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Coexistence of Cerebellopontine Angle Tumor and Frontal Convexity Meningioma at Distinct Location – A Rare Case Report and Review of Literature

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Abstract

The perioperative management of brain tumors can be significantly impacted by the presence of another intracranial tumor at a distinct location. We report a rare case of an adult who developed two primary brain tumors, a frontal convexity meningioma and a cerebellopontine angle (CPA) tumor at anatomically disparate locations. In our patient, it was unambiguously decided to address the CPA tumor first as it had led to multiple cranial nerve palsies and obstructive hydrocephalus. The relevant literature helped us better extrapolate the patient presentation and management of this disastrous presentation swiftly.

Keyword: Meningioma; Posterior fossa tumor; Hydrocephalus; Cerebellopontine angle tumor; Glasgow Coma Scale

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Introduction

The simultaneous occurrence of two primary brain tumors at the same anatomical location has been previously documented.[1] It is frequently associated with prior radiotherapy or neurocutaneous disorders but it has been proven to be a sporadic incidence when it comes to primary observation.[2] We report a rare case of an adult who developed two primary brain tumors, a frontal convexity meningioma and a cerebellopontine angle (CPA) tumor at anatomically disparate locations. The surgical indication and management of CPA tumor can be significantly impacted by the presence of another intracranial meningioma tumor at a distinct location. In our patient, it was unambiguously decided to address the CPA tumor first as it had led to multiple cranial nerve palsies and obstructive hydrocephalus. The relevant literature helped us better extrapolate the patient presentation and management of this disastrous presentation swiftly.

Case Report

A 72–year-old women weighing 60 kg, a known case of hypothyroidism, presented with complaints of imbalance while walking and headache for three months. Informed consent was from all the patient's relatives was obtained. Magnetic resonance imaging (MRI) of the head revealed well-defined extra-axial meningioma along the outer convexity of the left frontal lobe and well-defined extra-axial homogeneous signal intensity mass lesion in left CPA cistern resembling acoustic schwannoma (Figure 1a, b, c, d). On examination, the patient had a Glasgow Coma Scale (GCS) of E4V4M6, left facial nerve palsy, bilateral sensorineural hearing loss, cerebellum signs positive with right hemiparesis. The patient was taken up for an emergency ventriculoperitoneal shunt. She was premedicated with injection Fentanyl 70 mcg and injection Xylocard 40 mg intravenously followed by intravenous induction with propofol (sleep dose) and was paralyzed with atracurium 30 mg with 7.5 mm internal diameter endotracheal tube. General anesthesia was maintained with sevoflurane, oxygen, and air mixture. The procedure went smoothly, and the patient's trachea was extubated on the operating table. Following the shunt placement, there was further deterioration in GCS (E2V2M5) on day 5 of surgery. In view of disabling symptoms secondary to the CPA tumor, a definitive surgery of excision of the CPA tumor was planned. Histopathological examination revealed hypercellular (Antoni type A) and (Antoni type B) fascicles with Spindle cells. These spindle cells are arranged in short bundles and are compactly arranged. The cytoplasm of these spindle cells is moderately basophilic, and the nuclei are elongated and wavy, with bland chromatin. There is nuclear palisading. The hypocellular tissue and a few thick hyalinized blood vessels. Finally, histomorphology features that are consistent with schwannoma. There was a remarkable improvement in the sensorium with GCS of E4VTM6 following surgery. The patient later developed

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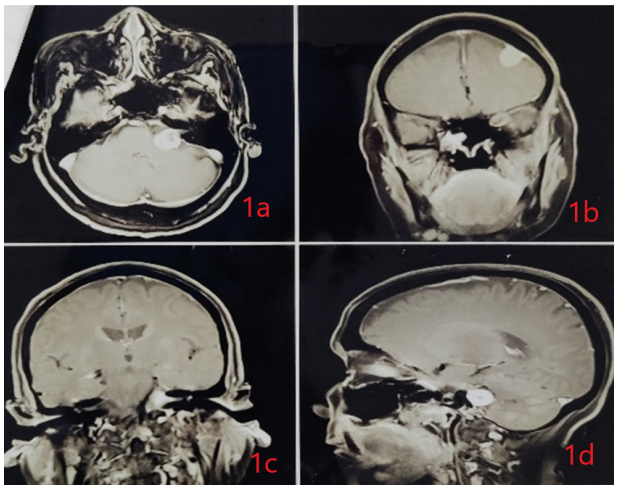

