

# Clinical cases of head osteomas in the Department of Otolaryngology at the University Hospital in Gdansk 2012–2019

## Kostniaki głowy i szyi w materiale Kliniki Otolaryngologii w Gdańsku w latach 2012–2019

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### ABSTRACT:

**Introduction:** Osteomas are the most common benign nonepithelial neoplasms of the head. The tumors are slow growing and cause headaches. Osteomas are often diagnosed accidentally, during the head imagining procedures.

**Objective:** Clinical and epidemiological assessments of patients with head and neck osteomas.

**Material and methods:** We carried out the analysis of medical documentation of patients treated in Otolaryngology Department of the Medical University in Gdańsk in the years 2012–2019 with osteoma diagnosis and analyzed the therapeutic approach and treatment results.

**Results:** 38 patients with osteoma have been operated on during the investigated period of time (18 men, 20 women). Most of the osteomas were localized in the frontal sinuses (55.3%). External frontoethmoidectomy was the most commonly performed surgery (73.7%). 10 patients (26.3%) underwent endoscopic ethmoidectomy. It has been proven that there is no link between this neoplasm and age, sex or tobacco smoking.

**Conclusions:** Osteomas are rare bone neoplasms. The course of the illness depends on the primary localization of the osteoma. Asymptomatic osteomas do not require surgical excision. They require only regular otolaryngological control. The most common symptoms of osteomas are intensive headaches, which are difficult to treat. Diagnostics of such tumors is based on Computed Tomography and surgery is in this case a treatment of choice.

### KEYWORDS:

headaches, osteoma, paranasal sinuses

### STRESZCZENIE:

**Wprowadzenie:** Kostniaki to najczęstsze łagodne nowotwory zatok przynosowych. Guzy te często rozpoznawane są przypadkowo podczas badań obrazowych głowy.

**Cel:** Ocena kliniczna i epidemiologiczna chorych z kostniakami zatok przynosowych.

**Materiał i metody:** Dokonano analizy dokumentacji medycznej chorych leczonych w Klinice Otolaryngologii GUMed w latach 2012–2019 z rozpoznaniem kostniaka i przeanalizowano postępowanie oraz wyniki leczenia.

**Wyniki:** W omawianym przedziale czasu operowano 38 chorych z powodu kostniaków (18 mężczyzn, 20 kobiet). Większość guzów zlokalizowana była w obrębie zatok czołowych (34%). Wykazano brak związku tego nowotworu z: wiekiem, płcią i paleniem tytoniu.

**Wnioski:** Kostniaki są rzadkimi nowotworami kości. Stanowią mniej niż 1% wszystkich nowotworów głowy i szyi. Powodują one silne, trudne do opanowania bóle głowy. Diagnostyka tego typów guzów oparta jest na tomografii komputerowej, a ich leczeniu z wyboru jest chirurgia.

**SŁOWA KLUCZOWE:** bóle głowy, kostniak, zatoki przynosowe

## ABBREVIATIONS

**CNS** – central nervous system

**CT** – computed tomography

**MRI** – magnetic resonance imaging

**X-ray** – X-ray image

## INTRODUCTION

Osteomas are the most common benign nonepithelial head and neck tumors, which represent around 2–3% of all primary bone tumors [1]. Apart from the head and neck, they are most often situated in the spine and long bones. Osteomas of the facial bones are a rare entity. Within the head and neck organs, they can be found practically everywhere, most often in the paranasal sinuses, and less often in the external auditory canal or the body of mandible [2]. Clinical and radiological imaging may suggest other, more frequent diseases of the nose and paranasal sinuses: inflammatory changes, including fungal lesions, other benign neoplasms (fibromas) or malignant neoplasms. Osteomas are a slow-growing lesion. They can cause mass effect-type symptoms depending on their location. A typical symptom of osteomas developing in the paranasal sinuses is headache [1, 2]. Diagnostics is based on computed tomography. The basis of how a final diagnosis is identified is histological examination of the tumor. Surgical treatment is the sole and predominant method of therapy.

