

## Use of $^{18}\text{F}$ -FDG PET/CT in the Staging of a Metastatic Nasopharyngeal Lymphoepithelioma: Case Report

Heloisa Dos Santos Sobreira Nunes\*

Department of Otolaryngology, Nucleus of Head and Neck Surgery of Sao Paulo, Brazil

**\*Corresponding Author:** Heloisa Dos Santos Sobreira Nunes, Department of Otolaryngology, Nucleus of Head and Neck Surgery of Sao Paulo, Brazil.

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### Abstract

Nasopharyngeal lymphoepithelioma is a rare condition, especially when metastatic. The study of positron emission tomography/computed tomography (PET/CT) using fluorodeoxyglucose (FDG) labeled with Fluorine-18 (PET/CT- $^{18}\text{F}$ FDG) is well established for head and neck tumors. In this case report we identified, in a 20-year-old patient, multiple lymph node enlargements and bone lesions that complemented the staging and provided a targeted treatment for this metastatic scenario.

**Keywords:** Fluorodeoxyglucose F18; Positron Emission Tomography Computed Tomography; Nasopharyngeal Neoplasms

### Introduction

The nasopharynx consists of a trapezium, bounded superiorly by the sphenoid bone; posteriorly through the vertebral bodies of the atlas and axis and extends from the base of the skull to the soft palate; before the choana; and inferiorly to the oropharynx and soft palate [1]. Among malignant tumors, nasopharyngeal epithelial tumors correspond between 75% to 85% of tumors, with the remainder mostly lymphomas<sup>1</sup>. The most common nasopharyngeal tumors are non-glandular and non-lymphatic epithelial neoplasms, grouped as nasopharyngeal carcinoma (NPC). NPCs were subdivided by the World Health Organization into three categories according to their differentiation and keratin production:

- Type I - Squamous Cell Carcinoma (25% of NPC);
- Type II - Non- Keratinized Carcinomas (12% of NPC);
- Type III - Undifferentiated carcinoma (approximately 60% of NPC).

Type III NPC is composed of several tumors such as lymphoepithelioma, anaplastic and clear cell. Types II and III have a positive

serological profile for Epstein-Barr Virus (EBV) while type I does not [1,2].

The standard exam for diagnosis of nasopharyngeal carcinomas is nasal endoscopy because it is easy to perform and the possibility of performing a biopsy at the same time. Computed tomography (CT) is described as essential for the staging and involvement of bone structures at the base of the skull. Magnetic resonance imaging (MRI) has been shown to be superior to CT in the assessment of soft parts, both of the superficial and deep parts of the nasopharynx [1].

Another useful tool in the diagnosis and staging of head and neck tumors is positron emission tomography/computed tomography (PET/CT) using fluorodeoxyglucose (FDG) marked with Fluorine-18 (PET/CT- $^{18}\text{F}$ FDG) [3]. This study allows the analysis of the whole body, being possible to evaluate all the organs and the bone framework. Thus, although the incidence of lymphoepithelioma metastasis is only 6.25%, bone location is the most frequent [3].

Considering the rare occurrence of nasopharyngeal lymphoepithelioma, especially when metastatic, the objective of this study

is to present a case report focusing on the usefulness of PET/CT-<sup>18</sup>F-FDG, in the evaluation of distant lesions and prevention of possible risks related to them.

### Case Report

M.L.S.C., female, 20 years old, was admitted to the emergency room with a history of cervical nodules on the left for 2 months, with progressive growth, associated with radiated pain to the left shoulder. The patient did not show signs of epistaxis, dysphonia, dyspnoea or recent infections.

On physical examination, multiple cervical nodules of up to 1 cm at levels II, III and V on the left, mobile, and the presence of lymph node conglomerate at levels IV and VI on the left, of approximately 10 cm, were hardened and painful.

