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# DIAGNOSIS OF THE SINONASAL CANCERS WITH 3D ENDOSCOPY IN THE MAXILO FACIAL AREA

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## INTRODUCTION

Unlike other tumors situated in the region of the head and neck, smoking and alcohol consumption have an insignificant role in the development of malignant sinonasal tumors. Certain jobs, however, mostly those with exposure to sawdust of strong essence represent an acknowledged factor in the etiology of the ethmoid adenocarcinoma as it was first described in 1968. Only jobs involving grinding procedures that produce dust particles bigger than 5 μm in diameter are susceptible of increasing the risk for such tumors although it has not been certainly proven which dust component is responsible for this. The exposure duration and the length of time lapsed between exposure and tumour development was initially considered to be longer than 20 years in both situations.

These tumors are very problematic due to their low occurrence, late symptomatology and proximity to important structures such as the orbit and the skull base. They also represent the region with the highest histological diversity in the body in what concerns the development of every type of tumour, each of them having a different natural history (table 1) and they are classified according to the TNM system which provides clinical estimations concerning the spread of the disease (the seventh edition 2010) (Table 2)

## MATERIAL,METHODS

In thIsstudy, we included a number of 21 biopsy fragments coming from patients who have been diagnosed with squamocellular carcinoma – 10 at the lavel of the maxillary sinus , 2 at the level of the pharynx, hard palate (1), tongue (2), submandibular (1), lip (2), gingival sulcus (1), nasal pyramid (1), , zygomatic (1). The biopsy fragments have been fixed into tamponated formalin 10% for 48 hours then included in paraffin. Seriated sections of 5 micrometers breadth have been obtained from each situation.

Although the squamous cell carcinoma has the highest occurrence, it is interesting to take into account the most important types of tumors that can be found in the nose and sinuses region (table 1)

## RESULTS

The characteristics of a sinonasal tumor are often subtle and easily mistaken for inflammations or allergies. The lack of any kind of significant symptom is rather common; therefore a late diagnosis takes place and the tumor progresses towards advanced stages. The warning signals emerge in a unilateral and spontaneous way. The tumors localized in the nasal cavity shall emerge sooner than the ones from sinuses which should penetrate the bone limit in the nose, orbit or in the intracranian cavity. Considering the fact that these initial symptoms are often overlooked by the patient and clinicians, the tumor often involves several regions where it appear, being difficult to determine the point of origin.

Tumors from this region usually have non-specific and common symptoms which are similar to the symptoms of many inflammatory pathologies contributing thus to a late diagnosis and treatment. The most common initial symptoms signaled are obstruction of the airways (61.2%) epistaxis (40.8%), facial pain (39.2%) and local infections (23.9%). The patient may also complain of headaches, nasal expectorations which may have blood traces and a reduction of the olfactory sense. As the tumor erodes the lamina papyracea, the eye moves in an anterior position which may produce double vision (diplopia) if it occurs fast enough. Quick movement may have as consequences exposure of the cornea, keratosis and laceration. Epiphora occurs as a result of an obstruction of the nasal-lacrimal apparatus. The tumor may penetrate the periosteum, infiltrating into

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the muscles, increasing diplopia, proptosis and impairing vision. From the orbital apex, the tumor may spread posteriorly, either intra- or extra-periostal, affecting the cavernous sinuses with the corresponding cranial nerves, the internal carotid artery and then it may reach the middle of the cranial fossa. If the sphenoid bone is also involved (for example the chondrosarcoma) one or several orbital apexes may be affected as well as the optic chiasm resulting in an irreversible loss of bilateral sight.

Computerized tomography (CT) Magnetic Resonance Imaging (MRI) are complementary investigations that evaluate the extension of soft and bone tissue of the tumor, including the orbital, intracranial, perineural and vascular extensions and suggest the vascularization degree; having therefore the role of pre-operation surgical maps. In the case of tumors that involve or are adjacent to the critical neurovascular structures we recommend an angiography CT (CTA) for surgical preparation and for fusion of the image with MRI during the intrasurgical navigation. It is very important to confirm the histology of the tumor before the final surgery.