Figure 1. (a) Magnetic resonance axial imaging of the head showing homogeneous signal intensity mass lesion in left cerebellopontine angle cistern likely acoustic schwannoma. (b). Magnetic resonance coronal imaging of the head showing well-defined extra-axial meningioma along the outer convexity of the left frontal lobe. (c). Magnetic resonance coronal imaging of the head showing mass lesion in left cerebellopontine angle cistern likely acoustic schwannoma. (d). Magnetic resonance sagittal imaging of the head showing mass lesion in left cerebellopontine angle cistern

septic shock on day 14 of surgery, secondary to catheter-related blood stream infection with Serratia marcescens, and succumbed to the infection.

Discussion

CPA tumors are the most common neoplasms in the posterior fossa, accounting for 5%-10% of intracranial tumors.[3] Different types of pathological tumors are known to occur at this location, with vestibular schwannoma being the most common.[3] The association of two primary intracranial tumors of different histogenesis at the same fossa location is reported with the incidence of < 0.9%. But the occurrence of two primary brain tumors at two distinct locations have not been reported in literature till date. Our patient had no family history and no clinical or radiological signs of neurofibromatosis-2. Elevated intracranial pressure (ICP) and hydrocephalus are common in these patients. External ventricular drainage or other shunt procedures may be indicated to manage hydrocephalus before surgery.

Meningioma, being an extra-axial tumor, can occur at any age. Most meningiomas are predominantly benign, well defined and develop slowly with 15% of meningiomas located in the convexity.[4] The clinical presentation generally depends on the intricate anatomical location. The main concern is to protect nerve tissue from injury, control ICP and brain volume, and ischemia by implementing brain protection techniques, and reduce bleeding during the surgery.

Meningioma symptoms are related to local mass effect leading to hydrocephalus or generalized rise in ICP. Hence, the main surgical concern would be brain exposure without retraction or mobilization damage and the main anesthetic concern would be avoidance of secondary brain damage. As CPA tumor was the cause of concern rather than the supratentorial tumor the surgeon preferred to operate CPA first. But operating on the CPA tumor may create a sense of perturbation of chance of hemorrhage in the supratentorial tumor leading to herniation mimicking the sign of brain stem compromise. Sitting positing for CPA does not affect the local hemodynamics of the supratentorial tumor, however preoperative cerebral autoregulation was found to be impaired in a significant number of patients with large supratentorial tumors and midline shift more than 5 mm. In addition, it was associated with postoperative impaired cerebral autoregulation during the first 24 hours.[5] So, even in case of uneventful CPA tumor surgery, it is recommended to consider the supratentorial tumor as large inoperable tumor with impaired autoregulation in the patient. There is an impending risk of abnormal neck positioning and venous obstruction during positioning for CPA tumor surgery that may raise ICP and increase supratentorial oedema. Arterial pressure to be zeroed at the foramen of Monro as both tumors are almost of same level in sitting position. The patient may throw seizure from supratentorial tumor bleed if evoked potential is stimulated in unparalyzed CPA tumor surgery intraoperatively.[6] Succinylcholine may be avoided for intubation as it may result in increased cerebral afferent input and catastrophic rise in ICP secondary to increase in muscle spindle activity. This may invoke edema in the supratentorial region while we are not aware as craniotomy is done in posterior fossa, leading to difficult weaning and poor postoperative outcome. Hence ICP monitoring or other monitoring systems to detect cerebral insult at cortex such as Near-infrared spectroscopy becomes genuinely necessary. Tracheal extubation sometimes leads to a 60%-80% increase in cerebral blood flow from preinduction baseline values that may contribute to postoperative cerebral edema or even hemorrhage in the nonoperating tumor.

The coincidental occurrence of CPA tumor and frontal convexity meningioma is extremely rare. The decision on definitive surgery for a patient with two primary brain tumors will be based on the disability, symptoms, and the complications caused by the tumor. The best anesthetic approach for definitive surgery can be determined with careful consideration of relevant parameters on admission, including a detailed history, presenting findings, and the clinical evaluation in the follow-up period. Conservative emergent management should precede a definitive surgical intervention to achieve an optimal preoperative status. Maintenance of cerebral perfusion pressure, avoidance of a rise in ICP, maintenance of hemodynamic stability, and early recognition of complications from the non-operating tumor will be the primary goals for intraoperative management.

Competing Interests
Nil.

Ethical Approval
Informed consent was obtained from the author for publication of this report.

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