From then on, some exams were carried out to better evaluate these lymph node enlargements. Nasofibrolaryngoscopy showed a nodular lesion on the posterior wall of the nasopharynx, of approximately 1.5 cm and of lymphoid aspect. Neck CT showed multiple lymph node enlargements in the left supraclavicular region, as well as in the mediastinum, confluent and with intervening calcifications (Figure 1).

**Figure 1:** Axial sections of computed tomography showing cervical (left) and mediastinal (right) lymph node conglomerates.

Thus, a level II lymph node biopsy was performed on the left, which showed infiltration by undifferentiated carcinoma, suggestive of a nasopharynx primary. The complementary immunohistochemical study corroborated the diagnosis of undifferentiated carcinoma, type lymphoepithelioma, originating in the nasopharynx and with a positive EBV test.

As it is an advanced disease and in order to complete the staging of this pathology, the patient underwent a PET/CT study with <sup>18</sup>F-FDG that showed multiple confluent lymph nodes in the left cervical region, bilateral supraclavicular and mediastinal, with SUVs up to 11.0 (Figure 2). In addition, areas of anomalous <sup>18</sup>F-FDG concentration were identified in the bone intramedullary regions, with no associated anatomical changes evidenced by CT, in the C7 vertebra with an SUV of 5.4, (Figure 3) in the head of the right femur with an SUV of 5, 8 (Figure 4) and in the left acetabulum with a 4.2 SUV (Figure 5).

**Figure 2:** PET/CT fusion images showing multiple confluent lymph node enlargements in the left cervical, bilateral supraclavicular and mediastinal regions in the axial (left), sagittal (center) and coronal (right) sections.

**Figure 3:** Axial sections showing an area of anomalous concentration of <sup>18</sup>F-FDG in the C7 vertebra (left) and without anatomical correspondence in the tomographic image (right).

**Figure 4:** Axial sections showing an area of anomalous concentration of  $^{18}\text{F}$ -FDG in the head of the right femur (left) and without anatomical correspondence in the tomographic image (right).

**Figure 5:** Axial sections showing an area of anomalous concentration of  $^{18}\text{F}$ -FDG in the left acetabulum (on the left) and without anatomical correspondence on the tomographic image (on the right).

Therefore, systemic chemotherapy was performed for metastatic disease.

### Discussion

The nasopharynx has several types of epithelium (respiratory, scaly, transitional), as well as different tissues (glandular, connective, lymphoid), and for this reason it can harbor a wide variety of neoplasms [4].

The clinical picture of patients with lymphoepithelioma depends on the location of the primary tumor and the direction of its expansion. It can vary from a tubal dysfunction due to obstruction of the tube ostium in the nasopharynx, to more nonspecific symptoms such as nasal obstruction, epistaxis, tinnitus and frontal headache. In 70% of patients, however, the initial symptom is a cervical mass, as in this case. This is due to the weakness of the nasopharyngeal barriers, which allow a rapid dissemination of the parapharyngeal spaces. At the time of diagnosis, 80% of patients have lymph node involvement [1,5].

In this case, we would like to emphasize the importance of PET-FDG in the evaluation of distant metastatic lesions, which is already well established for head and neck tumors [3].

Although CT of the neck has already shown mediastinal lymph node enlargement, stage IVB [1] and the therapeutic approach has already been defined, it was not able to show the intramedullary bone lesion in the C7 vertebra. This lesion did not present identifiable anatomical changes, but it did present abnormal uptake in the PET/CT- $^{18}\text{F}$ FDG study. In addition, other intramedullary lesions were also identified in the right femur and in the left acetabulum, which would not be identified by other methods.

In a general cancer scenario, the importance of correctly identifying metastatic bone lesions is the fact that a systemic treatment specific to each pathology is initiated. However, in this case report, PET-FDG was useful in identifying sites of bone injuries, not observed by other methods, which could cause serious consequences such as spinal cord compression and pathological fractures [6].

### Conclusion

Although metastatic nasopharyngeal lymphoepithelioma is a rare condition, bone metastases are the most common and an accurate diagnosis can help patients avoid possible complications of these injuries.

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