

## NASAL CAVITY MALIGNANCIES – A REVIEW

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*The origins of the malignant tumors are rarely encountered in the nasal cavity. In most of cases, they come from adjoining anatomical structures (for example, sinuses or skull base). The main factors that can lead to this illness are exposure to wood dust, nickel, chemical solvents and smoking. It has symptoms that can be found in chronic inflammatory rhinosinusal diseases, therefore the early diagnosis of cancer becomes very difficult. When the suspicion exists, the standard diagnosis methods are histopathological examination, CT, MRI. These methods together with an accurate staging of the tumor permit to institute the proper therapeutic approach and to estimate the prognosis. The aim of this work was to present the most important characteristics of the nasal cancer in a brief literature review.*

**Key words:** rhinosinusal cancer, biopsy, nasal cavity

### INTRODUCTION

Malignant tumors are rarely limited only to the nasal cavity. 3% of upper aerodigestive tract cancer has rhinosinusal location and only 1/3 of these are strictly located in the nasal cavity<sup>1</sup>. The most important risk factors are smoking, exposure to chemical solvents (e.g. formaldehyde), wood dust and nickel<sup>2-5</sup>. Rhinosinusal cancer is frequently discovered in advanced stages because it has symptoms also encountered in common disorders like inflammatory diseases or rhinosinusitis. The most common manifestations are persistent unilateral nasal obstruction, eyeball protrusion or impaired vision, pain or swelling of the face, eye or ears, non-responsive to antibiotic treatment chronic infection of the sinuses, headache. It may also appear: excessive tearing, smell impairment, teeth pain or even loss, rhinorea, nasal bleeds, fatigue or weight loss<sup>6</sup>.

Depending on its origin, there are described two types of neoplasms: nonepithelial origin (chondrosarcoma, mucosal melanoma and olfactory neuroblastoma) and epithelial origin (adenoid cystic carcinoma, squamous cell carcinoma and adenocarcinoma)<sup>7</sup>.

In order to establish the treatment approach, histopathologic exam is required together with computed tomography, MRI and staging of the tumor. The imagistic investigations determine the extent of the tumor. In most cases, surgical excision and postoperative radiotherapy are combined<sup>8</sup>.

Blanch et al.<sup>9</sup> reveal in an article from 2004 that sinonasal cancer has a negative prognostic, even if early discovered.

**Innervation of the nasal cavity** It is well known that in head and neck malignancies, nerves have a strong implications, as they might be extension paths for the tumoral cells<sup>12</sup>. There are many studies concerning nasal and paranasal sinuses cancer, but in order to understand its emergence and evolution it is mandatory to know that this is an important reflexogenous area due to its sensitive and vegetative innervation.

Sensitive innervation is provided by ophtalmic and maxillary nerves, branches of the trigeminal nerve<sup>13</sup>. The maxillary nerve give rise to postero-superior and lateral nasal branches which innervate the postero-superior part of the nasal fosae<sup>13,14</sup>.

The postero-superior portion of the nasal septum receives the medial branches of the maxillary nerve, while its lateral branches go to the middle and superior turbinates and also to the superior ethmoidal air cells<sup>13,14</sup>.

The antero-inferior region of the nasal fosae is innervated by nasal branches derived from anterior ethmoidal nerve, which comes from the ophtalmic nerve (R<sub>0</sub>) and a branch of maxillary nerve (R<sub>nm</sub>), the greater palatine nerve (via the pterygopalatine ganglion), provides sensory innervation to the postero-inferior part of the nasal fosae through its postero-inferior branches<sup>13,14</sup>. The ethmoidal anterior nerves enters into the nasal cavity through the anterior ethmoidal foramen and gives internal branches for the antero-superior part of the nasal septum and atrel branches for the antero-superior area of the nasal cavity lateral wall<sup>13,14</sup>. The vegetative innervation is represented by sympathetic and parasympathetic fibers which assure autonomic control of the nose glands and vessels<sup>14</sup>. The sympathetic fibers have common trajectories with the pericarotidian plexus and they have vasoconstrictor role and also they reduce the nasal secretion<sup>14</sup>. The nasal

secretion production and the vasodilator are controlled by the parasympathetic fibres which have their trajectory through the vidian nerve<sup>14</sup>.

