



# Contribution of MRI in the Diagnosis of Prostate Cancer: Study of 43 Cases at the CNSS of Guinea

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## Abstract

**Introduction:** Prostate cancer (PC) is a malignant proliferation of prostate cells. Common screening methods, such as digital rectal examination and prostate-specific antigen (PSA) testing, lack accuracy. Magnetic resonance imaging (MRI) improves the detection, localization, and assessment of cancer progression. The objective was to document the contribution of MRI in prostate cancer screening at the Imaging and Diagnostic Center of the National Social Security Fund (CNSS) in Guinea. **Methods:** Descriptive study conducted from January 1, 2023, to December 31, 2023. All patients referred to our department for symptoms of prostate cancer were included in our study. The sociodemographic characteristics of the patients were collected, the MRI semiology of the anomalies was described, and the associated anomalies were identified and listed. **Results:** The study included 43 patients with a mean age of 68.95 years. MRI revealed specific abnormalities, including nodular foci (67.4%), lymphadenopathy (37.2%), bone metastases (30.2%). **Conclusion:** MRI has been shown to be effective in improving the detection and assessment of prostate cancer, providing crucial information for clinical decisions. Further studies are recommended to confirm these findings and explore therapeutic implications.

## Subject Areas

Oncology

## Keywords

Prostate Cancer, Magnetic Resonance Image, Guinea

## 1. Introduction

Prostate cancer (PC) is a malignant proliferation of prostate cells, constituting the second leading cause of cancer death in men after lung cancer [1]. Traditional screening methods, such as digital rectal examination and prostate-specific antigen (PSA) testing, lack accuracy. Magnetic resonance imaging (MRI) improves the localization and assessment of cancer, providing crucial information for clinical decisions [2]. CP primarily affects men over 50 years of age, with a global incidence of 1.6 million cases per year and 366,000 annual deaths [3]. In the United States, 230,000 new cases and 30,000 deaths were reported in 2009 [4]. In France, 71,220 cases and 8685 deaths were estimated in 2011 [5]. In China, the prevalence of CP increased from 11.4 to 15.9 per 100,000 men between 2005 and 2015 [6]. In Morocco, the prevalence is around 8.1% [7], while in Togo, CP represents the leading cancer in men [8]. MRI has improved the detection of cancers not accessible to biopsies and has opened the way to therapeutic options such as active surveillance. In Guinea, the lack of data on the use of MRI for PC motivated this study, aimed at documenting the contribution of MRI in the diagnosis of PC at the Imaging and Diagnostic Center of the National Social Security Fund (CNSS).

## 2. Method

This descriptive study was conducted at the Diagnostic and Medical Imaging Center of the CNSS in Conakry. We included in our study all the results and reports of MRI examinations in the diagnosis of prostate cancer whose information was complete. Data entry and analysis were carried out using Epi info software in its version 7.4.0. The information collected on patients remained anonymous and was treated with absolute respect for medical ethics.

## 3. Results

During our study period, 76 prostate MRI reports were performed. Among them, 43 cases of prostate cancer were diagnosed, representing a frequency of 56.6%. The most represented age group among patients with prostate cancer was 65 - 69 years, representing 34.9% of cases. The mean age of patients was 68.95 years, with extremes ranging from 58 to 76 years. The most frequent indication for prostate MRI was staging, representing 41.9% of cases (See **Table 1** and **Figure 1**).

**Table 1.** Painting I: Distribution of MRI reports according to their indication.

	Staff	Percentages
Metastasis search	4	9.3
Prostatic extension assessment	18	41.9
PSA Elevation Assessment	14	32.6
Prostate exploration assessment	2	4.7
ADK Elevation Report	2	4.7
Suspected prostate tumor	11	25.6
Prostate adenocarcinoma	4	9.3

Prostatic capsule rupture was observed in 32.6% of cases, while seminal vesicle invasion was present in 30.2% of cases. Lymphadenopathy was detected in 16 patients (37.2%), with 50% of these lymphadenopathy located at the level of the left iliac vascular axis. Bone metastases were present in 30.2% of cases. They were mainly located at the level of the lower lumbar spine, with a frequency of 16.3%. In T2 sequence, the following observations were made:

- Hypo signal: 79.1%.
- Frank intensity: 72.1%.
- Heterogeneous character: 79.1%.

