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Bone invasion by an esthesioneuroblastoma mimicking fibrous dysplasia☆

Brian Jason Schiro[a,*], Edward Joel Escott[a,1], Jonathan Brad McHugh[b,2], Ricardo Luis Carrau[c,3]

[a] University of Pittsburgh Medical Center, Department of Radiology, 200 Lothrop Street, Pittsburgh, PA 15213, United States
[b] University of Pittsburgh Medical Center, Department of Pathology, 200 Lothrop Street, Pittsburgh, PA 15213, United States
[c] University of Pittsburgh Medical Center, Department of Otolaryngology, 200 Lothrop Street, Pittsburgh, PA 15213, United States

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Abstract

We report the unusual findings of a superior nasal esthesioneuroblastoma extending intracranially with a pattern of invasion of the frontal bone and skull base mimicking the radiographic appearance of fibrous dysplasia. We correlate the CT and MR appearance of the bony changes with the surgical and pathologic findings and review the radiographic appearance of esthesioneuroblastoma and fibrous dysplasia.

Keywords: Esthesioneuroblastoma; Olfactory neuroblastoma; Head and neck cancer; Nasal mass

1. Introduction

Esthesioneuroblastoma (ENB) (also reported as olfactory neuroblastoma) is a rare skull base malignancy that characteristically arises from the olfactory epithelium in the upper nasal cavity. It often erodes through the surrounding bony structures and invades the adjacent parenchyma of the brain. Both the CT and MR imaging characteristics of this malignancy have been reported in the literature [1–5]. Two previous reports describe exuberant hyperostosis of the frontal bone in association with ENB [6,7]. However, we are unaware of previous descriptions of ENB imitating the smooth, expansile, and ground-glass appearance of fibrous dysplasia.

2. Case report

A 56-year-old female presented with progressive nasal obstruction, dull frontal headache and a history of a histologically confirmed ENB diagnosed 7 years prior to our evaluation. This patient, despite multiple recommendations for surgery, initially elected to pursue alternative medical therapy with herbal remedies and vitamin supplements. Clinical examination revealed a reddish, vascular, polypoid mass obstructing 80% of the nasal airway bilaterally.

Magnetic resonance imaging (MRI) (Fig. 1A–C, E, F) at the time of presentation to our institution showed a large mass filling the nasal cavity and infiltrating intracranially into the frontal regions. The anterior frontal bones adjacent to the lesion demonstrated abnormal signal intensity on all pulse sequences. This also involved portions of the bone not in direct contact with the mass. Dural thickening and enhancement as well as enhancing forehead (subgaleal) soft tissue were also noted distant from the lesion. Computed tomography (CT) imaging (Fig. 1D) redemonstrated the mass and an abnormal bony matrix was present extending from the planum sphenoidale, superiorly through the ethmoid bone, and involving the frontal bones anteriorly. The appearance was a ground-glass bony matrix with expansion without hyperostosis. Bony erosions were present in portions of the ethmoid and sphenoid bones where the soft tissue mass was enveloping these structures. There was no erosion or destruction of the frontal bone.

At surgical exploration, the frontal bone was soft, vascular, and infiltrated with tumor. The mass had transgressed the inner and outer tables of the frontal bone and was substantially invading the soft tissues of the scalp, including the pericranium and galea. Given the aggressive local invasion and lack of ability to

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* Corresponding author. Tel.: +1 412 708 4034; fax: +1 412 647 1137.
E-mail addresses: SchiroBJ@upmc.edu (B.J. Schiro), EscottEJ@upmc.edu (E.J. Escott), jonamch@med.umich.edu (J.B. McHugh), CarrauRL@upmc.edu (R.L. Carrau).
[1] Tel.: +1 412 647 3540.
[2] Tel.: +1 734 936 6775.
[3] Tel.: +1 412 647 8075.