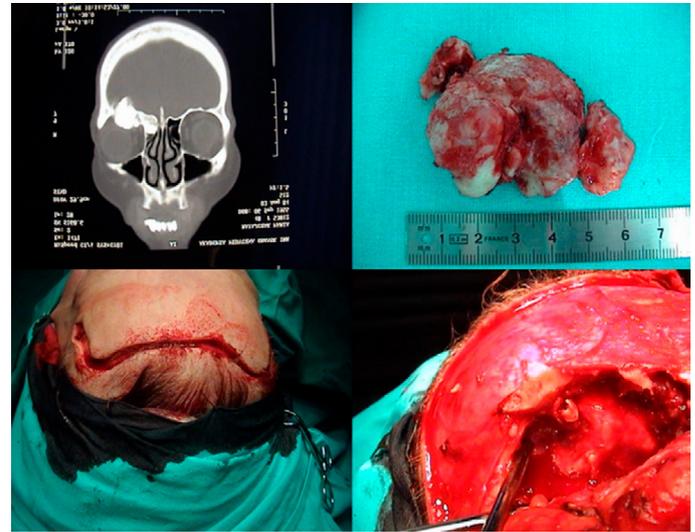
The medical records of patients diagnosed with osteoma and treated at the Otolaryngology Clinic in Gdańsk over the period 2012–2019 were analyzed, and the procedure and treatment outcomes were reviewed.

## METHODS

The analysis covered 38 patients with head osteomas treated at the Department of Otolaryngology GUMed between January 2012 and November 2019. The following information was collected: age at diagnosis, sex, symptoms, symptom duration, location, size of osteoma, method of treatment and hospitalization time.

## RESULTS

In the discussed period, 38 patients were admitted and operated on due to osteomas, including 18 men (47.4%) and 20 (52.6%) women who had met the inclusion criteria for the study (primary lesion located in the nose and/or sinuses). The mean age of patients was 47 years; the youngest hospitalized patient was 19 years old, and the oldest was 80 years old. Most osteomas were found in the 40–50-year-old age group. Ten of 38 (26.3%) patients were addicted to nicotine with an average 10 pack-years. The most common symptom reported by patients was headache located in the sinus affected by the osteoma. The headache occurred in all of our patients. Other symptoms are presented in Tab. I. The mean duration of symptoms was 6 months. The performed imaging studies were: craniofacial CT (34 patients), sinus X-ray (3 patients), head MRI (1 patient).



**Fig. 1.** 47-year-old patient, giant frontal osteoma, bicoronal approach, surgical material.

The most common location of osteoma was the frontal sinus – 21 patients (55.3%), followed by the ethmoid sinuses – 14 patients (36.8%). The location of osteomas is shown in Tab. II. Eleven of 38 osteomas qualified as large tumors of greater than 20 mm in diameter. The average size of osteomas in our material was 11 x 15 mm. The largest osteoma was 45 x 45 mm. Patients qualified for surgery were operated on within 24 hours of admission. The most common procedure was external frontoethmoidectomy, which was performed in a total of 28 patients (73.7%), of which in 2 cases by an otolaryngologist/neurosurgeon team due to the advancement of the tumor (involvement of the skull base). In 10 patients (26.3%), an endoscopic procedure was performed. The patients' postoperative course was uneventful. The mean time for hospitalization was 4 days. There were no deaths in our patient group.

## DISCUSSION

Osteomas are the most common benign nonepithelial tumors of the head. The most frequent location of osteomas is the frontal sinuses and the nose, rarely the maxillary and sphenoid sinuses [2–5, 6, 7]. There are sporadic cases of turbinate osteomas [3]. In our case series, osteomas were located mainly in the frontal and ethmoid sinuses (92.1%).

Osteomas are slow-growing tumors. Their mean growth rate is 1.61 mm/year [2]. They are common in adolescents and adults under 30 years of age and are generally asymptomatic [1]. These tumors are most common in 4<sup>th</sup>–6<sup>th</sup> decades of life [4]. The average age of our patients is 47 years.

