

Image Report

# Coexistent pituitary adenoma and frontal convexity meningioma with frontal sinus invasion: A rare association

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## ABSTRACT

The coexistence of pituitary adenoma (PA) and meningioma in the same patient is rare, after excluding radiotherapy-induced meningiomas. Most of the literature on their coexistence describes meningiomas located in the close vicinity to PA, that is, in the sellar/parasellar region. We describe a case of a 65-year-old lady with a nonfunctioning PA and an associated frontal convexity meningioma with frontal sinus invasion. The imaging was nonspecific for the meningioma, and its association with concomitant PA has not been reported before.

**Keywords:** Convexity, Frontal sinus invasion, Meningioma, Pituitary adenoma

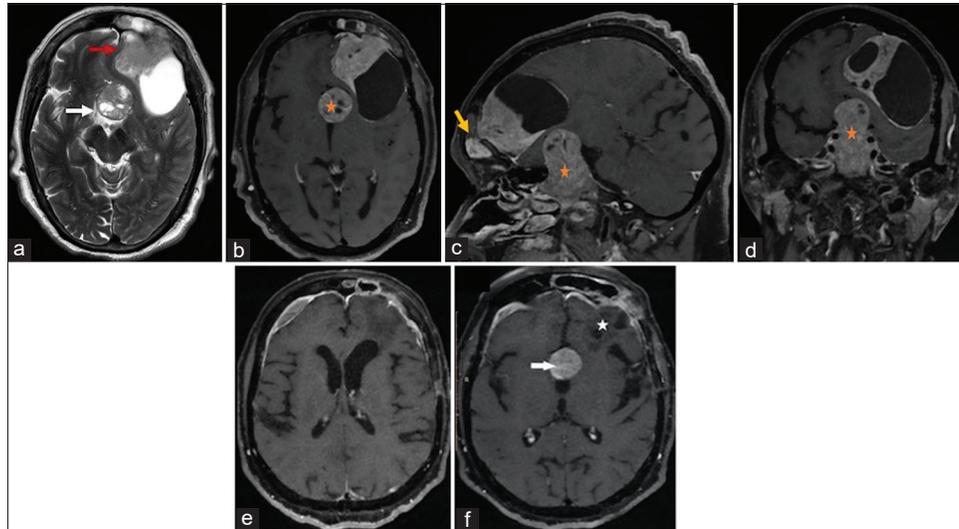
A 65-year-old lady presented with painless progressively decreasing vision both eyes for 2 years and worsening frontal headache for the past 1 year. On examination, she was oriented, cooperative. Her vision was finger counting (FC) at 1 foot in the left eye and FC at 3 feet right eye. Visual field examination was suggestive of bilateral temporal hemianopsia. The fundus examination revealed bilateral early primary optic atrophy. The rest of the examination, including her speech, was normal. Clinical localization was suprasellar mass and the clinical diagnosis of nonfunctioning pituitary adenoma (PA) was made.<sup>[4]</sup>

However, magnetic resonance imaging of the brain surprisingly showed two separate lesions: a well-defined homogeneously enhancing sellar-suprasellar mass lesion consistent with a pituitary macroadenoma and an extra-axial left frontal convexity mass lesion with a cystic component with dural enhancement and no perilesional edema. Interestingly, the frontal convexity mass lesion was invading the frontal sinus [Figure 1a-d]. The differentials of the second lesion were kept as a fungal mass lesion as it encroached into the frontal sinus, meningioma, or dural metastasis. Hormonal workup was within normal limits.

We planned to tackle both the lesions simultaneously using the left frontal craniotomy for frontal convexity lesion and subsequently to use a subfrontal approach for the pituitary macroadenoma.

