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Isolated fourth cranial nerve palsy due to pituitary macroadenoma

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Introduction

Isolated fourth cranial nerve palsy is a rare presentation of a pituitary adenoma. We encountered a male who presented with vertical diplopia on looking downwards as the only presenting symptom of a pituitary adenoma. MRI scan confirmed the diagnosis of a pituitary macroadenoma with parasellar extension compressing the fourth cranial nerve in the right cavernous sinus.

Clinical findings

A 46-year-old male patient presented with complaint of binocular diplopia when he looked down while getting down

stairs, since 3 weeks. There was no diminution of vision, pain, or redness in the eyes. There was no weakness of limbs or any other neurological symptom. On evaluation, general examination was unremarkable. There was no coarsening of facial features, acral enlargement, or cushingoid features. There was no evidence of any pituitary hormone excess or hypopituitarism. Neurological examination revealed a fourth cranial nerve palsy in the right eye (impaired depression of right eye in adduction – superior oblique palsy) (Fig. 1) with preserved adduction (Fig. 2). Pupillary reactions and the fields of vision were normal. There was no papilloedema. Other cranial nerves were normal. There was no other focal neurological deficit. MRI brain was done which showed pituitary adenoma measuring 1.2 cm × 0.6 cm × 0.7 cm, abutting the cavernous sinus on the right side (Fig. 3). Perimetry did not show any visual field defect. Pituitary hormone evaluation

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Fig. 1 – Impaired depression of right eye in adduction suggestive of right superior oblique palsy (fourth cranial nerve).

Fig. 2 – Normal adduction of right eye (medial rectus) suggestive of normal third nerve action.

Fig. 3 – Coronal section of brain showing pituitary macroadenoma with parasellar extension into right cavernous sinus.

was within normal limits. Workup for vasculitic disorders, thyroid profile, blood glucose profile, and lipid profile was within normal limits.

Discussion

The fourth cranial nerve innervates superior oblique muscle, which depresses in adduction and intorts the globe. The nerve exits from the dorsal aspect of the brainstem and traverses in the lateral aspect of cavernous sinus. Lesions of nucleus, roots, or the nerve trunk involve adjacent structures, which gives the clue to localization. Isolated fourth nerve palsy is most likely due to the nerve trunk involvement. Trauma is the most common cause of isolated, unilateral, acquired palsy of the trochlear nerve. Ischemia due to vasculopathy is a common cause, especially in older patients with risk factors like diabetes mellitus, hypertension, and dyslipidemia. Compression due to extrasellar extension of a pituitary adenoma is a rare cause of isolated fourth cranial nerve palsy.¹ Even in cases where vasculopathic cause for cranial

neuropathy is presumed, neuroimaging has demonstrated other demonstrable causes like intracranial tumor, especially in those patients who did not have any risk factors for vasculopathy.²⁻⁴ Our patient had a predominantly intrasellar pituitary adenoma (non-functioning) abutting the right cavernous sinus, likely causing the pressure effect on the fourth cranial nerve leading to the nerve palsy presenting with right superior oblique muscle palsy. Other possible causes of isolated fourth cranial nerve palsy and risk factors for vasculopathy were excluded by clinical examination and relevant investigations. Lack of resolution of the superior oblique palsy over the 8 weeks of observations further suggests that vascular ischemia is less likely. However, the patient refused to undergo surgery for pituitary adenoma and hence definitive evidence of resolution after tumor removal could not be demonstrated in this case.

Conflicts of interest

The authors have none to declare.

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