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Ectopic pituitary adenoma in the sphenoid causing Nelson's syndrome

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Abstract
An ectopic functioning pituitary in the sphenoid is an extremely rare occurrence, and even rarer is pituitary adenoma causing symptoms of Nelson's syndrome. A case is presented of a young female diagnosed and treated in our clinic. The only functioning hypophyseal tissue was detected inside the sphenoid, as the pituitary gland had been radiated because of Cushing's syndrome 10 years before and imaging studies revealed an empty sella.

Key words: Adenoma; Pituitary gland, anterior; Sphenoid sinus; Nelson's syndrome

Introduction

Nelson's syndrome is generally regarded as an unusual sequela of primary bilateral adrenalectomy when performed for Cushing's disease. It is defined by cutaneous hyperpigmentation, noticeably elevated adrenocorticotropic hormone (ACTH) levels, and an enlarged sella turcica. We present here a patient initially treated with hypophyseal radiotherapy and bilateral adrenalectomy for Cushing's disease, who presented several years later with Nelson's syndrome, and a tumour inside the sphenoid but not within the sella. The tumour was approached through an open rhinoplasty, which rendered a wide surgical field with excellent control of bleeding and the recovery was uneventful. To our knowledge, this is the first report of an ectopic functioning pituitary adenoma inside the sphenoid sinus. However, there have been reports of ectopic pituitary tissue along the tract that runs from the anterior part of the pituitary fossa of the sphenoid bone to the exterior of the skull, to the junction of the posterior septum of the nose with the palate (McGrath, 1972, 1974; see for review Fuller and Batsakis, 1996).

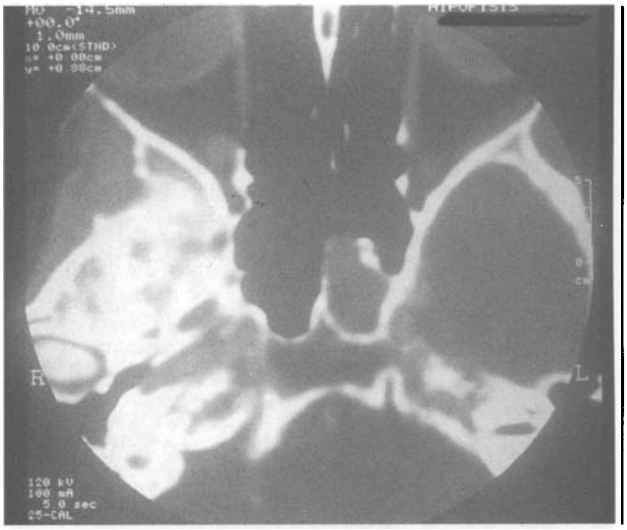

FIG. 1
Pre-operative CT scan, axial view. Tumour in the left sphenoid sinus.

Patient

A 38-year-old female was presented from the Department of Endocrinology, where she was studied because of Nelson's syndrome. She suffered hypertension and Cushing's syndrome (bilateral adrenal hypertrophy) in 1981, and underwent bilateral adrenalectomy and pituitary radiotherapy (1982). She complained of amenorrhoea secondary to pituitary suppression in 1984. The patient started steroids (prednisone, 10 mg daily) after the operation until 1988 when high levels of ACTH were detected. Cutaneous hyperpigmentation was present. A computed tomography (CT) scan in 1989 revealed an empty sella, and a small mass in the left sphenoidal sinus was detected (Figure 1). ACTH and cortisol tešts were carried out (ACTH inhibition by hidraltelsone, prednisone, bromocriptine and valproic acid tests found plasma cortisol levels without rhythm and not suppressible), and Nelson's syndrome was suspected. Magnetic resonance imaging (MRI) performed in 1991 revealed a mass filling the left sphenoid sinus (Figure 2) connected with the sellae. An open rhinoplasty approach was chosen to open the sphenoid, and the tumour was removed. The cavity was filled with gauze soaked in Whitehead varnish for one week. The post-operative period was uneventful, and the patient was discharged after seven days. The surgical specimen consisted mainly of growths of epithelial cells without atypia forming papillae (Figure 3) and the final report was of ectopic pituitary adenoma. Three years later

