B-ENT, 2007, 3, 101-104

Case report: olfactory loss and unrelated chronic rhinosinusitis

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Key-words. Anosmia; olfactory groove meningioma; sinusitis

Abstract. Case report: olfactory loss and unrelated chronic rhinosinusitis. A case is presented in which a meningioma of the olfactory region caused olfactory loss as the only presenting symptom. Diagnosis was delayed by the presence of mild chronic sinusitis, presumed to have been responsible for the presenting hyposmia. The meningioma was initially not detected on a CT scan of the sinuses. A well conducted anamnesis and objective assessment of total anosmia through smell identification tests raised the suspicion of a sensorineural olfactory disturbance. The tumour was finally diagnosed on MR imaging. The paper discusses the practical management of patients presenting with olfactory dysfunction.

Introduction

Olfactory disturbances can be classified into three classes: 1) Conductive olfactory dysfunction, caused by compromised nasal patency, e.g. in patients with chronic rhinosinusitis or nasal polyposis, 2) Sensorineural olfactory dysfunction, caused by damage to the olfactory epithelium, e.g. post-infectious, post-traumatic or post-surgical, and 3) Central olfactory dysfunction, caused by damage to the anterior olfactory nucleus in the brain, e.g. in patients with intracranial tumours, in Parkinson’s or Alzheimer’s disease.

Rhinitis and rhinosinusitis are common causes of olfactory disturbances.1 Hyposmia is a common complaint in chronic rhinosinusitis (CRS), and the degree of olfactory loss is usually proportional to the severity of the rhinosinusitis.2 Although very suggestive of CRS,2 it is rarely the only symptom. Patients often also present with nasal obstruction, rhinorrhea, a postnasal drip, or headache as their primary symptoms. Rhinosinusitis is one of the best treatable causes of hyposmia/olfactory dysfunction. It frequently resolves after a short treatment with oral steroids combined with a nasal steroid spray3; however this improvement is often transient or incomplete. Surgical treatment of patients with rhinosinusitis may also have a positive effect on the sense of smell.

If the dysosmia does not fit within the clinical picture, e.g. if nasal endoscopy fails to reveal obstruction of the superior meatus or a tumour, other causes of olfactory loss have to be excluded. The olfactory disorder may then be explained by a neuroepithelial or central nervous system disturbance, in which case further investigations (assessment of olfactory function, CT or MR imaging) are appropriate.

Case report

A 68-year-old female presented with progressive hyposmia, nasal congestion and frontal headache. Initially, her hyposmia was believed to be related to the ethmoidal and sphenoidal sinusitis seen on CT scan (Figure 1a-b). Since medical therapy, including systemic steroids, had not changed her olfaction and her symptoms had been present for over a year, she was referred to the university clinic. Because of a striking discrepancy between the mild findings on CT and nasal endoscopy, and her history of total anosmia, other causes were considered. Total anosmia was confirmed after smell identification tests using smell diskettes (Zürcher Geruchstest, Dietikon, Switzerland). This screening test is designed as a triple forced multiple choice test of 8 different odorants. The patient correctly identified 2 out of 8 smell diskettes, this being compatible with severe hyposmia.4

An MRI scan of the brain showed an extra-axially located bi-frontal sharp mass (diameter 3.1 cm), suggestive of a meningioma. The mass was surrounded by mild intracerebral oedema and did not invade the sphenoid or ethmoidal sinuses (Figure 2a-b). The CT findings were reviewed and the tumour, initially not seen by the radiologist, not by the ENT
The patient was admitted to the hospital for removal of the meningioma. Preoperatively, an embolisation of the middle meningeal artery was performed to occlude the feeding vessels of the tumour. The tumour was removed through a bicoronal incision and subfrontal approach. The frontal sinus was trepanated under neuronavigation control. The tabula interna of the frontal sinus was removed and the meningioma was resected by the neurosurgeon. The dura of the floor of the anterior fossa was reconstructed using TissuDura and a galeal periosteal flap. The frontal recesses were obliterated with abdominal fat. All mucosa was removed from the remaining walls of the frontal sinus and the tabula externa was then put back in place.

Postoperatively the patient recovered well, although she complained of severe headache, which was treated symptomatically. The headaches resolved completely within a month and a postoperative CT scan showed no residual meningioma.

Histology revealed a neoplastic meningotheial meningioma (WHO grade 1) consisting of uniform cells with discrete cytonuclear atypia. Neither mitoses nor necrosis were seen.

**Discussion**

Meningiomas are the most frequent type (15-30%) of primary intracranial tumour, and are usually benign and attached to the dura. Patients may present with a gradually worsening focal neurological deficit, focal seizures or symptoms of raised intracranial pressure. Obviously, the clinical presentation depends on the localisation of the tumour. Meningiomas may also be found incidentally on a CT or MRI scan. Since they are usually benign tumours, complete surgical removal is often possible and in most cases curative.

In our case, the olfactory disturbances were caused by an olfactory meningioma, while mild chronic sinusitis coexisted. Olfactory meningiomas represent about 12% of all basal meningiomas. Anosmia is thought to be among...
the first symptoms, although patients are often unaware of olfactory loss. Most patients present with headache, visual or cognitive disturbances. The fact that meningiomas are slow growing tumours often results in their late discovery.

As in the present case, we feel that – rare as it may be – sensorineural olfactory function loss must be considered in every case of severe hyposmia. The evolution of the olfactory dysfunction, the response to medication, critical evaluation of the available data and olfactory function tests can help select those cases, in which additional investigations may be useful.

Smell disturbances are very suggestive of CRS, but only when other symptoms of CRS are also present (headache, postnasal drip, nasal obstruction, rhinorrhea). CT imaging is commonly used in the diagnosis of CRS, but it is in fact too sensitive as 27-45% of normal subjects show sinus opacification. Furthermore, as in the present case, the CT scan did not distinctly show the meningioma, which caused a delay in the diagnosis.

Several authors have designed algorithms to evaluate olfactory dysfunction. The first step is to take a good history regarding the nature, timing, onset, fluctuation, precipitating events and localisation (left/right) of the disorder. A correct description has to be obtained (anosmia, hyposmia, parosmia, dysosmia ...). A complete otorhinolaryngologic examination with nasal endoscopy (visualization of the middle and superior meati and the olfactory cleft) has to be performed.

The next step is the evaluation of the smell disturbance using psychophysical testing, which gives a semi-objective measure. A number of psychophysical tests have been validated and standardized: the UPSIT test, the Sniffin Stick test, the Scandinavian odour-identification test and the alcohol sniff test.

Olfactory function can be electrophysiologically assessed using chemosensory event related potentials (CSERP). These tests provide objective measures, but are only available in specialized centres.

When no evidence of sinonasal disease is found and the history of the patient has not revealed another possible explanation for the sensory olfactory dysfunction, brain MR imaging is essential. This may reveal congenital disorders, post-traumatic brain disorders or tumour lesions (e.g. esthesioneuroblastoma, meningioma ...). However, post-infectious, toxic or sensorineural olfactory disorders in the brain are not always associated with pathologic changes on MRI. For this reason, some cases of olfactory dysfunction remain unexplained (idiopathic).
Conclusion

Although chronic rhinosinusitis is a common cause of hyposmia, one should always consider other (less common) aetiologies for olfactory loss, especially when the loss does not fit with the clinical picture. We therefore recommend the use of smell identification tests to objectively assess a smell disorder. MR imaging of the brain should be carried out to exclude central or sensorineural causes of olfactory loss.

References