and neurovascular plexus	12	15
Capsular incision	8	10
Seminal vesicle damage	6	7.5
Inguinal adenopathy	4	5

Sixty-six patients, or 82.5%, underwent prostate biopsy after MRI. In 57.6% of cases, the biopsy revealed adenocarcinoma, and Gleason score 8 was the most common, occurring in 50% of cases (Table 3).

Table 3. Distribution of patients by Gleason score.

	n	%
ISUP 1 Gleason 6 (3 + 3)	4	10.5
ISUP 2 Gleason 7 (3 + 7)	3	7.9
ISUP 3 Gleason 7 (4 + 3)	5	13.5
ISUP 4 Gleason 8 (4 + 4)	19	50
ISUP 5 Gleason 9	7	18.4
Total	38	100

There was no statistically significant association between the presence of a suspicious lesion on MRI and a normal digital rectal examination (Table 4).

Table 4. Correlation between suspicious lesion on MRI and DRE.

	Suspect area on MRI		
	No (n = 21)	Yes (n = 59)	
Normal rectal examination	5 (35.7%)	9 (64.3%)	p = 0.37
Abnormal rectal exam	16 (24.2%)	50 (75.8%)	

There was a statistically significant association between histological type and the presence of a suspicious lesion on MRI (Table 5). Using histology as a reference, we found that MRI had a sensitivity of 86%, a specificity of 39%, a positive predictive value of 66%, and a negative predictive value of 68%.

Table 5. Correlation between biopsy results and suspicious lesions on MRI.

	Histology type		
	Adenomyoma	**Adenocarcinoma**	
Positive MRI	17 (34%)	33 (66%)	**p = 0.014**
Negative MRI	11 (68.7%)	5 (31.3%)	
Total	28	38	

There was no statistically significant difference between the location of the lesion on MRI and the histological type (Table 6).

Table 6. Correlation between biopsy result and location of suspicious lesion on MRI.

	Histology type		
	Adenomyoma	**Adenocarcinoma**	
Anterior	7 (43.7%)	9 (56.3%)	**p = 0.901**
Negative MRI	21 (42%)	29 (58%)	
Total	28	38	

There was a statistically significant relationship between histological type and PI-RADS score (p = 0.012). Among patients with PI-RADS V lesions, 14 patients (82.4%) had adenocarcinoma (Figure 4).

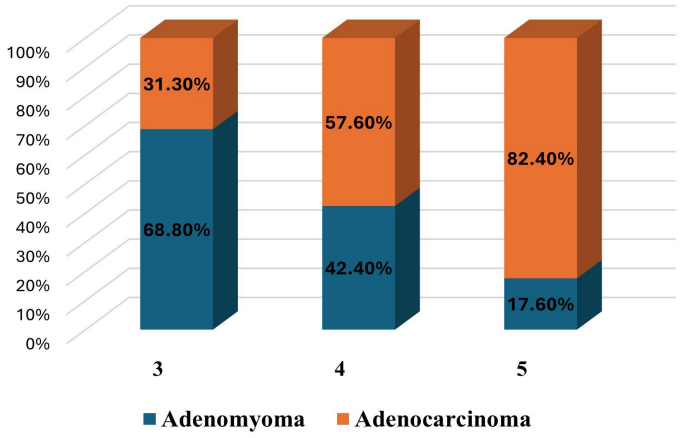

Figure 4. Correlation between PIRADS score and histology.

4. Discussion

We collected 80 prostate MRIs performed with an increase in the number of cases

over the years. The retrospective nature of the study constitutes a definite bias in our work, as some patients may have been excluded from our sample. Thus, biopsies were only performed on significant lesions in order to avoid unnecessary biopsies, in accordance with department protocols. This constitutes a limitation of this study, which does not evaluate the biopsy correlation of PIRADS 1 and 2 lesions.