## DISCUSSIONS

There are described two types of neoplasms, considering their origin: nonepithelial origin (chondrosarcoma, mucosal melanoma and olfactory neuroblastoma) and epithelial origin (adenoid cystic carcinoma, squamous cell carcinoma and adenocarcinoma)<sup>7</sup>. The specialty literature<sup>7-10,19,20</sup> shows that the most encountered type of nasal cancer is the squamous cell carcinoma.

As we discussed earlier, a tumor limited to the nasal cavity without extension to other adjacent structures is uncommon and therefore is difficult to establish a specific behavior. Studies reveal the main symptoms similar to those specific to common nasal disorders, fact that impedes early diagnosis<sup>6</sup>. Commonly, in the first place antibiotic and specific treatment is administered, with partial regression of the complaints. Later, when persistent unilateral nasal obstruction, eyeball protrusion or impaired vision, pain or swelling of the face, eye or ears, non-responsive to antibiotic treatment chronic infection of the sinuses, headache, excessive tearing, smell impairment, teeth pain or even loss, rhinorea, nasal bleeds, fatigue or weight loss occur, the malignancy suspicion is set, but the prognosis decreases<sup>6,15-17,20</sup>.

In what concerns the treatment for nasal cavity malignancies, in order to find the best therapeutic method, must be evaluated the histopathologic type of tumor, its stage, limits and nearby affection. These data are obtained by biopsy, CT and MRI<sup>8</sup>. Depending on the stage, the treatment options are surgical excision combined with radiotherapy, radiotherapy only or chemotherapy.

There are 2 types of surgical approaches: the classic one, craniofacial resection and endoscopic approach<sup>10,21</sup>.

In 1994, Pantelakos, Mc Guirt and Nussear studied a small group of patients with nasal vestibule and anterior nasal cavity squamous cell carcinomas and they promoted the combination between wide surgical resection and postoperative radiotherapy<sup>10</sup>.

Four years later, in 1998, Lund et al. obtained favorable data regarding survival, morbidity and mortality after craniofacial resection of the sinonasal tumors, therefore they concluded that, at that time, the external approach was the most convenient to be used<sup>21</sup>.

Nicolai P. et al.<sup>11</sup> treated a number of 184 patients with different types of nasal cancer using exclusive endoscopic approach- EEA or cranioendoscopic approach- CEA (depending on the tumor extension), from 1996 to 2006 and they obtained a 5-year disease-specific survival of 91% for the EEA and 58% for the CEA. Their conclusion is that a well done endoscopic surgery may be a suitable treatment of nasal malignancy.

In 2009, a group of scientists from Florida<sup>18</sup> studied the effects of different treatments applied to 109 patients with carcinoma of the nasal cavity and paranasal sinuses

and they obtained better results after surgery combined with adjuvant radiotherapy than after simple radiotherapy<sup>18</sup>.

In case of unresectable malignancies of the nasal cavity a promising treatment option might be the proton beam therapy. Irradiation with proton beams offer a better dose distribution than classic radiotherapy and a study took on 39 patients reveals a better rate of survival<sup>22</sup>.

## CONCLUSIONS

1. Malignant tumors are rarely limited only to the nasal cavity. 3% of upper aerodigestive tract cancer has rhinosinusal location and only 1/3 of these are strictly located in the nasal cavity.
2. Rhinosinusal cancer is frequently discovered during benign pathologies treatment.
3. Rhinosinusal mucosa receives sensitive and vegetative innervation. Sensitive innervation via the trigeminal nerve branches, anterior ethmoidal nerve. The vegetative innervation is represented by sympathetic and parasympathetic fibers which assure autonomic control of the nose glands and vessels.
4. The most common type of nasal cavity cancer is squamous cell carcinoma.
5. The most used treatment options are surgical resection, radiotherapy, used independently or together.

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