A PET and CT mixed scanning is the best solution for identifying the metastasis in patients who have advanced stages of the disease and in the case of those who present tumors that are known to be spreading in a hematogenous way (e.g. sarcomas, melanomas, adenoid cystic carcinoma). Similarly, the sarcomas and other serious malignancies with dural transgression justify a cytological analysis of the cerebrospinal fluid (that is, lumbar puncture) and an MRI scanning of the spine in order to exclude the presence of metastasis in an organ situated in an inferior position to the one where the tumor was initially localized. All the subsequent procedures are carried out under general anaesthesia in the inverted Trendelenburg position with the head raised to 15-20 degrees. The nose is usually unplugged with 0.05% topical oxymetazoline or epinephrine 1/10,000-1/20,000. Povidone is applied in the perinasal and periumbilical region (in the case when an autologus graft without fat is necessary for reconstruction).

***Table.1: Histology of Malignant Sinonasal Neoplasias***

| | |
|---|---|
| Epithelial<br>Epidermoid | Squamous cell carcinoma (fusiform, verrucos and transitional cells) |
| Epithelial<br>Non-epidermoid | Adenoid cystic carcinoma<br>Adenocarcinomas<br>Mucoepidermoid carcinomas<br>Acinar cell carcinoma |
| Neuroectodermal | Malignant melanoma<br>Olfactory neuroblastom<br>Neuroendocrin carcinoma<br>Neuroectodermal primitive peripheral tumor and the Ewing sarcomas<br>Undifferentiated sinonasal carcinomas |
| Odontogenic tumors | Ameloblastoma |
| Vascular | Angiosarcoma<br>Kaposi sarcoma<br>Hemangiopericytoma |
| Muscular | Leiomyosarcoma<br>Rhabdomyosarcoma |
| Cartilaginous | Chondrosarcoma (+mesenchymal) |
| Osseous | Osteosarcoma |
| Lymphoreticular | Burkitt lymphoma<br>Non-Hodgkin Lymphoma<br>Extramedullary plasmocytoma<br>T and NK cells lymphomas<br>Malignancies of the histiocytic/dendritic cells |
| Mesenchymal | Fibrosarcoma<br>Liposarcoma<br>Malignant fibrous histiocytoma<br>Sarcoma of the soft alveolar part |
| Metastatic | |

***Table.2 : TNM System 2010***

Primary tumor **(T)**

| | |
|---|---|
| TX | Primary tumor cannot be evaluated |
| T0 | No proof for primary tumor |
| Tis | In situ carcinomas |
| The Maxillary Sinus | |
| T1 | Tumor limited to the mucous of the maxillary sinus without erosion or bone destruction |
| T2 | Tumor that causes erosion of the bones or destruction including spread towards the hard palate and/or mezo-nasal meatus, with the exception of the extension towards the posterior wall of the maxillary sinus and the pterygoid plates. |
| T3 | The tumor invades any of the following: the bone of the posterior wall of the maxillary sinus, the subcutaneous tissue, the platform of the medial wall of the orbit, the pterygoid fossa or the ethmoid sinuses. |
| T4a | Local disease, moderatelly advanced |
| | The tumor invaded the anterior orbit content, the cheek tegument, the pterygoid plates, the infratemporal fossa, the cribriform plate or the sphenoid or frontal sinuses. |
| T4b | Localdisease, very advanced |
| | The tumor invades any of the following: the orbital apex,the dura, the brain, the middle cranial fossa, the cranial nerves which are different from the maxillary division of the trigeminal nerve ($V_2$), naso-pharynx or clivus. |
| The nasal cavity and the ethmoid sinus | |
| T1 | Tumor restricted within any sub-region with or without bone invasion |
| T2 | Tumor that invades two sub-regions in a single area or expanding for involving an adjacent surface within the naso-ethmoidal complex, with or without bone invasion. |
| T3 | The tumor expands in order to invade the medial wall or the orbit platform, the maxillary sinus, the palatine or the cribriform plate. |
| $T4_a$ | Local disease, moderatelly advanced |
| | The tumor invades any of the following: the anterior orbital content, the nose and cheek tegument, minimum spread towards the anterior cranial fossa, the pterygoid plates or the sphenoid or frontal sinuses. |
| $T4_b$ | Local disease, very advanced |
| | The tumor invades any of the following: the orbital apex, the dura, the brain, the medial cranial fossa, the cranial nerves others than ($V_2$), naso-pharynx or clivus. |

