An unusual nasal polyp: skull base meningioma with extracranial extension into the nasal cavity

Introduction

Nasal polyps are predominantly non-neoplastic and a common cause of breathing difficulty, while meningiomas are the most common benign intracranial neoplasm and are largely asymptomatic. A small proportion of nasal polyps, however, may contain a neoplasm, and less than 3% of meningiomas may extend into the sinonasal tract. This article presents an exceptionally rare case of a skull base meningioma that extended into the nasal cavity and presented as a nasal polyp. The aetiopathology, diagnosis and management of such cases is discussed, with emphasis on the importance of histopathological examination and cross-sectional imaging in the decision-making process.

Discussion

Meningiomas are the commonest primary intracranial neoplasm of adults, and may occur in up to 2–3% of the population (Whittle et al, 2004). They are benign tumours that originate from the meningothelial cells of the arachnoid granulations overlying the convexity of the brain and the skull base (Campbell et al, 2009). The majority of meningiomas occur over the convexity of the brain, while 33–50% of meningiomas occur in the skull base (Desai and Bruce, 1994).

Females are affected twice as commonly as males, and the peak incidence is after the 5th decade. The aetiology is unknown, but there are well-recognized associations with neurofibromatosis type II and previous cranial irradiation. Meningiomas are generally asymptomatic and discovered incidentally. However, the minority of meningiomas which are symptomatic commonly present with seizure disorders and/or symptoms related to localized tumour effect, such as cranial nerve palsy.

The World Health Organization (WHO) classifies meningiomas into three grades on the basis of histology: benign (WHO grade I), atypical (WHO grade II) and malignant

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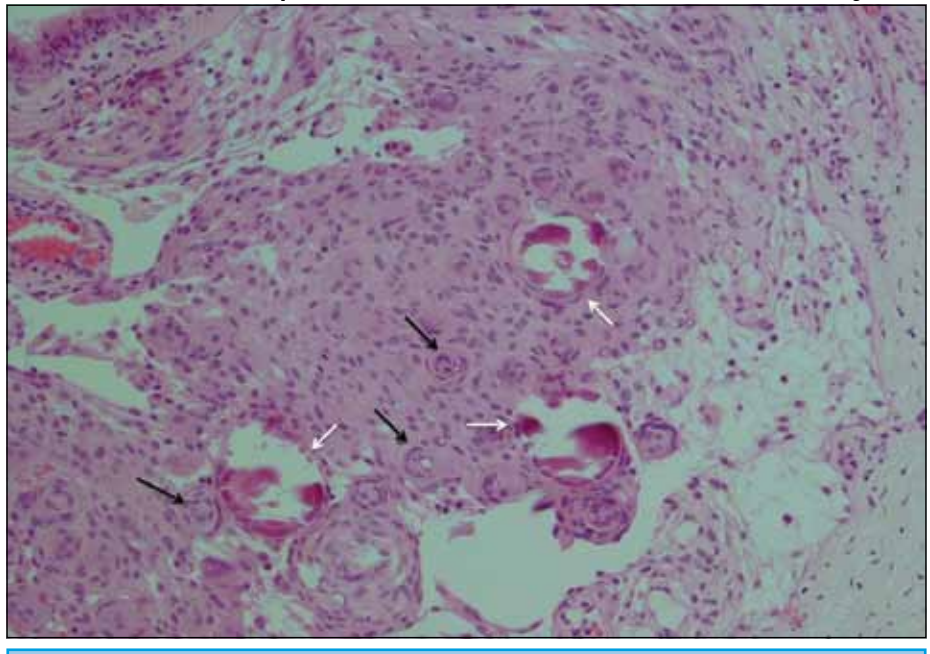
Figure 1. Haematoxylin and eosin stain photomicrograph of the nasal biopsy specimen. Psammoma bodies (white arrows) and whorls of epithelioid cells (black arrows) are shown, consistent with a meningioma.



Case Report

A 66-year-old man attending the ear, nose and throat outpatient clinic for routine follow up of chronic ear infections complained of recent difficulty in breathing through his nose. Naso-endoscopy demonstrated abnormal polypoid tissue arising from the posterior edge of the right middle turbinate, which was biopsied. Histopathological analysis revealed tissue containing extensive whorls of epithelioid cells and Psammoma bodies (*Figure 1*), while immunostaining demonstrated strongly positive staining for epithelial membrane antigen and Vimintin and negative staining for pancytokeratin, neuroendocrine markers, CEA and S-100. The features were consistent with a benign meningioma.

Cross-sectional imaging with both computed tomography and magnetic resonance imaging was performed. Magnetic resonance imaging (*Figure 2*) demonstrated a typical skull base meningioma with en plaque growth along the floor of the right temporal fossa. The tumour infiltrated the right cavernous sinus and extended into extra-cranial structures, including the right nasal cavity, where it formed the suspected 'polyp' that was causing this patient's breathing difficulty (*Figure 3*). Computed tomography demonstrated hyperostosis of the skull base underlying the lesion.

The patient was referred to the regional neurosurgery unit, but while awaiting review, experienced a single episode of complex partial seizure activity. Oral therapy with sodium valproate was commenced, and no further neurological symptoms have been experienced since. Conservative management with surveillance imaging has been adopted, and to date 6-monthly magnetic resonance imaging scans have been stable.

(WHO grade III). Around 90% are WHO grade I, reflecting the benign nature of the disease, while 5–7% are atypical and 1–3% malignant (Whittle et al, 2004).

