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SUCCESSFUL MANAGEMENT OF SPHENOID RELAPSE OF MULTIPLE MYELOMA WITH RADIATION THERAPY: A CASE REPORT

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ABSTRACT Multiple myeloma (MM) is typically characterized by neoplastic proliferation of plasma cells in the bone marrow and can result in extensive skeletal destruction. Involvement of skull base is extremely rare, especially sphenoid bone. We report in this work the case of a 62-year-old woman, who presented with a sphenoid relapse of multiple myeloma treated with radiation therapy, with significant clinical improvement and almost complete disappearance of the sphenoid metastasis. We shed light, through this case, on the rarity of sphenoid metastases in multiple myeloma and on the role of radiotherapy in the management of this type of location.

KEYWORDS : Sphenoid metastasis, multiple myeloma, radiation therapy.

INTRODUCTION:

Multiple myeloma (MM) is characterized by neoplastic proliferation of a single clone of plasma cells producing a monoclonal immunoglobulin and presents as multiple lesions. This clone of plasma cells proliferates in the bone marrow and often results in extensive skeletal destruction with osteolytic lesions, osteopenia, and/or fractures [1].

Metastasis to the sphenoid bone is a rare event, especially since it is a relapse of a MM [2]. Due to their rarity, sphenoid metastases can pose a problem of differential diagnosis with other tumors of skull base [3].

We report in this work the case of a 62-year-old woman, who presented with a sphenoid relapse of multiple myeloma treated with radiation therapy, with significant clinical improvement and almost complete disappearance of the sphenoid metastasis.

We shed light, through this case, on the rarity of sphenoid metastases in multiple myeloma and on the role of radiotherapy in the management of this type of location.

Case report:

A 62-years-old woman, followed since 2009 for standard risk MM, having benefited from a first chemotherapy and autologous hematopoietic cell transplantation. The disease remained well controlled until September 2020, when the patient presented with right unilateral headaches, right diplopia with ptosis of the right upper eyelid. The patient also presented with spinal and rib bone pain.

Various examinations carried out (biological, morphological and metabolic), made it possible to establish diagnosis of relapse of MM. Brain magnetic resonance imaging (MRI) has objectified a discreetly enhancing tumoral process of sphenoid bone of 22×18×19 mm, which extended to right optical channel sheathing the right optic nerve, right cavernous sinus and right left temporal lobe (Fig. 1).

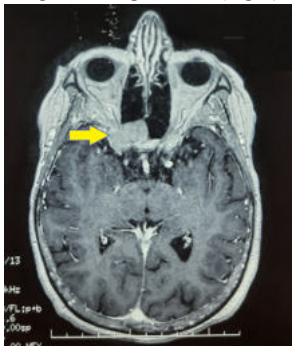

Figure 1: Axial slice of gadolinium-enhanced T1 weight brain magnetic resonance imaging, showing discreetly enhancing tumoral process of sphenoid bone, which extended to right optical channel sheathing the right optic nerve, right cavernous sinus and right left temporal lobe.

After discussion in a multi-disciplinary concretion meeting, it was decided to carry out pallitaive radiation therapy on the spheniod lesion and to start treatment based on monoclonal antibody-containing three-drug combination.

A CT-simulation was performed, the patient was positioned supine, thermoplastic mask was used for head immobilization. For delineation of target volume and organs at risk, a CT-MRI image registration was made. Clinical target volume (CTV) was defined as gross tumor volume (GTV) visualized on MRI with a 5 mm margin. CTV was expanded by 3mm to generate planning target volume (PTV) (Fig. 2).

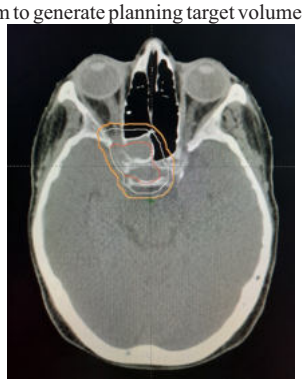

Figure 2: Axial CT-scan image from treatment planning system, showing delineation of Gross Target Volume (red), Clinical Target Volume (cyan), Planning Target Volume (green).

The patient was treated with dynamic conformal arc therapy using a single arc. A total dose of 50.4 Gray (Gy) was prescribed to the PTV in 28 fractions, five days a week. The PTV was covered by the 95% isodose volume, and maximum hot spots were <110% (Fig. 3).

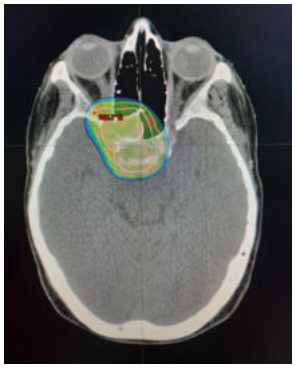

Figure 3: Axial CT-scan image from treatment planning system, showing dose distribution.

Clinical improvement was noted during radiation therapy with marked reduction in headache, and improvement in diplopia and ptosis of the right upper eyelid. The treatment was well tolerated and no acute side effect was noted.

On control MRI, carried out 3 months later, an almost complete disappearance of the sphenoid process was objectified (Fig. 4).

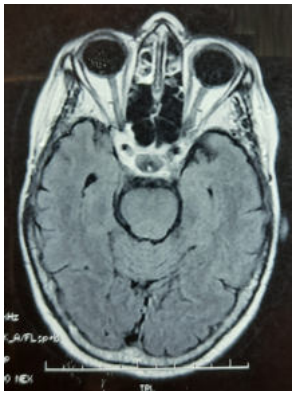

Figure 4: Axial slice of T1 Fat Saturation weight brain magnetic resonance imaging, showing complete disappearance of the sphenoid process

DISCUSSION:

The majority of patients with MM will have an initial response to treatment. However, conventional therapy is not curative and most of these patients will ultimately progress [4]. The relapse is usually multiple and may rarely occur at skull base, and more particularly the sphenoid bone [5].

Sphenoid bone represents a complex anatomical region. Indeed, it is at this level where the main holes of skull base are located, which act as a passage for the different pairs of cranial nerves; moreover it is closely in contact with the optic canal and the cavernous sinus [6]. This explains the symptomatology presented by our patient.

Of course, treatment for relapse of multiple myeloma is systemic, but for our patient it was important to relieve her symptoms, especially since malignant plasma cell tumors are very radiosensitive [7]. Up to 40 percent of patients with myeloma will require radiation to control disease at some point in their disease course [8].

The dose of radiation used varies according to the clinical situation. Palliation of lytic bone lesions may be accomplished with 20 to 30 Gy administered in 5 to 10 fractions while higher doses are required for the treatment of solitary plasmacytoma (in which the intent is curative) or spinal cord compression [9]. In our patient, even if relapse was multiple, we undertook palliative radiotherapy at the level of the sphenoid metastasis, but at a curative dose. We took a dose of 50.4 Gy, which remains a dose lower than constraints of adjacent nervous structures, namely the right optic nerve, the chiasma and the right temporal lobe.

Due to the radiosensitivity of MM, clinical improvement was achieved even during treatment with radiation therapy. In addition, on the control imaging, we noted disappearance of sphenoid metastasis.

CONCLUSION:

MM is typically characterized by neoplastic proliferation of plasma cells in the bone marrow and can result in extensive skeletal destruction. Involvement of skull base is extremely rare, especially sphenoid bone. A sphenoidal location is generally accompanied by a rich neurological symptomatology, related to the involvement cranial nerves. Due to the radiosensitivity of MM, radiation therapy should always be favored for metastases located in rich anatomical regions, as it allows rapid palliation of symptoms.

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