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CASE REPORT

The role of CT scan in predicting complications in small ethmoidal osteomas

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ABSTRACT

Osteomas are slow-growing tumors of the paranasal sinuses, usually found in the frontal and ethmoidal sinus. In many cases, these tumors are discovered by chance or after an imagistic exam for a non-responsive to medical treatment headache. In asymptomatic tumors, conservative treatment is indicated, while in big tumors with complications the gold standard is surgical resection of the tumor. We present two cases of rather similar anterior ethmoidal osteomas in which the therapeutic management was decided according to the symptomatology of the patient and the imagistic CT exam. We decided different ways of treatment for the two cases based on the CT scan, which has a major role in predicting intraoperative complications during endoscopic sinus surgery.

KEYWORDS: ethmoidal osteoma, FESS, frontal recess

INTRODUCTION

Osteomas are the most common benign tumors of the paranasal sinuses and they are observed in about 3% of CT scans[1] and in about 1% of plain X-ray investigations[2]. This benign osteogenic lesion arises usually in the frontal sinus (80%), in the ethmoid and the maxillary sinus (19%) and very rarely in the sphenoid sinus (1%)[3].

Osteomas originate into the sinus wall, but their etiology is still uncertain. Age of presentation is most commonly the second to fifth decade, with a male to female ratio of approximately 3:1. Osteomas are usually found incidentally on a CT scan investigation in a patient with or without symptomatology. For asymptomatic osteomas it is indicated a conservative management, while in symptomatic tumors (with complications) the surgical treatment is the treatment of choice.

Frontal osteomas can be classified according to their size into small, large or giant (more than 3 cm). Depending on the size, location and anatomic local variations, frontal osteomas can develop sinus pressure and headache symptoms that are very important in indicating the proper therapy. Small osteomas are usually asymptomatic without affecting the frontal sinus ventilation and drainage. After a CT scan revealing a small tumor, the therapeutic attitude can be either conservative or surgical. A small ethmoidal osteoma located near the frontal recess has to be completely resected if it interferes with the normal drainage of the frontal sinus. The role of the CT scan is to provide a precise topographic diagnose and to take into account all the complications that may occur during surgery.

MATERIAL AND METHODS

We present in this article two cases of small osteomas located in the anterior ethmoidal cells, in the frontal recess region, which were referred to our department with chronic headache. After performing a CT scan, we had an imagistic diagnose of

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small ethmoidal osteoma. Even if the two cases were almost similar, the therapeutic approach was different due to symptomatology and the risk of complications.

Case 1

We present the case of a 29-year-old female patient who came to our ambulatory department with severe and constant headache, which appeared within the last 6 months. She was consulted in several neurologic departments and underwent specific treatments without any complete resolution. She was referred to an ENT specialist and we performed a clinical examination and a nasal endoscopy. The investigations showed no inflammatory or tumoral pathology, with a wide opened middle meatus, no secretions in the osteomeatal unit and no nasal obstruction on that side. The next step consisted in performing a craniofacial CT scan (Figure 1).

Figure 1. CT for left ethmoidal osteoma.

The CT scan investigation revealed the presence of a small osteoma (4/5/3 mm in size) located in the anterior ethmoid, superior to the hiatus semilunaris in its posterior part. The tumor was closely attached to the cribriform plate (we had in mind that it might be the arising point of the tumor), and it was situated close to the anterior ethmoidal artery with its posterior part. There was no direct contact with the lamina papyracea on the left side. Due to the persistent symptomatology and the lack of results with therapeutic medication, we decided to perform an endoscopic approach for complete tumoral resection. We were aware of the risk of intracranial penetration with consequent CSF leak and of the haemorrhagic risk if damaging the anterior ethmoidal artery. After an anterior ethmoidectomy, the tumor was resected without any complications through an endoscopic approach (Figure 2).

The next day after surgery the headache disappeared, and the patient had no complaints anymore. The histopathologic exam concluded that we were dealing with an osteoma spongiosum with content of trabecular tissue and bone marrow surrounded by small haversian systems. This structure of the tumor allowed the mobilisation after exposure bluntly without the need to use a drill.

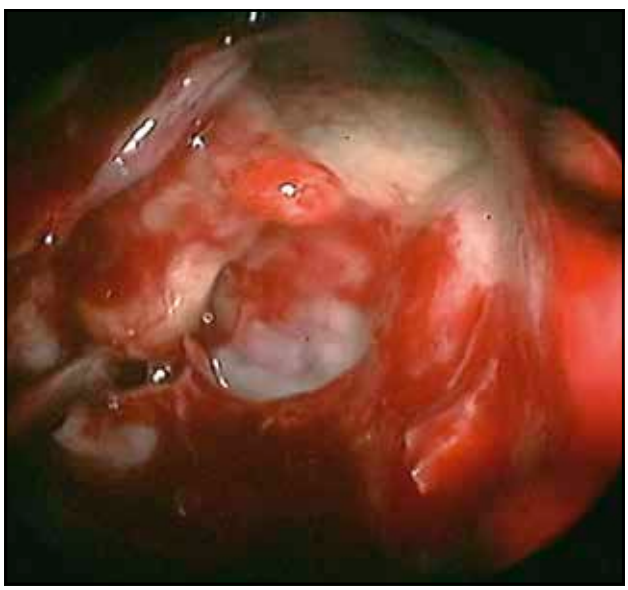

Figure 2. Left ethmoidal osteoma -endoscopic view.