The most common PIRADS grade was PIRADS 5, with a frequency of 37.9% (See **Table 2**).

**Table 2.** Painting: Distribution of nodules according to PIRADS grade.

	Staff	Percentages
PIRADS 2	2	6.9
PIRADS 3	10	34.5
PIRADS 4	6	20.7
PIRADS 5	11	37.9
<b>Total</b>	<b>29</b>	<b>100</b>



**Figure 1.** CT scans of a patient with prostate cancer.

#### 4. Discussion

Our study revealed a frequency of 56.6% of prostate cancer among prostate MRI reports, or 43 cases out of 76. This frequency is notably higher than those reported by Basga Enock [9] in 2020 (4.4%) and Koné YL [10] in 2021 (22.7%). Several factors may explain this difference, including the size of our respective samples and the fact that our study was carried out in a specialized medical imaging center, which could lead to a more selected patient population and a higher detection rate.

The most represented age group in our study was 65 - 69 years, representing 34.9% of cases, with a mean age of 68.95 years. These results are comparable to those of Hichame Najihi [11], who reported a mean age of 68 years, and those of Heidenreich *et al.* [12] in 2014, with an average age of 70 years. These observations

are consistent with the literature, which indicates that more than 75% of prostate cancer cases occur in men aged 60 and over [13]-[15].

The most common indication for prostate MRI in our study was the staging assessment, with a rate of 41.9%. This result is in agreement with the study of Weinreb *et al.* [16] in 2016, which reported that multiparametric MRI (mpMRI) is increasingly used for the initial assessment and staging of prostate cancer, representing approximately 35% - 45% of indications. The effectiveness of mpMRI in assessing local and regional cancer extension justifies this trend.

Our study showed prostatic capsule rupture in 32.6% of cases and seminal vesicle invasion in 30.2% of cases. These results are similar to those of the study of Ismaili Mohammed [17] in 2016, which reported capsular rupture in 30% of cases and seminal vesicle invasion in 20% of cases. Furthermore, according to the EAU guidelines, prostatic capsule rupture is observed in approximately 25% - 30% of cases diagnosed at an advanced stage [18].

MRI detected lymphadenopathy in 37.2% of patients, with 50% of these lymphadenopathy located in the left iliac vascular axis. These results corroborate the study of Heesakkers *et al.* [19], where lymphographic MRI detected lymphadenopathies in 35% of patients, and approximately 45% of these lymphadenopathies were located in the iliac axis. These observations highlight the effectiveness of mpMRI for the detection of pelvic lymphadenopathies and the identification of lymph node metastases.

Bone metastases were present in 30.2% of cases, mainly in the lower lumbar spine with a frequency of 16.3%. This observation is slightly lower than that of Lecouvet *et al.* [20], which reported bone metastases in approximately 35% of patients with advanced prostate cancer. The predilection of prostate metastases for the spine, due to its rich vascularization, justifies the use of targeted imaging for this region as part of the staging workup.

In T2 sequence, a hyposignal was mainly observed (79.1%), with a clear intensity in 72.1% of cases and heterogeneity in 79.1% of cases. These results are consistent with those of Barentsz *et al.* [21], where T2 hypointensity was observed in approximately 75% - 80% of prostate cancer cases. Similarly, Turkbey *et al.* [22] reported that prostate cancer lesions often present with T2 hypointensity, with clear intensity and heterogeneous features in 75% of cases.

The most common PIRADS grade in our study was PIRADS 5, with a frequency of 37.9%. The study by Rosenkrantz *et al.* [23] showed that PIRADS grades 4 and 5 are predominant in patients with positive biopsy results for significant prostate cancer, with approximately 40% of diagnosed lesions classified as PIRADS 5. These observations validate the use of the PIRADS score to assess prostate cancer risk and probability of malignancy.

## 5. Conclusion

Our results confirm the high prevalence of prostate cancer in the study population and highlight the effectiveness of multiparametric MRI for the diagnosis, staging,

and treatment planning of prostate cancer. T2-weighted MRI features and the PI-RADS score are essential tools for the detection and assessment of malignancy, confirming their central role in prostate cancer management.

### Conflicts of Interest

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

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