A 26-year-old man was admitted with complaints of worsening of vision for one month. Investigations revealed a large sellar and parasellar tumor mass invading into both the cavernous sinuses. The tumor invaded the clivus and both petrous apices. It was radically but partially resected through a transsphenoidal approach. Following surgery, the patient showed symptomatic improvement. The residual tumor was treated by radiation treatment. The case is discussed and the literature on the subject is briefly reviewed.

Key Words: Clivus, giant pituitary adenoma, invasion, petrous bone, sella

Introduction

Despite the histological benign nature, pituitary tumors frequently achieve a large size, invade into the compartment of the cavernous sinus and transgress the dural confines of the sella and diaphragma sellae. We encountered an unusual pituitary adenoma, which invaded the clivus and petrous bones. Although invasion of the bone by a pituitary tumor has been reported earlier, we could not locate a report of a case wherein there was clear radiological and histological evidence of bone invasion.

Case Report

A 26-year-old man presented with complaints of generalized headaches and worsening vision in both eyes, left side being worse, for one month. In the last seven months, he had two episodes of relatively minor epistaxis. When admitted, he had severe bitemporal field defect. The vision was reduced to finger counting at one foot in the left eye and 6/18 in the right eye. Magnetic resonance (MR) imaging showed a massive sellar tumor with suprasellar extension (Figure 1a). The tumor invaded into both the cavernous sinuses and extended into the sphenoid and ethmoid air sinuses (Figure 1b). It also invaded the clivus and was present anterior to it and in the extradural space anterior to the brainstem (Figure 1c). It also involved both petrous apices. Endocrinological evaluation (baseline hormonal as-

Figure 1: (a) Sagittal T1-weighted MR image of the brain showing the giant pituitary adenoma with massive suprasellar extension. (b) Coronal T1-weighted MR image showing extension of the tumor into both cavernous sinuses. (c) Axial T2-weighted MR image showing extension of the tumor into the ethmoid and sphenoid sinuses, anterior to the clivus and in the extradural space anterior to the brainstem. Invasion into the clival bone is seen

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the left eye was 6/12. The tumor had shown no radiological progression. The patient was asymptomatic. The vision in the right eye was 6/9 and in the left eye was 6/12. The tumor had shown no radiological progression.

The tumor involved the clivus, which had become brittle and could be removed with the help of a scoop. The tumor extended in the retroclival extradural space. The part anterior to the dura was removed. The patient showed marked improvement in the vision following surgery. However, postoperative imaging showed a significant residual tumor in the sella, cavernous sinuses, subfrontal region and in the region of the clivus. Histological examination revealed a tumor composed of round cells with spherical nuclei arranged in sheets. The tumor cells showed infiltration into the bony trabeculae, which were seen amidst the sheet of cells (Figure 2). The tumor was immunonegative. The proliferative index using MIB-1 antibody was 4.5%. The lesion was negative for prolactinoma. A transsphenoidal surgery was performed. 

Discussion

Pituitary tumors frequently grow into a large size and invade into cavernous sinuses, extend into the intracranial compartment and in the paranasal air sinuses. Findings on histological examination of invasive or giant pituitary tumors do not usually correlate well with the gross features and the tumor generally appears benign.

Various classifications of pituitary tumors have been proposed on the basis of size, radiographic appearance, cytogenesis, staining properties, and endocrine function. There is no consensus regarding the terminology to be used in describing large pituitary tumors. They have been described as invasive adenoma, malignant adenoma and carcinoma. Hardy classified pituitary tumors on the basis of their biological behavior. Some authors refer to pituitary tumors with size in excess of 40 mm, or to those extending less than 6 mm from the foramen of Monro as ‘giant’ irrespective of their invasiveness. Jefferson observed an incidence of giant or invasive pituitary tumors in about 6% of all cases.

Our patient reported two episodes of ‘minor’ epistaxis seven months prior to consultation. Epistaxis in a pituitary adenoma should raise the suspicion of a pituitary apoplexy in a giant pituitary adenoma with an infra-sellar extension into the nasopharynx. Other reported causes of epistaxis related to pituitary tumors are an aggressive TSH-secreting adenoma and a rupture of an intratumoral aneurysm enclosed in a large prolactinoma.

There are no reports relating a poor outcome of a radically or partially resected invasive pituitary tumor. However, various reports mention about the need for and a positive outcome of a radical surgical resection. Intraoperative and postoperative tumor swelling and/or hematoma leading to an acute elevation of the intracranial pressure can be catastrophic. A variety of surgical options have been discussed for giant and invasive pituitary tumors.

Multiple attempts have been made to identify prognostic markers of aggressive behavior among such tumors. Invasive adenomas have higher proliferation rates than non-invasive adenomas, as shown by immunohistochemical detection of proliferating cell nuclear antigen (PCNA), Ki-67, and MIB-1. The expression of p53, increased epidermal growth factor receptors, and protein kinase C activity correlate with invasion and aggressive behavior, which may be of prognostic significance.

Invasion of pituitary tumors into the clivus has been described but there is no report in the literature showing radiographic and histological demonstration of bone invasion. During the operation it was observed that the tumor was not only present on either side of the clivus but had actually invaded and destroyed it. The benign histological features of the pituitary adenoma do not reflect such an aggressive pattern of extension.

References


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