Case 2

We were faced with the case of a 37-year-old male who came in our department with mild headache which appeared from time to time, usually after physical effort. In the previous 4 months the patient had had several airplane flights because of his job, and he developed headaches in the fronto-orbital region during take-offs and landings. Firstly, he addressed to a neurologist who began the treatment with anti-inflammatory medication. The results were good on daily headaches but pain persistent during flights. He was referred to our department and we performed an endoscopic examination. There was completely normal appearance in the left nasal fossa with a normal osteomeatal unit, without any secretion in the middle meatus and no anterior or posterior rhinorrhea. We continued the investigations with a cranio-facial CT scan (Figure 3).

The CT scan revealed the presence of a small tumor (4/4/3 mm) with the likelihood of an osteoma, located in the left anterior ethmoid, in the frontal recess. Taking a thorough look at the CT images we underlined the limits and surroundings of the tumor. First of all, we realized that the originating point of the osteoma was on the ethmoidal roof, more precisely on the thin bone which connects the ethmoidal roof with the cribriform plate and forms the lateral aspect of the olfactory fovea on the left side. This thin bone appeared also on the right side, but with no tumor attached to it. In an endoscopic approach, this attachment is very difficult to resect because of the risk of intracranial penetration with CSF leak. If using a diamond burr, there is a risk of overheating the bone and also the dura with intracranial edema. The second aspect we were dealing with was the presence of the anterior ethmoidal artery in complete contact with the tumor, in which case it would be very difficult to dissect the artery without any injury.

Based on these two imagistic aspects, we decided to have a conservative management of this case. The therapeutic attitude was to "wait and scan" considering that the risks of an endoscopic approach were much more important than the benefits. We decided to initiate a medication for nasal patency and also an anti-inflammatory medication prior to any flight or for any headache that occurs. Taking into consideration that osteoma is a slow-growing tumor, the "wait and scan" position seems to be the proper one in order to avoid major complications for a pathology treated with usual medication.

DISCUSSIONS

We presented two cases of anterior ethmoidal osteomas, occurring in both a female and a male patient, with approximately the same age. The symptoms were rather the same, consisting in headache and frontal pressure described as intense in the first case and mild in the second one. Both cases were referred to our department from the neurologist, after a therapeutic medication was performed. We performed an endoscopic examination of the nose which, in both cases, looked completely normal with good nasal ventilation and without obstruction of the osteomeatal unit.

The next step was to perform an imagistic examination in order to get a proper diagnosis and to establish the correct treatment. In both cases, we found an anterior ethmoidal osteoma without blockage of the frontal sinus drainage, but there

Figure 3. Osteoma located in left frontal recess – cranio-facial CT scan.

were also some differences. We were concerned about the intraoperative complications that could occur, so we looked very carefully and several times on the CT scan images.

We were interested in the origin of the tumor and, by checking the images, it appeared to be a contact between the ethmoidal roof and the tumor in the first case and, in the second case, the origin of the tumor was on the ethmoidal roof. We always look to compare both sides and it was obvious that the connecting bone lamella in the lateral part of the olfactory fovea was very thin and the risk of intracranial penetration was really significant[4]. We were also interested to see the contact between the tumor and lamina papyracea and in both cases there was a reduced risk for orbital complications.

The third important landmark we checked on the CT was the presence of the anterior ethmoidal artery in the surgical field. The CT images revealed that the anterior ethmoidal artery was located posteriorly to the tumor in the first case, but deeply connected to the osteoma in the second one; so, we expected that, in that particular case, we might have damaged the artery with a secondary orbital hematoma which would have needed an orbital decompression.

Last but not least, we checked the consistence of the bony tumor on the CT scan. While in the first case we had the spongiosum type which is easier to mobilize, in the second case it looked like the ivory type, which is a hard and dense bone, lacking a haversian system and difficult to resect. In this second case, the risk of intracranial complications was significant due to CSF leak or bone overheating while drilling and subsequent intracranial edema[5].

Taking into account the symptomatology and the CT scan, we decided that in the first case we could perform an endoscopic approach with minimal orbital, haemorrhagic and intracranial complications, the result being a complete resection of the tumor and an entirely disappearance of the painful complaints of the patient. In the second case, there were significant risks for haemorrhage from the anterior ethmoidal artery and for intracranial penetration through the ethmoidal roof. Therefore, the "wait and scan" attitude seemed to be the best therapeutic management of this case.

CONCLUSIONS

Osteomas are one of the most frequent benign tumors of the paranasal sinuses. If they appear in the ethmoid, the most important aspect is the location which establishes the risk of preoperative and intraoperative complications. Usually, a small osteoma without complications needs a conservative management, but when the patient complains of unknown headaches and poor quality of life, surgical resection is the gold standard treatment. There is no emergency approach in ethmoidal osteomas (unless complications occur), because we are dealing with a slow-growing tumor[6].

Focusing on the CT images and the possible intraoperative complications, the attitude of surgical endoscopic resection or "wait and scan" position has to be chosen by the skilled surgeon, based on the patients' symptomatology.

Conflict of interest: The authors declare that there is no conflict of interest.

Contribution of authors: All authors have equally contributed to this work.

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