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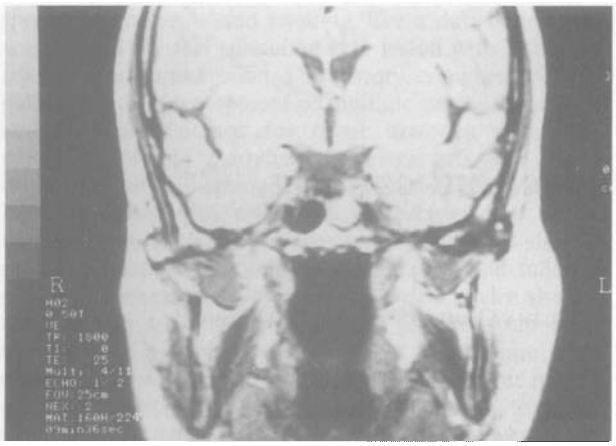

FIG. 2

Pre-operative MRI of the patient, coronal view. A mass can be seen filling the left sphenoid sinus, connected with the sellar region.

there is no evidence of recurrence in the sphenoid, and the patient shows a clinical remission with biochemical improvement of the syndrome. (Figure 4).

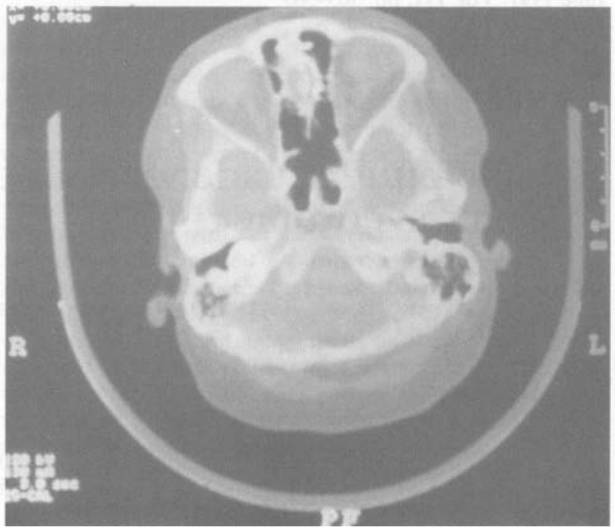

FIG. 4

Post-operative CT scan, axial view. The left sphenoid sinus is empty.

Discussion

Pathological lesions involving the sphenoid sinus are rare (Levine, 1978). Inflammatory disease is the most common cause of isolated sphenoid sinus lesions, manifested by sinusitis or mucocoele formation. Even mucocoeles are a rare occurrence, with 150 cases reported in 1989 (Stankiewicz, 1989) Primary tumours of the sphenoid sinus are less common, and metastatic cancer is only rarely reported (Barrs *et al.*, 1979). Although MRI may be considered the optimal imaging technique for the study of the sellar and parasellar region (Baleriaux *et al.*, 1990), CT studies may help when there is paranasal sinus involvement, as here. CT may help showing bone erosion and detecting focal lesions and could be the procedure of choice (Davis *et al.*, 1987).

