



## **SINUS TUMORS**

### **INTRODUCTION**

A tumor is a mass or growth. Tumors of the nose and paranasal sinuses are rare. They represent less than 1% of all tumors. These lesions can be either benign (non-cancerous) or malignant (cancerous). They vary in location, size and type. The care for a patient with a sinonasal tumor is highly individualized and commonly involves a multi-disciplinary team approach. Possible treatments include surgery, radiation therapy and chemotherapy. Either a single form or multiple forms of treatment may be recommended.

### **SYMPTOMS**

The symptoms associated with nasal and sinus tumors are non-specific. They are often difficult to distinguish from symptoms of other more common nasal conditions such as allergies and sinus infections. Symptoms may include nasal congestion, facial pain and pressure, runny nose, and post-nasal drip. Symptoms that may be more concerning for tumor may include recurrent or severe bleeding from the nose, facial swelling, change in vision, tearing of the eye, and numbness of the face. Symptoms that are present only on one side and symptoms that progressively worsen are also concerning. Finally, a patient who develops symptoms for the first time at an older age raises the level of concern for tumor. Ultimately, the clinical symptoms experienced by a patient with a sinonasal tumor are not specific and require evaluation with a specialist.

### **EVALUATION AND DIAGNOSIS**

Evaluation of patients with sinonasal symptoms is most often performed by an otolaryngologist (ENT). An evaluation involves taking a history and performing an examination of the head and neck region. The examination includes a procedure to examine the nasal cavity with a small endoscope (See Nasal Endoscopy). If there is any concern for a tumor, imaging studies are performed. Imaging may include a CT scan, MRI scan and, in certain situations, PET-CT scan. The studies each provide specific information. A CT evaluates the bony cavities of the sinuses and surrounding regions including the skull base and orbit. An MRI shows the tumor and can differentiate it from the surrounding normal structures and inflammation. Finally, a PET-CT is used to rule out distant spread of a tumor. If a tumor is suspected, a biopsy is performed to determine exactly what type of growth is present. A biopsy involves taking a small sample of the tumor. This can be done either in the office or the operating room based on the physician's determination.

### **BENIGN AND MALIGNANT TUMOR TYPES**

A variety of benign and malignant tumors may occur in the nose and paranasal sinuses. The more common benign lesions are:

- Papillomatous (inverted and squamous papillomas)
- Fibro-osseous (bone based, including osteoma and fibrous dysplasia)
- Vascular (from a blood vessel, including juvenile nasopharyngeal angiofibroma)
- Neurogenic (from a nerve, including schwannoma and neurofibroma)
- Tumors of minor salivary gland origin

Benign tumors do not have the potential to spread to other parts of the body. However, they can still grow over time and cause significant symptoms. Benign sinus tumors can grow to involve the orbit (eye socket) and the base of the skull.

The World Health Organization has classified cancers in the nose and paranasal sinuses based on the type of tissue, with more than 25 specific types listed. Malignant tumors may include:

- Squamous cell carcinoma
- Adenocarcinoma
- Adenoid cystic carcinoma
- Mucoepidermoid carcinoma
- Melanoma
- Olfactory neuroblastoma (also known as esthesioneuroblastoma)
- Sarcoma
- Lymphoma

Cancers from other body sites may also metastasize (spread) to the nose and paranasal sinuses. In contrast to benign tumors, malignant tumors of the sinonasal cavity generally tend to grow faster. They invade tissue more aggressively including the surrounding orbit and skull base. Malignant tumors may spread to lymph nodes and to distant body sites (metastasis).

## **TREATMENT CONSIDERATIONS**

The treatment for benign and malignant sinonasal tumors is complex. Treatment may involve evaluation by several medical specialties including ENT, radiation oncology, medical oncology, neurosurgery and others. The treatment decisions are based on the overall health of the patient, and the type, location and extent of the tumor. Involvement of the surrounding structures such as the orbit, skull base, brain and soft tissues of the face impacts treatment options. Spread of the tumor into the nearby lymph nodes or to other body sites also impacts treatment. Treatment options may include any combination of surgery, radiation therapy and chemotherapy. The majority of benign tumors are treated with surgery alone. Treatment for malignant cancer is individualized and often includes multiple types of treatment.

