



## Therapeutic Response of Congolese Patients Treated with Radiotherapy Abroad for Prostate Cancer

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### Abstract

Prostate cancer is the first male cancer in Congo. Its management requires the use of radiotherapy after surgery. The indication for radiation therapy depends on certain factors with poor prognosis including marginal resection limits, seminal vesicle involvement, capsular capture or pelvic lymph node involvement.

Adjuvant radiation therapy prevents local recurrence.

The current unavailability of radiotherapy in Congo forces patients at the University Hospital of Brazzaville to travel abroad to benefit from this type of treatment, which is essential for the management of operated prostate cancer.

After radiotherapy, the therapeutic response should be assessed and patients reassured of the possibility of complete remission or cure.

The patients selected in this study had all benefited from intensity-modulated radiotherapy (IMRT or MRI) or Irradiation with Volumetric Intensity Modulation by Arc Therapy in acronym VMAT.

It seemed appropriate to us to take stock of patients treated with radiotherapy abroad for prostate cancer.

**Keywords:** Response; Radiotherapy; Cancer; Prostate; Foreign

### Introduction

Prostate cancer is the first male cancer in Congo. Its management requires the use of radiotherapy after surgery. The indication for radiation therapy depends on certain factors with poor prognosis including marginal resection boundaries, seminal vesicle involvement, capsular capture or pelvic lymph node involvement [1,2].

After prostatectomy, biochemical relapse is not exceptional, affecting according to the series 20 to 40% of operated patients. After surgery, so-called adjuvant or salvage radiotherapy may be offered. Adjuvant radiation therapy is the standard treatment after prostatectomy to prevent recurrence. On the other hand, salvage radiotherapy is offered in case of increase in PSA (prostate specific antigen) after surgery to destroy the tumor cells persisting in the operated area.

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After radiotherapy, the therapeutic response should be assessed and patients reassured of the possibility of complete remission or cure.

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### Patients and Methods

We undertook a descriptive retrospective study in the radiotherapy and medical oncology departments of the University Hospital of Brazzaville (CHUB), between January 2018 and December 2022.

Pour être inclus dans l'étude, les patients devaient remplir les following criteria:

- Have histological confirmation of the diagnosis of prostate cancer;
- Have benefited from radiotherapy treatment abroad;
- Have a medical report confirming the effectiveness of the radiotherapy treatment;
- A preoperative pelvic MRI;
- Histological confirmation of the prostate cancer operating room;
- A remote extension assessment including a thoraco-abdominopelvic CT scan with or without bone scintigraphy and/or a PET scan with 18F-Choline.
- An operative report.

Patients were referred to the radiotherapy department by the urology and medical oncology department of Brazzaville University Hospital.

All patients had received radiotherapy abroad and had a medical report signed by a radiation oncologist.

Patients were treated with particle accelerators in Kinshasa in DRC, Bamako in Mali, Rabat and Casablanca in Morocco and Paris in France. The radiotherapy received was conformal with intensity modulation (IMRT or MRI) or Irradiation with Volumetric Intensity Modulation by Arc Therapy (VMAT).

All the files were passed through a multidisciplinary consultation meeting (RCP) and the decisions taken collectively during the said CPR were recorded in the patients' files.

A prelude phase to treatment, simulation, during which patients benefited from a dosimetric scanner thanks to a device called simulator scanner allowed the acquisition of images. The images acquired during this dosimetric scanner were transferred to a

contouring station of target volumes and organs at risk. The fusion of the preoperative pelvic MRI images with those of the CT scan allowed a good delineation.

After the delineation of the different target volumes and organs at risk and the prescription of doses at different volumes by the radiotherapist, it was the turn of the dosimetrist to perform the dosimetry. Next, the medical physicist should verify and validate the calculations and the homogeneous distribution of the prescribed doses to the different target volumes and ensure the maximum protection of the organs at risk.

The final work of the radiotherapist and medical physicist duo was then presented to the internal radiotherapy staff for validation of the proposed protocol. Thus, after the analysis of the Dose Volume (HDV) histogram which is the statistical summary of the dosimetry At the staff, the therapeutic protocol was validated and patients scheduled to start treatment. All patients in our series were irradiated by the «VMAT» technique.

The VMAT technique synthesizes the latest technical developments in radiotherapy and combines image-guided conformal radiotherapy combined with intensity modulation. It is an Irradiation with Volumetric Intensity Modulation by Arc Therapy which offers the possibility of irradiating cancerous tissue with more precision, thanks to a modulation of the irradiation beams on a complete arc of 360°. Unlike Tomotherapy, which is also a method of conformal irradiation with intensity modulation by circular action, VMAT offers a faster treatment that acts on smaller areas.

The Novalis Tx device of the Clarac Hospital of the CHU of Martinique makes this «VMAT» technique possible, thus allowing better local control, good coverage of the different target volumes and maximum protection of organs at risk.

In our series, all patients had received the dose of 66 Grays of 2 Grays per fraction on the prostate compartment in 33 sessions at a rate of 5 sessions per week for 7 weeks.

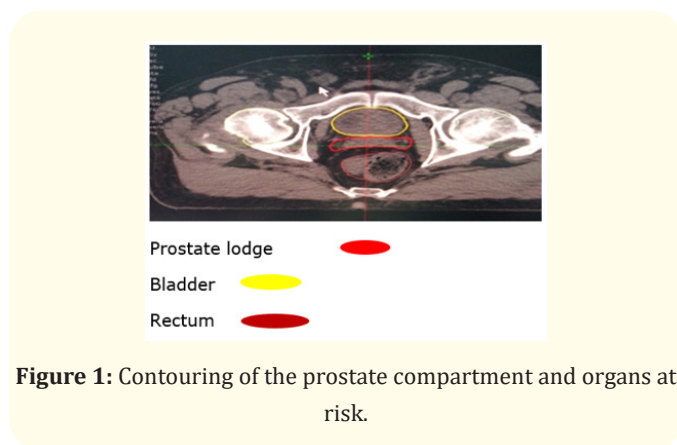
### Results

During the study period, 60 records of patients treated with radiotherapy for operated prostate cancer and meeting the inclusion criteria of our study were collected.