The etiology of the osteoma is still unknown. There are three current theories regarding osteoma formation: (1) infectious, (2) traumatic, and (3) embryologic, in which the activated growth of stem cells leads to the development of osteomas [5]. Histologically, osteomas are divided into three categories: (1) ivory osteoma composed of dense bone, (2) mature osteoma composed of a spongy bone and (3) mixed osteoma [5].

Tab. I. Symptoms reported by patients.

Symptoms	Number of patients (n = 38)	%
Headache	38	100
Nasal obstruction	4	10.5
Nasal discharge	1	2.6
Nosebleed	1	2.6
Oedema	1	2.6
Paresthesia	1	2.6
Double vision	1	2.6

Tab. II. Osteoma's location within the head and neck.

Location	Number of patients (n = 38)	%
Frontal sinus	21	55.3
Rush	14	36.8
Maxillary sinus	2	5.3
Sphenoidal sinus	1	2.6

Osteomas are often found incidentally in patients who undergo computed tomography of the sinuses for other reasons [6]. Most of these changes are asymptomatic due to their slowly growing nature. The symptoms are related to the mass effect and localization. The most common symptoms include headache and nasal obstruction [1, 4, 5, 6, 8]. Large osteomas, especially in the sphenoid or frontal sinuses opening into the cranial cavity, may lead to life-threatening complications, such as: pneumothorax, meningitis or monocular vision [9–13]. Our patients also reported headache. Among imaging studies, computed tomography is performed. The CT image (as in our patients) is characteristic; we observe a high-density, well-limited lesion [5]. In patients with an unclear CT scan who are experiencing symptoms, we perform magnetic resonance imaging. MRI is used to exclude the spread of lesions to the CNS, especially in osteomas of the sphenoid and frontal sinuses [5, 9]. These tumors should be differentiated from other diseases of the nose and paranasal sinuses, such as: nasal polyps, inverted papilloma, angiofibroma, squamous cell carcinoma, adenocarcinoma, adenoid cystic carcinoma, mucoepidermoid carcinoma and melanoma [14, 15]. Differential radiological diagnosis of osteomas must include other fibrous bone changes: fibrous dysplasia or ossifying fibromas [15]. With small, randomly detected osteomas that are

asymptomatic due to their slow growth, the procedure of choice may be patience and follow-up CT examinations. In the case of discomfort, surgical resection is the treatment of choice.

Osteoma is a slow-growing tumor. Its clinical course in some cases may be locally aggressive and may recur after removal [14]. As the recurrence rate after curettage is reported as approx. 15% and malignant transformation is rare, initial therapy has to include extensive en bloc excision [9, 16]. The patient requires constant otolaryngological control, including endoscopic and imaging examinations.

Taking account of the location and size of osteoma, various surgical incisions are used to get access. Because the most common site of osteomas is the frontal sinus, external frontoethmoidectomy is the usual choice. It is a multi-stage procedure that preserves the anterior wall of the frontal sinus, thereby reducing the risk of forehead deformation. Frontoethmoidectomy is performed mainly in the treatment of various inflammations and complications in the frontal sinus. External frontoethmoidectomy is also appropriate in the case of large lesions in the frontal sinus and when osteomas are extending into the ethmoid sinuses. Frontoethmoidectomy requires appropriate instruments and careful postoperative management [17, 18].

Another, though less frequently performed procedure, used in osteoma surgery is endoscopic sinus surgery (ESS). Ten of our patients underwent ESS. Indications for surgery from internal access include the small size of osteoma. Endoscopic procedures are not recommended when removing lesions in the inferior, anterior or posterior frontal sinus [17, 18].

## CONCLUSION

Osteomas are common benign tumors of the paranasal sinuses. Their symptomatology is not specific and depends on the location and size of the tumor. Sinus CT scan is the basic diagnostic method. Final diagnosis is based on the histological examination. The treatment of choice for these types of tumors is surgical excision. Patients with osteomas who are ineligible for surgery require constant laryngological monitoring.

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