**The regional lymphatic nodules(N)**

| | |
|---|---|
| NX | The regional lymphatic nodules cannot be assessed |
| N0 | Without metastasis in the regional lymphatic nodules |
| N1 | Metastasis in a single ipsilateral nodule, ≤3 cm, maximum dimension |
| N2 | Metastasisin a single ipsilateral nodule, >3 cm, but ≤6 cm in maximum diension or metastasis in the multiple ipsilateral lymphatic nodules, ≤6 cm in maximu dimension,or in the contralateral or bilateral lymphatic nodules, ≤6 cm inmaximum dimension |
| N2a | Metastasis in a single ipsilateral nodule, >3 cm but ≤6 cm in maximum dimension |
| N2b | Metastasis in the multiple lymphatic ipsilateral nodules, ≤6 cm in maximum dimension |
| N2c | Metastasis in the contralateral or bilateral lymphatic nodules, ≤6 cm in maximum dimension |
| N3 | Metastasis in a lymphatic nodule, >6 cm, in maximum dimension |

**Distant metastasis (M)**

| | |
|---|---|
| M0 | Without diatant metastasis |
| M1 | Distant metastasis |

**Anatomic staging/Prognostic groups**

| Stage | T | N | M |
|---|---|---|---|
| 0 | Tis | N0 | M0 |
| I | T1 | N0 | M0 |
| II | T2 | N0 | M0 |
| III | T3 | N0 | M0 |
| | T1 | N1 | M0 |
| | T2 | N1 | M0 |
| | T3 | N1 | M0 |

| | | | |
|---|---|---|---|
| IVA | T4a | N0 | M0 |
| | T4b | N1 | M0 |
| | T1 | N2 | M0 |
| | T2 | N2 | M0 |
| | T3 | N2 | M0 |
| | T4a | N2 | M0 |
| IVB | T4b | Any N | M0 |
| | Any T | N3 | M0 |
| IVC | Any T | Any N | M1 |

***CLINICAL CASE:***

***Patient T.I.***, age 68, who presented :

- Respiratory nasal obstruction and hyposmie, the situation worsened along one year; already operated on for a "lobular capillary hemangioma" diagnosis

Endoscopic examination indicated the presence of a grey, soft, vegetative and bleeding lesion in the right nasal cavity (Image 1).

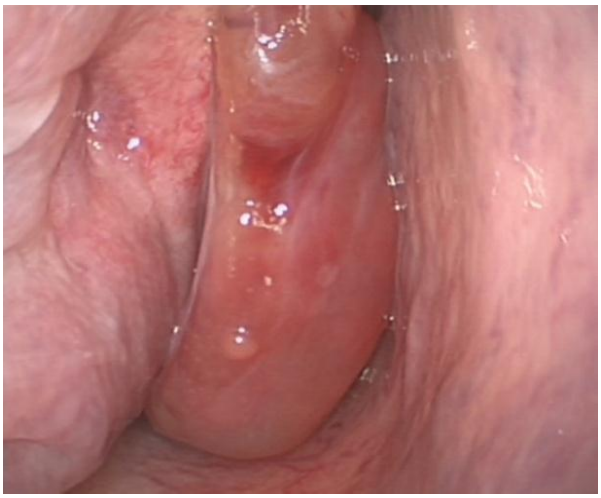

***Image.1 : Endoscopic examination***

**DISCUSSIONS**

Final histologic examination indicated a diffuse proliferation of the round-oval cells with vesicular and small nucleus, sometimes combined with fusiform cells situated around vascular spaces resembling a "stag antler". Immunohistochemistry showed round-oval cells which were positive to vimentin and focal for CD34. The aspects described are comparable with the sinonasal hemangiopericytoma. After 3 days the nasal cotton swabs were taken out and the patient was discharged on condition that he/she will attend periodical medical check-ups. The consultation carried out at one year after the operation by means of computerized tomography (CT) without contrast substance showed good surgical results as well as the absence of a local recurrence of the neoplastic process (Image 2).

***Image.2:*** The medical check-up carried out at one year after the operation by means of Computerized Tomography (CT) without contrast substance indicated good surgical results as well as absence of local recurrence of the neoplastic process.

**CONCLUSIONS**

In conclusion, the advanced endonasal endoscopic approaches provide an auxiliary element for the surgical resources used in the therapeutic handling of sinonasal malignancies that lead to satisfying results and limited morbidity. However, these results are strongly influenced by an adequate selection of the cases, considering the stage of the disease, the invasion degree and the histopathology of these tumors.

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