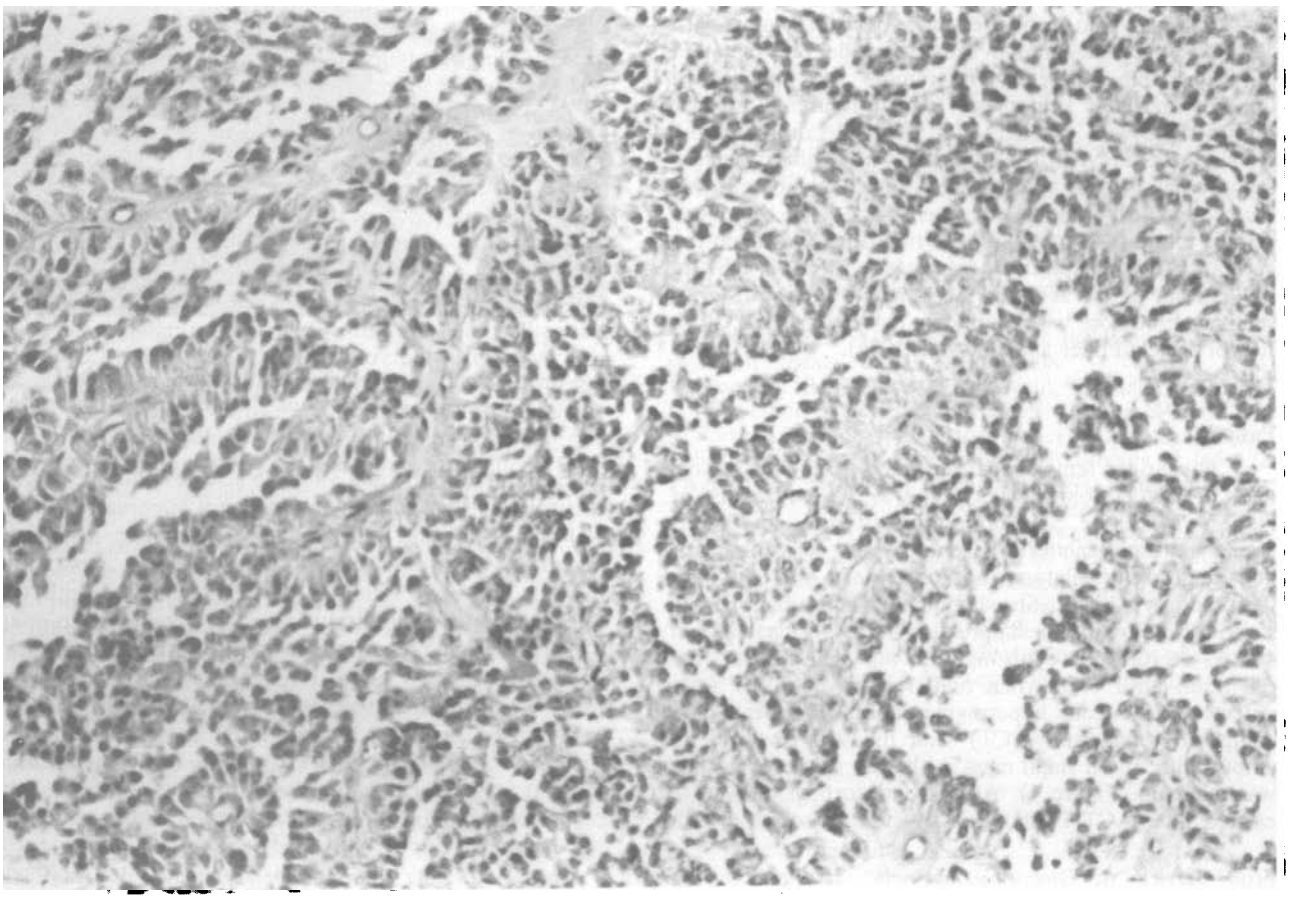

FIG. 3

Surgical specimen. Growths of epithelial cells without atypia forming papillae. Vessels can be seen in the papillary axis. (H & E; × 400)

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To our knowledge, this is the first report of an ectopic functioning pituitary ACTH-secreting adenoma located in the sphenoid sinus. This adenoma could arise from the remnants of the pharyngeal hypophysis, as proposed for craniopharyngioma in 1904 by Erdheim, who observed the pharyngeal hypophysis to be located on the posterior edge of the vomerine bone (Erdheim, 1904). Carmichael in 1931 found remnants of the obliterated craniopharyngeal duct in the immediate region of the pituitary gland in 32.7 per cent of the autopsy cases he studied (Carmichael, 1931). Later McGrath demonstrated the presence of functioning pharyngeal hypophysis in the adult, with a vascular communication from the hypothalamic-pituitary portal system through the sphenoid bone to the vascular bed of the pharyngeal hypophysis (McGrath, 1972, 1974). This could account for an infrasellar location of the tumour, inside the sphenoid bone.

Several approaches for pituitary surgery have been proposed (Kenan, 1979; Petruson and Elversson, 1988; Andrieu-Guitrancourt *et al.*, 1990; Wilson *et al.*, 1990; Jankowski *et al.*, 1992). In 1985, Koltai *et al.* reported an external rhinoplasty approach for transsphenoidal hypophysectomy. Nevertheless, there are similar possibilities when approaching the sphenoid (Stankiewicz, 1989, Sawyer, 1991; Cheung *et al.*, 1992). Intracranial, septoplastic, antral, external sphenoethmoid, extensive intranasal and endoscopic techniques have been described. Acute sphenoidal sinusitis can be approached both trans-nasally and trans-septally (Kibblewhite *et al.*, 1988). We preferred an open rhinoplasty approach because it offered maximal exposure and better control of haemorrhage than might have been possible with an endoscopic approach, the overhanging of the upper lip as happens in sublabial approaches is avoided, and bleeding is absent or minimal through the septum. There are also other advantages, such as avoiding the sublabial incision in the highly vascular gingivolabial sulcus, eliminating contamination of the operative field by oral flora (Koltai *et al.*, 1985), or the use of both hands in association with an operating microscope.

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