The average age was 65 years for extremes ranging from 51 to 90 years. The histological type was essentially adenocarcinoma.

**Table 1:** Age Distribution and Risk Factors.

| Age ranges (years) | Limits Intrusion Vesicles Invasion positive seminal lymph node capsular |    |    |   | Total |
|--------------------|---|----|----|---|-------|
| 50 - 60            | 14  | 10 | 11 |   | 35    |
| 61 - 70            | 3   | 3  | 2  | 6 | 14    |
| 71 - 80            | 2   |    | 1  | 3 | 5     |
| 81 - 90            | 1   | 1  | 3  | 1 | 5     |
| Total              | 20  | 14 | 17 | 9 | 60    |



Dose constraints to organs at risk must be respected, including bladder, rectum and intestinal loops. Thus, the following constraints were respected:

- V65 bladder < 50% (50% of the prescribed dose should not exceed 65 Grays).
- Rectum V 50 < 50% (50% of the prescribed dose should not exceed 50 Grays).

**Figure 1:** Contouring of the prostate compartment and organs at risk.

**Table 2:** Therapeutic response.

| Post-radiation response | Limits Vesicle intrusion affected positive seminal lymph node capsular |    |    |   | Total |
|-------------------------|--|----|----|---|-------|
| Complete remission      | 18   | 12 | 14 | 6 | 50    |
| Progression             | 2  | 1  | 1  | 1 | 5     |
| Lost to follow-up       |  |    |    | 1 | 1     |
| Death                   | 1  |    | 3  |   | 4     |
| Total                   | 21   | 13 | 18 | 8 | 60    |

**Discussion**

Prostate cancer is the most common male cancer and remains the leading cause of cancer death in men in Congo. Adjuvant radiotherapy is the principle of treatment after surgery to prevent recurrence if risk factors are present. Some international studies have shown that adjuvant radiotherapy decreases the risk of recurrence at 5 years and 10 years; It is proposed in case of seminal vesicle involvement, in case of exceeding the capsule, with an invaded surgical margin or in case of pelvic lymph node involvement [1,2].

The dose delivered is 66 Gy over a volume appropriate to the histological result of prostatectomy. It usually includes the operative prostate bed (prostate compartment) with or without lymph node areas depending on the dissection.

It is best to start treatment once continence has been acquired. Side effects are minimal: frequent and urgent urination, irritation, risk of worsening incontinence of the order of 3%.

Some effectiveness of routine «adjuvant» postoperative radiotherapy has been demonstrated: it increases recurrence-free survival rates at 5 and 10 years and delays the onset of metastases. However, its side effects and the limited level of risk of failure of prostatectomy lead to reserve the indication only for high-risk patients. These include those with extracapsular extension, a slice of section chirurgicale envahie, l'envahissement d'une vésicule séminale [1,5].

For other patients, close monitoring is recommended and, as soon as PSA levels above 0.2 ng/ml occur, possible radiothérapie de catching up, especially according to the age of the patient, all his risk factors as well as his wishes.

Radiotherapy remains the only curative treatment after failure of a prostatectomy. Only in the event of a recurrence or for patients with a poorer prognosis could other treatments such as hormone therapy be considered [5].

In our series of studies, the most representative age group was between 50 and 60 years with an average age of 57 years. The youngest patient was 51 years old and the oldest was 88 years old. In our study, all patients had received a remote extension workup including thoraco-abdominopelvic CT with or without bone scintigraphy and/or PET -Choline [3,4]. 18-FDG PET-CT has no indication in lymph node assessment due to low glucose metabolism in prostate cancer. Thus, as part of the extension assessment, the recommendations currently use PET with 18 F-Choline (PET-Choline) or PET with 68Ga-PSMA (PET-PSMA).

In our series, patients had benefited from PET-Choline because it detects subclinical bone lesions early.

In the absence of lymph node invasion (pN0), radiotherapy was targeted only to the prostate compartment.

In case of lymph node invasion (pN+), the pelvic lymph node areas were irradiated.

The annual post-radiation therapeutic evaluation in this study found a complete remission rate of 49 patients. This objective response after one year of treatment shows how much this new technique improves the quality of life of patients benefiting from

this scientific evolution. In addition, we noted progression in four patients and two deaths.

The VMAT technique (Irradiation with Volumetric Intensity Modulation by ArcTherapy) offers the possibility of irradiating cancerous tissue with more precision than conventional radiotherapy, thanks to a modulation of the irradiation beams over a complete arc of 360°. It is a technique that combines image-guided irradiation (IGRT) with intensity modulation.

Indeed, image-guided irradiation (IGRT) makes it possible to control the correct position of the tumor target during processing via 3D volumetric image acquisition. It is justified by the anatomical and positioning variations occurring during irradiation.

Intensity modulation is a feature that allows to change during irradiation, the doses of radiation according to the volume to be irradiated. It is then possible to treat tumors of complex form and to preserve more the neighboring organs, reducing acute toxicity and especially long-term toxicity [6-14].

## Conclusion

Adjuvant radiation therapy after prostatectomy can prevent recurrence if risk factors are present. The VMAT technique is one of the innovative radiotherapy techniques used in the management of operated prostate cancer and the results are encouraging because they increase survival and improve the quality of life of patients.

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