## **SURGERY FOR NASAL AND SINUS NEOPLASMS**

There are several different techniques currently available. Surgery is classified as “open surgery” or “endoscopic surgery”. “Open surgery” is done through incisions on the face and scalp. An open approach may be preferred in patients with extensive disease. “Endoscopic surgery” involves removal of the tumor through the nostrils with the use of an endoscope and camera. The benefits of the endoscopic approaches include avoidance of facial incisions, amongst others. In some situations, the endoscopic approach improves the ability to visualize and remove a tumor. The decision to use an open versus endoscopic approach is individualized based on a patient's needs. Increasingly, endoscopic approaches are used when appropriate.

These surgeries are often complex and require a team approach with otolaryngology and neurosurgery. In some cases, plastic-reconstructive surgery and ophthalmology (eye) are involved. Regardless of the surgical technique used, the goals of the surgery are the same. The first is complete removal of the tumor. The second is removal of a margin of tissue around the tumor so that any microscopic spread is cleared. The third is preservation of the critical nerves and arteries in the area whenever possible. The fourth is to maintain the function of the nose, sinuses and any other involved structures whenever possible. Last is to maintain a separation between the sinonasal and intracranial

(brain) cavities. These surgeries require expertise, advanced surgical equipment and a dedicated team approach.

Regardless of whether the surgery is done with an open or endoscopic technique, one can think of the surgical process as having discrete steps:

**Step 1:** The first step is pre-operative planning. This involves discussion between the patient and the different members of the treatment team, obtaining the appropriate diagnostic studies (imaging, biopsy) and detailed coordination of the treatment plan.

**Step 2:** The surgery itself is the second step. The surgery starts with the approach to the tumor. This commonly requires opening and removal of the nasal and sinus tissue that surrounds the target area. The next step of the surgery focuses on completely removing the tumor. During this step, confirmation of complete tumor removal is performed. This involves biopsy of the margins where the tumor was located. The final step of the surgery is reconstruction. During this step a separation is recreated between the sinonasal and intracranial cavities. This last step is important to prevent postoperative cerebrospinal fluid leakage (See CSF Leak). CSF leak is a risk for serious intracranial complications including meningitis (infection of the brain lining) and pneumocephalus (intracranial air trapping). To create a separation, a variety of reconstruction materials are available. These materials can be classified as autologous and synthetic. Autologous tissues come from the patient. Non-autologous biologic grafts come from a different source of living tissue, human or animal. Synthetic grafts come from non-living, fabricated material. In general, multiple different layers are placed to ensure a successful closure. Nasal packing is also commonly used inside of the nose.

**Step 3:** The third step of the surgical procedure is the postoperative care. This includes recovery, additional treatment, and long term surveillance. The recovery from surgery may entail both a portion within the hospital and longer portion at home. Common patient experiences after surgery include facial and nasal pain, nasal congestion, decrease or absent sense of smell, drainage of secretions, crusting, and recovery from anesthesia. Complete healing time varies, but a period of 2-3 months is typical. Following complete healing, the alteration in the nasal anatomy from surgery may result in a need for regular care. Such maintenance may include office based cleanings and at home use of saline irrigations. Additionally, there are potential long term side effects from surgery including disruption of the normal function of the nose and paranasal sinuses. Additional treatment after surgery is termed “adjuvant” treatment. Adjuvant therapy may include radiation and/or chemotherapy. The decision to perform adjuvant therapy is determined by your team of experts. All patients require long term follow up. This typically involves in-office examinations on a regular schedule and surveillance imaging studies. The timing of these evaluations is based on the type of tumor and patient specific factors.

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