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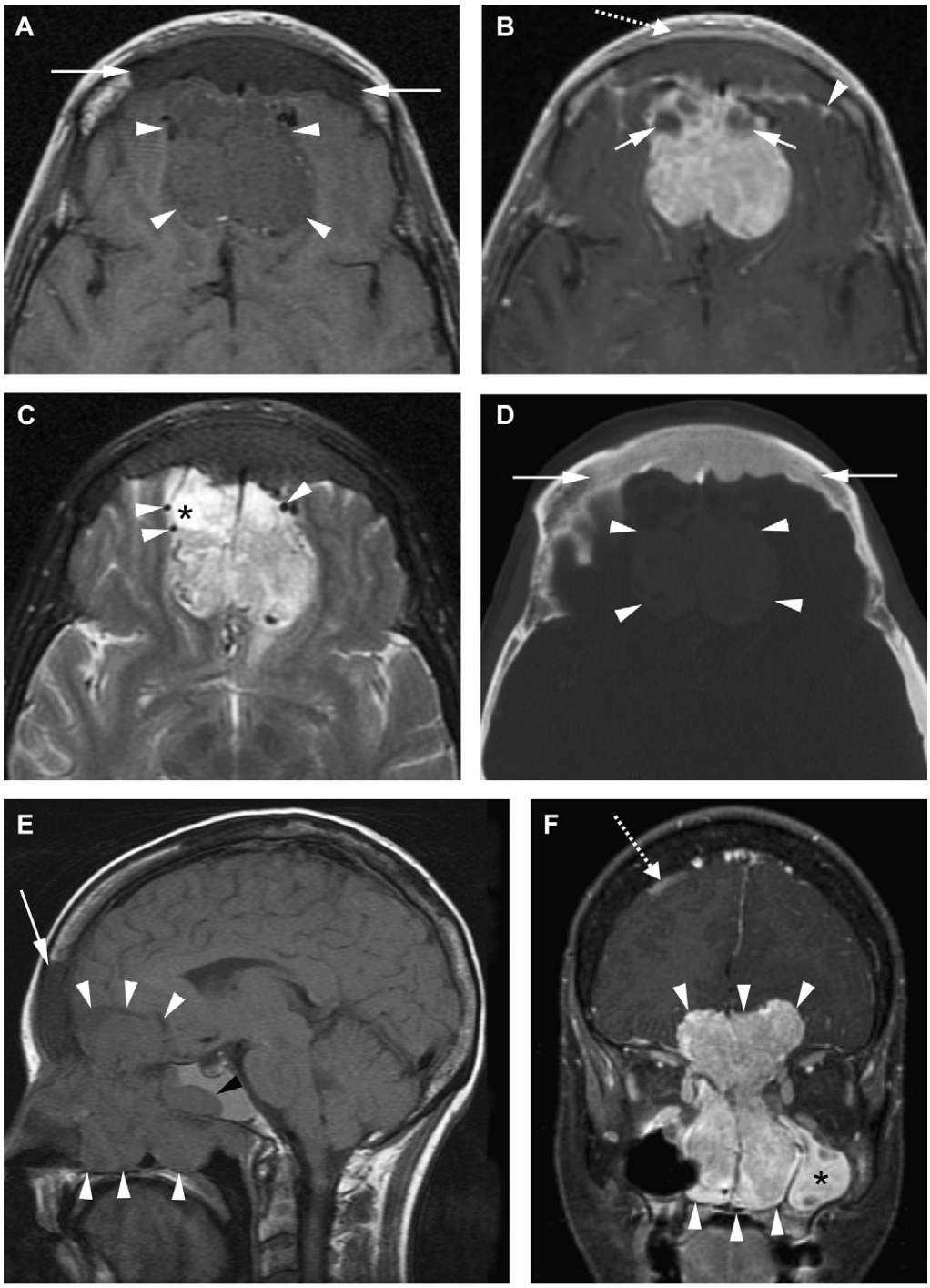

Fig. 1. Axial T1-weighted (A) image of the anterior cranial fossa shows an extra-axial, hypointense-to-white matter mass (arrowheads) partially splaying and invading the anterior frontal lobes. There is also a well-circumscribed hypointense lesion replacing and expanding the marrow cavity of the frontal bone (arrows). Axial post-contrast T1-weighted (B) image demonstrates intense enhancement of the mass with non-enhancing cystic structures anteriorly (solid arrows). There is minimal enhancement of the frontal bone lesion. Also note a thin rim of enhancing tissue in the overlying scalp (dotted arrow) and leptomeninges and dura anteriorly (arrowhead). Axial T2-weighted (C) image shows that the mass is heterogenously hyperintense. Peripheral cystic structures are present anteriorly (asterisk) and flow voids are noted along the periphery (arrowheads). Post-contrast axial CT (D) image through the anterior cranial fossa in bone algorithm shows an enhancing mass (arrowheads) corresponding to that seen on MRI. No calcifications are identified within the lesion. A uniformly dense ground-glass matrix lesion is noted in the frontal bone with smooth bony expansion (arrows). Sagittal T1-weighted (E) image at midline shows the mass within the inferior frontal region extending to the inferior nasal cavity (white arrowheads). The lesion replacing the frontal bone anteriorly (arrow) extends into regions separate from the soft tissue mass. Also note invasion of the sphenoid sinus by the lesion (black arrowhead) with resulting mucous impaction. Coronal post-contrast T1-weighted (F) image shows the extent of the "dumbbell-shaped" enhancing mass (arrowheads) filling the nasal cavity and extending superiorly. The medial wall of the left maxillary sinus is bowed laterally, and enhancing tissue (which is likely post-obstructive) fills the sinus (asterisk). Leptomeningeal or dural metastases are also noted (dotted arrow).