Of meningiomas 20% may extend into extracranial structures, such as the calvarium, orbit and ear (Farr et al, 1973). Less than 3% of such intracranial meningiomas with extracranial extension invade the nasal cavity, and in most such cases, the primary tumour mass is located along the skull base, as in this patient (Perzin and Pushparaj, 1984).

Like other such tumours that are discovered within the nose, meningiomas of the sinonasal tract may closely resemble nasal polyps on clinical examination (Hellquist, 1996). Nasal polyps are non-neoplastic mucosal swellings that are a common cause of nasal obstruction, and most frequently arise from the middle turbinate of the nose (Lund, 1995), the same location as the meningioma in this case. Although the frequency of such neoplasms masquerading as polyps is rare, their incidence is sufficient to mandate histopathological correlation for all cases of nasal polyposis.

Both computed tomography and magnetic resonance imaging are needed for accurate staging of meningiomas, with magnetic resonance imaging providing superior delineation of the tumour and any localized extension, and computed tomography providing superior visualization of the extent of bony involvement, which can be seen in up to 50% of skull base meningiomas, classically as hyperostosis (bony thickening). Hyperostosis denotes chronicity, and can help to differentiate slow-growing meningiomas from malignant neoplasms which are more likely to be associated with bony destruction. On magnetic resonance imaging, meningiomas are iso- to hypointense on T1-weighted sequences and hyperintense on T2-weighted sequences. Contrast-enhanced imaging demonstrates avid enhancement and may also highlight the 'dural tail' sign, a characteristic feature of meningiomas that is present in 35–80% of cases and which represents thickening of the dura at the site of tumour origin (Campbell et al, 2009). Pathological analysis is also essential, as locally aggressive meningiomas, such as in this case, may still be histologically benign.

The definitive treatment for meningiomas is excision and, together with WHO grading, resectability is one of the key prognostic factors. Given the often large size of

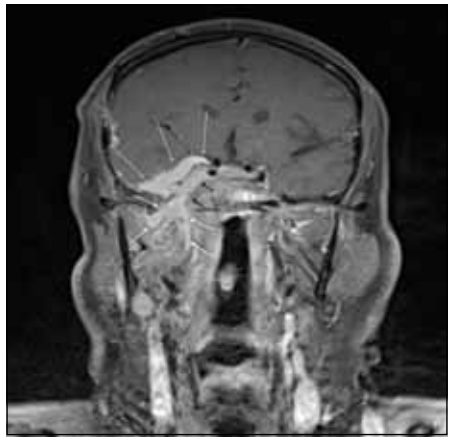


Figure 2. Coronal T1 gadolinium-enhanced magnetic resonance imaging demonstrates an extra-axial, avidly enhancing lesion along the base of the right temporal fossa (long white arrows) which extends into the right cavernous sinus (black arrows), and right infratemporal fossa and masticator space (short white arrows). The features are in keeping with a skull base meningioma with extracranial extension.

skull base meningiomas at presentation, as well as their vascularity, proximity to vital structures and tendency to extend beyond the skull base, only 28% are completely resectable, and recurrence rates can be as high as 34% at 5 years (Desai and Bruce, 1994; Whittle et al, 2004). In addition, mortality following meningioma resection has been reported at around 23% in patients over the age of 70 years, while operative morbidity is seen in up to 36%, with complications including blindness and various other permanent cranial nerve palsies.

For these reasons, as well as the fact that the majority of meningiomas are slow-growing tumours, conservative management is often favoured (Desai and Bruce, 1994; Campbell et al, 2009). One area of promising research in this group of patients is the use of modern radiotherapy techniques, such as sterotactic radiosurgery, for the primary treatment of meningiomas (Marosi et al, 2008). Currently these therapies require greater follow up in order to determine their long-term efficacy.

Overall, prognosis for benign meningiomas is excellent, with upwards of 70% 5-year survival.

Conclusions

Histopathological examination of excised nasal polyps is essential, as they may occasionally harbour neoplasms, including

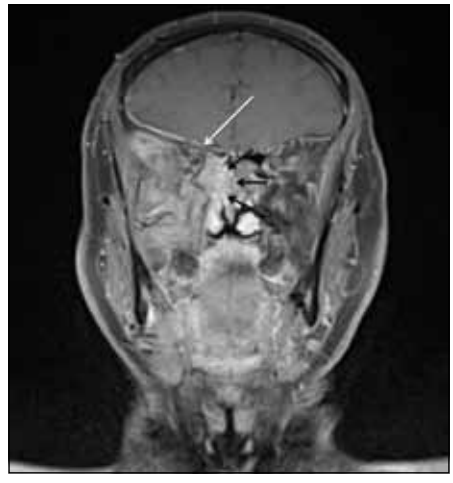


Figure 3. Coronal T1 gadolinium-enhanced magnetic resonance imaging showing the meningioma extending through a widened foramen ovale (white arrow) into the infratemporal fossa, and the right nasal cavity (black arrows) at the level of the middle meatus.

meningiomas. Large skull base tumours in elderly patients can be associated with high rates of morbidity following resection, so conservative management with serial imaging follow up is favoured. BJHM

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LEARNING POINTS

- Nasal polyps rarely harbour neoplasm and very rarely meningiomas.
- Skull base meningiomas are benign and conservative treatment is recommended because of the difficulty of surgical access and the extent of disease at presentation.