The annual frequency of MRI scans was 26 cases/year on average. In 2017, in Togo, Amadou *et al.* reported a frequency of three prostate MRIs per year [8]. Our results show an increase in the number of prostate MRIs performed in Togo. This is due to growing demand from urologists and could be explained by the need to comply with new recommendations that advocate this examination before performing prostate biopsies [9]. Current diagnostic techniques have weaknesses due to their lack of sensitivity or specificity, which cannot be compensated for when combined. In addition, biopsy sampling and the semi-random nature of the method can lead to underdiagnosis. When PSA is abnormal and the biopsy is negative, the question arises as to when to repeat the biopsy and when to stop. It can also lead to over- or under-diagnosis of aggressiveness due to the heterogeneity of the lesion and over- or under-estimation of tumor volume. Thus, to avoid unnecessary biopsies indicated for PSA levels > 4 ng/ml, MRI has proven to be a fairly effective test for detecting suspicious areas [10].

Some authors have demonstrated the potential of MRI with high specificity: Numao *et al.* [11] in 2013 reported sensitivity, specificity, positive predictive value, and negative predictive value rates of 74%, 72%, 43%, and 91%, respectively. Tanimoto *et al.* [12] in Japan in 2006 showed in a series of 83 patients that MRI was associated with a sensitivity of 95% and a specificity of 74% for the detection of prostate cancer. A study conducted by Haffner *et al.* [13] in 2011 showed that the sensitivity and specificity of MRI for cancer detection were 83% and 61%, respectively.

In our study, using biopsies as a reference, we found a sensitivity of 86%, a specificity of 39%, a PPV of 66%, and an NPV of 68%. It should also be noted that in cases where the MRI was strictly normal, prostate biopsy was no longer performed in our context. We conclude for our series that MRI has good sensitivity for the detection of prostate cancer but lacks specificity. A negative MRI does not rule out the diagnosis of prostate cancer. However, its good sensitivity would be useful in guiding prostate biopsies to suspicious areas in order to ensure early diagnosis.

There was a statistically significant difference between the PI-RADS score and the biopsy result ($p = 0.012$). PI-RADS III lesions are mostly benign, and the higher the PI-RADS score, the higher the rate of prostate cancer detection.

The cancer detection rates in the 2020 study by Lefevre *et al.* [14] in France were 0.9% (2/21), 59% (16/27), and 81% (13/16) for PI-RADS III, IV, and V, respectively. Sarkis *et al.* [15] also reported in 2020 in France that the detection rates for PIRADS scores III, IV, and V were 10.8%, 44.2%, and 96.5%, respectively.

Since the PI-RADS score allows the risk of a patient having a clinically signifi-

cant lesion to be assessed [16], the greater the suspicion, the greater the risk of the patient having a malignant lesion. MRI, therefore, remains an essential examination to avoid non-contributory biopsies in patients at low risk of developing prostate cancer.

5. Conclusion

MRI has good sensitivity for detecting prostate cancer but lacks specificity. A negative MRI does not rule out a diagnosis of prostate cancer. However, its good sensitivity would be useful in guiding prostate biopsies to suspicious areas in order to ensure early diagnosis. It remains a useful test for avoiding inconclusive biopsies in patients at low risk of developing prostate cancer.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Sung, H., Ferlay, J., Siegel, R.L., Laversanne, M., Soerjomataram, I., Jemal, A., *et al.* (2021) Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. *CA*: *A Cancer Journal for Clinicians*, **71**, 209-249. https://doi.org/10.3322/caac.21660

[2] Lemaitre, L., Rouvière, O., Penna-Renard, R., Villers, A. and Puech, P. (2008) L'IRM du cancer de la prostate: Un changement de paradigme. *Journal de Radiologie*, **89**, 1053-1064. https://doi.org/10.1016/s0221-0363(08)73909-x

[3] Hu, Q.S., Cheng, S.P., Yuan, C.S. and Jin, C.H. (2024) Recent Research Advances in Imaging of Prostate Cancer. *Journal of Biosciences and Medicines*, **12**, 114-128. https://doi.org/10.4236/jbm.2024.126012

[4] Puech, P., Sufana-Iancu, A., Renard, B., Villers, A. and Lemaître, L. (2012) Pourquoi et comment détecter le cancer de la prostate en IRM? *Journal de Radiologie Diagnostique et Interventionnelle*, **93**, 291-301. https://doi.org/10.1016/j.jradio.2012.01.011

[5] Villani, R., Roosendaal, A., Hämmerli, P. and Iselin, C.E. (2020) PSA et IRM: Comment s'en servir de façon raisonnable pour la détection du cancer de la prostate. *Urologie in der Praxis*, **22**, 153-159. https://doi.org/10.1007/s41973-020-00118-7

