

## Original Research Article

**The Role of Radiation Therapy in the Management of Brain Metastases****J. Drissi<sup>1,4\*</sup>, A. Mharrech<sup>1</sup>, H Riahi<sup>1</sup>, N. Cherif Gannouni Idrissi<sup>2,4</sup>, H. Rais<sup>3,4</sup>, R. Belbaraka<sup>1,4</sup>, A. El Omrani<sup>1,4</sup>, M. Khouchani<sup>1,4</sup>**<sup>1</sup>Oncology Department, Mohammed VI University Hospital Center. Marrakech, Morocco<sup>2</sup>Radiology Department, Mohammed VI University Hospital Center. Marrakech, Morocco<sup>3</sup>Pathological Department, Mohammed VI University Hospital Center. Marrakech, Morocco<sup>4</sup>Faculty of Medicine and Pharmacy of Marrakech, Cady Ayyad University, Morocco**\*Corresponding Author:**

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**Abstract:** The occurrence of brain metastases in oncology has become an increasing frequency event. Their management is complex and aims to control the symptoms and avoid neurological degradation. Radiotherapy retains a prominent place in any therapeutic approach. However, their prognosis remains bleak. We report our experience in the management of these metastases. Retrospective study of 129 patients with cerebral metastases treated between January 2011 and December 2016 at the Oncology Department of the Mohammed VI University Hospital Center in Marrakech, Morocco. The mean age was 47.34 years (range 19 and 78 years). The sex ratio was 1.04. Clinical symptomatology was dominated by intracranial hypertension (95.65%), signs of focus (30%) and convulsive seizures (23.91%). Metastasis was indicative of the disease in 13% of cases. The primary focus was bronchial (37.3%), mammary (35.8%), digestive (10.2%), gynecological (6.6%), dermatological (4.3), urological (2.9%) and undetermined in 2.9% cases. The predominant histological types were infiltrating ductal carcinoma and bronchial adenocarcinoma. The lesions were multiple in 76.08% of the cases. Excision surgery was performed in 8.69% of cases. All patients were treated with brain radiotherapy according to two protocols; 30Gy in 10 sessions (78.26% of cases) and 20Gy in 5 sessions (21.73% of the cases). With an average follow-up of 7.3 months (between 1 month and 15 months), symptom improvement was observed in 63.04% of cases and neurocognitive disorders in 8.16% of cases. Radiotherapy retains a pivotal role in the treatment of brain metastases, although the optimal associations of systemic and local treatments remain to be defined.

**Keywords:** cancer, brain metastases, histology, radiation therapy.

**INTRODUCTION**

The occurrence of brain metastases in oncology has become an increasingly frequent event due to the aging of the population and advances in diagnostic methods and treatments. Their management is complex and aims to control the symptoms and avoid neurological degradation. Radiotherapy retains a prominent place in any therapeutic approach. The aim of this work is to determine the histological, clinical and therapeutic profile of these metastases.

**MATERIAL AND METHODS**

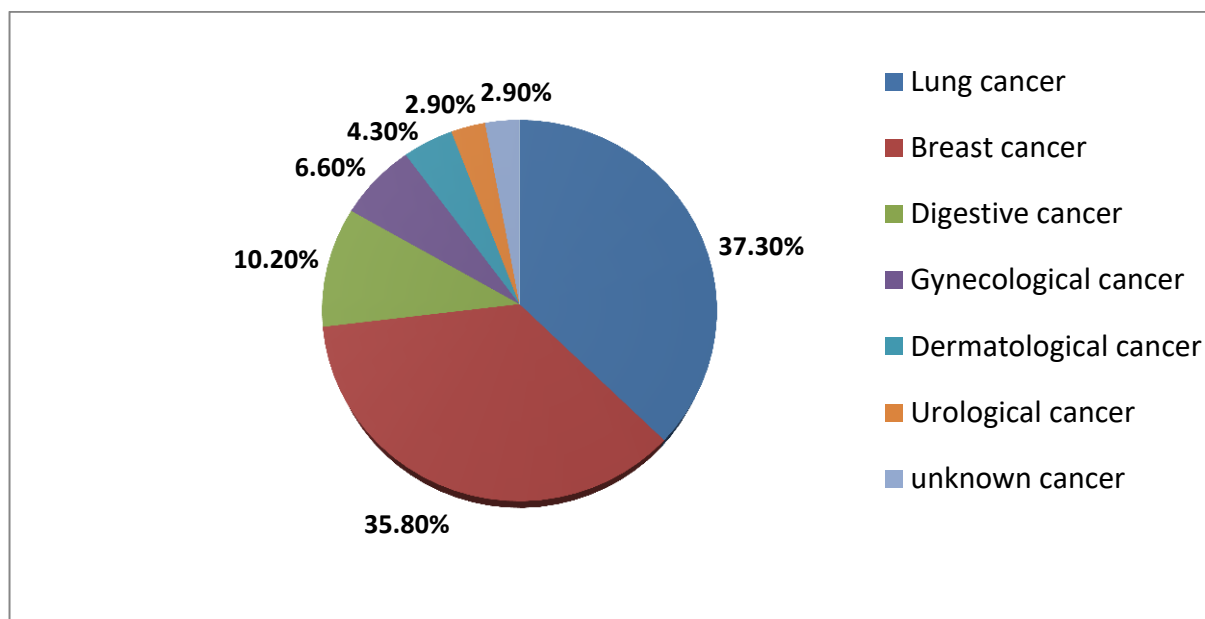
A retrospective study of 129 patients with brain metastases diagnosed and treated at the Oncology Department of the Mohammed VI University Hospital Center in Marrakech - Morocco between January 2011 and December 2016.

