A rare case of nasal schwannoma with intracranial extension*

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SUMMARY

A rare case – only the fourth as known – of a nasal schwannoma with intracranial extension is presented. A 28-year-old Japanese man complained of right nasal obstruction and bleeding for one year. A biopsy indicated the presence of a nasal schwannoma. Computed tomography and magnetic resonance imaging demonstrated intracranial extension of the tumour. The patient underwent surgery with a combined intra- and extracranial approach. Reconstruction was performed using pericranial flaps. Surgical management of this tumour is also described.

Key words: schwannoma, nasal cavity, intracranial extension, reconstruction, pericranial flap

INTRODUCTION

The head and neck are the most common sites of origin of schwannomas. Those originating in the nasal cavity or paranasal sinus are very rare. Among 430,000 histological sections of nasal tumours, there were only two cases of nasal or paranasal schwannoma (Perzin et al., 1982). We report a case of nasal schwannoma with intracranial extension and describe its surgical management.

CASE REPORT

A 28-year-old Japanese man complained of increasing right nasal obstruction and nasal bleeding for the past year. He consulted our department on February 26, 1996. His right nasal cavity was obstructed by a reddish, slightly solid tumour, with an irregular surface which bled readily. Regional lymph nodes were not enlarged. The patient's past medical and family history was uneventful. Physical examination revealed no neurological deficits except anosmia. Results of all laboratory tests were within the normal limits. Computed tomography demonstrated that the tumour extended into the cranium through the anterior cranial fossa. Biopsy revealed schwannoma.

Upon magnetic resonance imaging the tumour appeared as an iso-intensity mass on the T_1-weighted image and as a high-intensity mass on both the gadolinium-enhanced T_1-weighted image (Figure 1) and the T_2-weighted image. The tumour extended from the nasal cavity to the ethmoid and frontal sinuses, and into the cranium. Whole-body scintigraphy with gallium-67 citrate showed no apparent deposits.

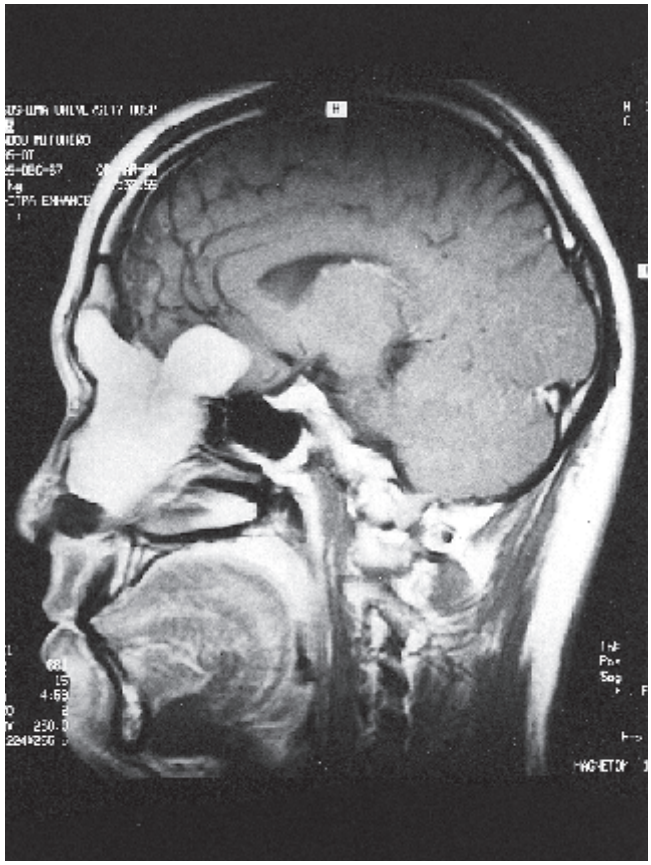

Figure 1. Sagittal MR image with gadolinium enhancement showing a tumour of high intensity, which extends from the nasal cavity to the ethmoid and frontal sinuses and to the cranium.