[6] Arafa, M.A., Rabah, D.M., Khan, F.K., Farhat, K.H. and Al-Atawi, M.A. (2021) Effectiveness of Magnetic Resonance Imaging-Targeted Biopsy for Detection of Prostate Cancer in Comparison with Systematic Biopsy in Our Countries with Low Prevalence of Prostate Cancer: Our First Experience after 3 Years. *Prostate International*, **9**, 140-144. https://doi.org/10.1016/j.prnil.2021.01.001

[7] Tengue, K., Kpatcha, T.M., Botcho, G., Leloua, E., Amavi, A.K., Sikpa, K., *et al.* (2016) Profil épidémiologique, diagnostique, thérapeutique et évolutif du cancer de la prostate au Togo. *African Journal of Urology*, **22**, 76-82. https://doi.org/10.1016/j.afju.2015.06.006

[8] Amadou, A., Moumouni, D., Assih, K., Sonhaye, L., Darre, T., Kpatcha, T., *et al.* (2018). Etat des lieux et profil de l'Imagerie par Résonance Magnétique dans l'exploration du cancer de la prostate au Togo. *Journal de la recherche scientifique de l'Université de Lomé*, **19**, 361-367.

[9] Rozet, F., Hennequin, C., Beauval, J.-B., Beuzeboc, P., Cormier, L., Fromont-Hankard,

G., *et al.* (2018) Recommandations françaises du Comité de Cancérologie de l'AFU—Actualisation 2018-2020: Cancer de la prostate. *Progrès en Urologie*, **28**, R81-R132. https://doi.org/10.1016/j.purol.2019.01.007

[10] Renard-Penna, R., Mozer, P., Lunelli, L. and Cussenot, O. (2017) Place de l'imagerie IRM, des biopsies en fusion d'image et des nouveaux marqueurs dans la stratégie diagnostique des cancers de la prostate. *La Presse Médicale*, **46**, 928-934. https://doi.org/10.1016/j.lpm.2017.03.017

[11] Numao, N., Yoshida, S., Komai, Y., Ishii, C., Kagawa, M., Kijima, T., *et al.* (2013) Usefulness of Pre-Biopsy Multiparametric Magnetic Resonance Imaging and Clinical Variables to Reduce Initial Prostate Biopsy in Men with Suspected Clinically Localized Prostate Cancer. *Journal of Urology*, **190**, 502-508. https://doi.org/10.1016/j.juro.2013.02.3197

[12] Tanimoto, A., Nakashima, J., Shinmoto, H., Okuda, S. and Kuribayashi, S. (2007) Prostate Cancer Screening: The Clinical Value of Diffusion-Weighted Imaging and Dynamic MR Imaging. *Journal of Magnetic Resonance Imaging*, **25**, 146-152.

[13] Haffner, J., Lemaitre, L., Puech, P., Haber, G., Leroy, X., Jones, J.S., *et al.* (2011) Role of Magnetic Resonance Imaging before Initial Biopsy: Comparison of Magnetic Resonance Imaging-Targeted and Systematic Biopsy for Significant Prostate Cancer Detection. *BJU International*, **108**, E171-E178. https://doi.org/10.1111/j.1464-410x.2011.10112.x

[14] Lefevre, A., Camparo, P., Dumonceau, O., Galiano, M., Flam, T. and Cornud, F. (2020) Cancer de la prostate de la zone transition: Détection par micro-échographie de seconde intention après IRM biparamétrique. *Progrès en Urologie*, **30**, 741. https://doi.org/10.1016/j.purol.2020.07.084

[15] Sarkis, P., Sarkis, J., Assaf, S., Semaan, A., Nemer, E., Ayoub, N., *et al.* (2020) Est-il nécessaire d'associer des biopsies systématiques aux biopsies ciblées («In Bore») de lésions ayant un score de PIRADS 4 et 5 à l'IRM multiparamétrique? Notre expérience chez 257 patients. *Progrès en Urologie*, **30**, 741-742. https://doi.org/10.1016/j.purol.2020.07.086

[16] Renard-Penna, R. (2018) IRM Prostatique: Diagnostic du cancer de la prostate. *Correspondance en Onco-Urologie*, **9**, 58-60.