**RESULTS**

The mean age in our series was 47.34 years (with extremes between 19 and 78 years). The sex ratio was 1.04. The devolution time before diagnosis was 37 days.

Clinical symptomatology was dominated by intracranial hypertension syndrome found in 95.65% of patients, neurological signs of focalization found in 30% of cases and convulsive seizures found in 23.91% of cases.

Metastasis was indicative of the disease in 13% of cases. The primary site was bronchial in 37.3% of cases, mammary in 35.8% of cases, digestive in 10.2% of cases, gynecological in 6.6% of cases, dermatological in 4.3 cases, urologic in 2.9% of cases and undetermined in 2.9% cases (figure 1).



**Fig-1: Distribution of cases according to the primitive site**

The predominant histological types were infiltrating ductal carcinoma and bronchial

adenocarcinoma. The lesions were multiple in 76.08% of the cases (Figure 2).



**Fig-2: Scannographic appearance of a multiple cerebral metastasis of bronchial cancer**

Excision surgery was performed in 8.69% of cases. All patients were treated with brain radiotherapy according to two protocols; 30Gy in 10 sessions and 2Gy / session (78.26% of cases) and 20Gy in 5 sessions and 2Gy / session (21.73% of cases).

With an average follow-up of 7.3 months (between 1 month and 15 months), symptom improvement was observed in 63.04% of cases and neurocognitive disorders in 8.16% of cases.

## DISCUSSION

The frequency of intracranial metastasis is difficult to assess. Their incidence is increasing due to the aging of the population, resulting in an increase in the number of cancers, an increase in the incidence of bronchopulmonary cancers, advances in diagnostic methods and more effective systemic treatments extending the life span patients. Their incidence varies according to the primary tumor and its histology [1]. It corresponds to more than a quarter of the adult's

intracranial tumors since they are found in 25 to 30% of patients with cancer and at autopsy in 10 to 25% of patients with malignant tumors [2].

The risk of having intracranial metastasis varies considerably depending on the type of primary cancer. According to a literature review involving 4374 cases [3], 70% of cerebral metastases are secondary to five primary cancers; which are in descending order: lung, breast, digestive, kidney and melanoma (Table 1).

**Table 1: Nature of the primitive found before a cerebral metastasis.**

Primary site	Percentage
Lung	30%
Breast	23%
Digestive	7%
Renal	7%
Melanoma	6%
Other	7%
Unknown	20%

The clinical presentation is usually asymptomatic at the beginning [2]. Tumor growth is responsible for a progressively progressive neurological symptomatology of headache, focal neurological deficits, confusion, behavioral disturbances and convulsive seizures.

Studies using the CT scanner, although poorly performing, found a greater frequency of solitary brain metastases (50%) [4]. MRI with injection of contrast agent, particularly high doses is the most appropriate examination [4].

The therapeutic management of cerebral metastases is multimodal. It uses symptomatic treatment to ensure an acceptable level of comfort. Corticosteroid therapy is particularly used because of its efficacy on tumor edema. Surgery can only be proposed in very specific situations; In case of single metastasis, in an accessible location and in a patient in good general condition. Under these conditions, surgery followed by radiotherapy increases median survival, reduces cerebral recurrences and improves quality of life [6].

Radiotherapy is often considered the reference treatment for brain metastases [7]. In addition to its impact on survival, radiotherapy improves the quality of life by acting on neurological signs or by preventing their onset [1]. Several therapeutic protocols are possible. The choice depends on the life expectancy of the patient and the potential toxicity of each technique. Three diagrams derived from the Radiation Therapy Oncology Group (RTOG) trials are most often selected: 37.5 Gy in 15 fractions of 2.5 Gy, one fraction per day, five fractions per week; 30 Gy in 10 fractions of 3 Gy, one fraction per day, five fractions per week (classic regimen), 20 Gy in five fractions of 4 Gy, one fraction

per day, five fractions per week (An alternative regimen to the classical regimen for patients whose performance index is altered) [8,9].

With the new technological advances in radiotherapy, treatment focused by stereotactic radiotherapy can be used. This is an external radiotherapy for administering a high dose of radiation to a very specific region of the brain, thus sparing the healthy brain tissue around the tumor. A recent analysis appears to show a better quality of life in patients receiving radiation therapy under first-line stereotactic conditions before full brain radiotherapy [10]. It can be delivered as a single dose (when the patient has one to five metastases of less than 3cm) [11] or be fractionated (for metastases greater than 3cm) [11].

## CONCLUSION

Although it is aimed at patients in the palliative stage, the management of brain metastases is one of the locations for which technical reflection is the most demanding. Radiotherapy in all these forms will remain pivotal in all therapeutic strategies. The role of optimal associations and systemic treatment remains to be defined.

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