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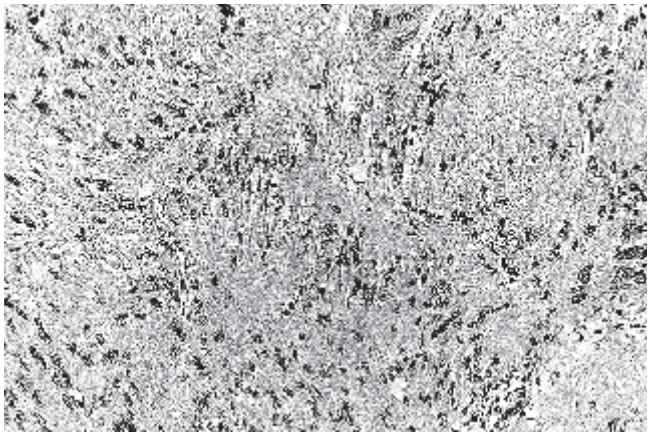

Figure 2. Light micrograph of the tumour showing proliferation of spindle-shaped nuclei and fibrillary cytoplasm in a palisade-like pattern (haematoxylin and eosin; ×200).

Figure 3. Light micrograph of the tumour stained with an antibody to the S-100 protein showing nuclear and cytoplasmic localization (×400).

The patient underwent a combined intra- and extracranial surgical approach on March 13, 1996. The intracranial approach was a standard bifrontal craniotomy. The tumour was easily separated from the dura. Extradural exploration then demonstrated a defect in the floor of the anterior cranial base, which was approximately 3 cm in diameter. A smooth, encapsulated mass protruded through the defect into the nasal cavity. This tumour was removed *en bloc* via the maxilla with an additional Denker's procedure. The defect in the anterior cranial base was reconstructed with bone obtained from the inner part of the skull, which had been detached during the bifrontal craniotomy. Reconstructed bone was "sandwiched" with pericranial flaps intra- and extracranially. The pericranial flap was sutured to the dura. No skin was grafted onto the intranasal surface of the pericranial flap. The patient's post-operative course was uneventful. There was no leakage of cerebrospinal fluid or formation of haematoma, and no herniation of the brain was observed.

Examination of histological sections stained with haematoxylin and eosin showed spindle-shaped nuclei and fibrillary cytoplasm in a palisade-like pattern (Figure 2). Immunohistochemical staining with an antibody to the S-100 protein showed nuclear and cytoplasmic staining (Figure 3). Those findings were consistent with that of schwannoma. Histological examination of the entire tumour revealed no signs of malignancy.

DISCUSSION

A schwannoma is a tumour that arises from the peripheral nerve sheath. While they can occur in any part of the body, 16-45% of the schwannomas occur in the head-and-neck region (Hawkins and Luxford, 1980). However, they rarely originate in the nose or paranasal sinuses, representing only 4% of the tumours of the nerve sheath in the head and neck (Shugar et al., 1981). An estimated 116 cases of schwannoma that originated in the nasal cavity, ethmoid sinus and naso-ethmoid region have been reported in the international literature (Higo et al., 1993). Nasal schwannomas with intracranial extension are extremely rare, with only three such cases previously published (Zovickian et al., 1986; Enion et al., 1991; Bavetta et al., 1993).

Schwannomas are classified into two types histologically. *Antoni type A* consists of swirls or palisades of spindle-like cells surrounding a central core of collagen. *Antoni type B* consists of a loose cellular array without the characteristic swirls or palisades. Such findings lack prognostic value. The origin of nasal schwannomas is not known, but they may arise from the autonomic nerve or from the ophthalmic or maxillary branches of the trigeminal nerve. Schwannomas do not arise from the olfactory nerve as that nerve lacks Schwann cells.

Radiotherapy is ineffective in controlling a schwannoma, so complete excision is the only effective treatment. Schwannomas, which are slowly growing tumours, characteristically expand and sometimes cause thinning of the bone or its destruction, as was seen in the present case. The defect in the anterior skull base had to be adequately reconstructed to isolate the cranial cavity from the upper respiratory tract. A failed reconstruction would be associated with an increase in morbidity and mortality. Repairing the surgical defect with vascularized tissue would help to promote rapid healing and to reduce the risk of post-operative complications. Reconstruction with vascularized autogenous tissue is preferable. A pericranial flap is ideally suited for reconstruction, as it provides a "watertight"seal with adequate structural support for the brain. A pericranial flap is the most suitable for repairing a defect of small to moderate size in the anterior cranial base (Stiernberg et al., 1987). In the present case, the bone defect was replaced with the inner part of the skull, which was detached during the bifrontal craniotomy. The grafted bone was covered with pericranial flaps, such as to provide a rich vascular supply. Allografts were used for reconstruction in the previous cases of nasal schwannoma with intracranial extension (Enion et al., 1991; Bavetta et al., 1993). Reconstruction in the present patient utilized an autograft to reduce the risk of viral or other infections, such as Creuzfeldt-Jakob disease.

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ANNOUNCEMENT