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**Figure 1:** The axial T2 image (a) shows two discrete heterogeneous extra-axial lesions at suprasellar cistern (white arrow) and left frontal convexity (red arrow). The axial (b), sagittal, (c) and oblique coronal (d) contrast-enhanced T1 scan shows a sellar lesion with suprasellar extension extending till the floor of third ventricle (asterisk) consistent with pituitary macroadenoma. The heterogeneous solid cystic enhancing lesion at the left frontal convexity is dural based, shows extension into the left frontal sinus (yellow arrow). Note that both the lesions are discrete with normal brain parenchyma between them. Postoperative scan (e and f): the postcontrast T1 axial image shows complete resection of the left frontal convexity meningioma (asterisk in Figure f) with postoperative dural thickening at operative site. Persistent enhancing pituitary macroadenoma (white arrow) is seen in the axial (f) image.

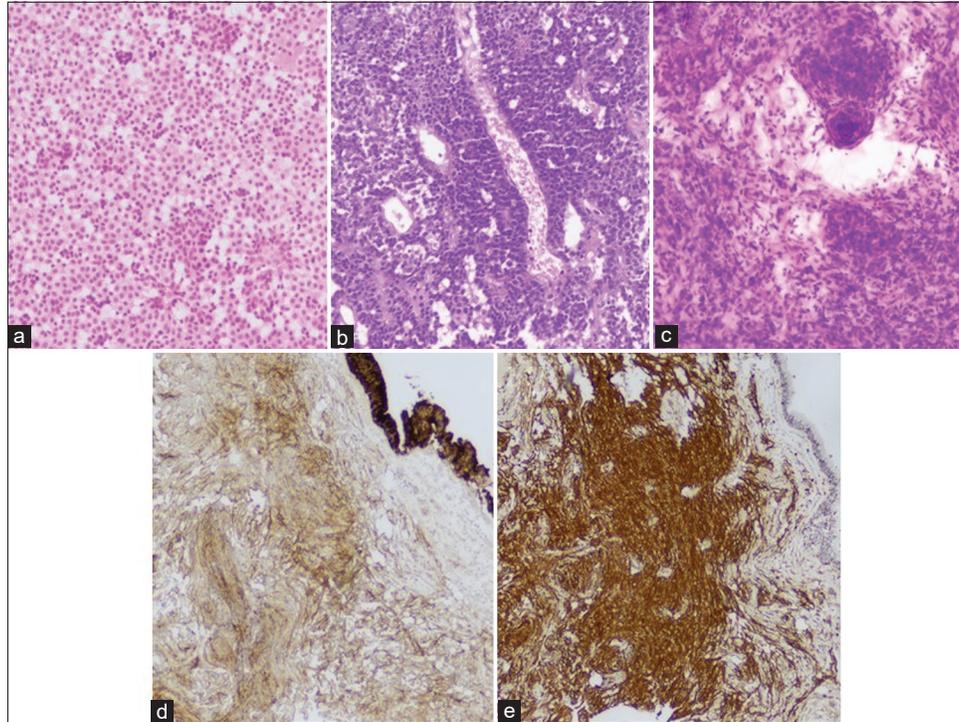
An intraoperative impression of the convexity lesion was that of meningioma; it invaded the frontal sinus with the parenchymal invasion at places. Gross total excision of meningioma done, and frontal sinus was repaired using muscle, bone wax, and exteriorized using the pericranium. Using the subfrontal corridor, the suprasellar part of the PA was decompressed. However, due to significantly high vascularity of PA, an adequate decompression could not be achieved, and a significant residual was left. We planned to tackle the PA through the endoscopic endonasal transsphenoidal approach, but the patient did not give consent for the second surgery. Despite this, the patient had subjective improvement in her vision in the immediate postoperative period. Postoperative imaging showed operative changes in the frontal convexity region and the residual sellar mass lesion [Figure 1e and f]. Histopathological evaluation revealed frontal lobe lesion – metaplastic meningioma and suprasellar tumor – PA [Figure 2]. At 6 months of telephonic follow-up, the patient is doing well, has no headache, and vision has improved to FC 3 feet left eye and 6 feet right eye. She was offered surgery for the residual sellar mass using a transsphenoidal approach, but she refused.

There is a well-known association of meningiomas with neurofibromas and gliomas (neurofibromatosis, NF Type I) and schwannoma (NF Type II).<sup>[1,7,11,10,16]</sup> Coexistent meningioma and PA, like other collision tumors elsewhere,<sup>[12]</sup> in the same patient are a rare occurrence, especially after excluding postradiation therapy meningiomas. There are several reports in the literature documenting the concurrent

PA and meningiomas in the same patient.<sup>[1-3,5,6,8,9,13-15]</sup> However, a thorough review of the literature reveals that in most of the cases described in these reports/series, there is a preponderance of sellar/parasellar meningiomas.<sup>[2,5,8]</sup> There are only a few cases of coexisting PA and meningioma, in which the meningioma was located far away from the adenoma.<sup>[3,6,9,13-15]</sup> Table 1 summarizes these cases. The significance of classifying meningiomas associated with PA into two types based on their location, whether its parasellar or situated away from sella is not known. It might just be a coincidence, or there may be some yet unknown factors leading to the induction of parasellar meningiomas, which are different from the factors leading to the development of meningiomas located far away from the sella. We describe a case of PA and an associated frontal convexity meningioma invading the frontal sinus. To the best of our knowledge, such an association has not been reported in the literature before. The nonspecific imaging findings of convexity meningioma, namely, cystic component, frontal sinus invasion, and heterogeneous enhancement added to the diagnostic dilemma in the preoperative period in our case. Several genetic/hormonal theories have been described in the literature to explain their coexistence, but none has been conclusive to date.<sup>[3,9]</sup>

#### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.



**Figure 2:** (a and b) Hematoxylin and eosin (H&E) staining, ×10, shows sheets of monomorphic cells with round nuclei, salt and pepper chromatin consistent with pituitary adenoma (c). H&E, ×10, whorl, suggestive of meningioma confirmed with immunohistochemistry (IHC) (d). IHC for vimentin, ×4 and (e). IHC for EMA, ×4.

**Table 1:** Literature review of meningiomas situated far away from PA in the same patient.

S. No.	Author/year	Age/sex	Pituitary adenoma	Meningioma location	Meningioma biopsy	Symptoms due to meningioma	Frontal sinus involvement by meningioma
1.	Hyodo <i>et al.</i> /1982 <sup>[14]</sup>	52/F	Acromegaly	Parietal convexity	Fibroblastic and meningothelial pattern	Yes	No
2.	Honegger/1989 <sup>[13]</sup>	37/F	Prolactinoma	Temporal convexity	Meningothelial	No	No
3.	Honegger <i>et al.</i> /1989 <sup>[13]</sup>	74/M	NFPA	Parietal convexity	Not operated	No	No
4.	Mathuriya <i>et al.</i> /2000 <sup>[15]</sup>	58/F	Acromegaly	Parasagittal	Meningothelial	Yes	No
5.	da Costa <i>et al.</i> /2007 <sup>[6]</sup>	45/M	Prolactinoma	Fourth ventricle	Meningioma	Yes	No
6.	Furtado <i>et al.</i> /2010 <sup>[9]</sup>	53/M	NFPA	Parasagittal	Meningothelial	Yes	No
7.	Nsir <i>et al.</i> /2016 <sup>[3]</sup>	61/F	NFPA	Foramen magnum	Meningothelial	Yes	No
8.	Present case/2020	65/F	NFPA	Frontal convexity	Metaplastic	Yes	Yes

NFPA: Nonfunctioning pituitary adenoma. Note: We did not include a convexity meningioma associated with PA reported by Zulch *et al.* (1956, chapter in a German book) as we could not access it. Convexity meningioma described in Abs *et al.*<sup>[11]</sup> was not included as it was postradioactive iodine treatment in the patient

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**Conflicts of interest**

There are no conflicts of interest.

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