CASE REPORT

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Lipoma of the Quadrigeminal Cistern as a Rare Cause of Vertigo: Case Report with Literature Review

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ABSTRACT

Intracranial lipomas are very rare mesenchymal tumors, constituting 0.1% of all cases. These tumors may be located in the quadrigeminal cistern. Most quadrigeminal lipomas do not cause any clinical symptoms and are found incidentally. If the lesion is large enough, it can cause headaches, seizures, and diplopia. We present a 56-year-old male patient who presented with the complaint of vertigo for five years and was diagnosed with quadrigeminal plaque lipoma, accompanied by magnetic resonance imaging findings and literature review. According to our knowledge, this is the first case in the literature in which a quadrigeminal cistern lipoma caused vertigo.

Keywords: Lipoma, intracranial lipoma, quadrigeminal cistern, quadrigeminal plate, quadrigeminal lipoma, vertigo

INTRODUCTION

Lipoma is a common benign mesenchymal-induced tumor with variable distribution. Intracranial lipomas (ILs) are rare and account for 0.1% of all primary brain tumors [1,2]. They are usually diagnosed incidentally [3]. IL is located in the midline regions such as the corpus callosum and quadrigeminal plate [4]. Computed tomography (CT) and magnetic resonance imaging (MRI) are usually sufficient for diagnosing lipomas. Quadrigeminal lipomas (QL) generally present as asymptomatic. However, they can cause neurologic symptoms if they are large enough to cause a mass effect [5]. Symptomatic treatment and follow-up are the main management of these cases. Surgical removal of QL carries risks of postoperative complications and morbidity due to adjacent brainstem structures. Therefore, if the patient is asymptomatic, follow-up is recommended. We report a case of a 56-year-old male who presented with vertigo caused by quadrigeminal plate lipoma.

CASE PRESENTATION

A 56-year-old white male was admitted to the otolaryngology department with vertigo as his main complaint for the past five years. He also described experiencing multiple episodes of nausea and visual disturbances during this period. The patient had a long history of seizures, treated by a neurologist. No other comorbidity was described. Family history was not remarkable. On physical examination, left-side hypesthesia was detected, but he had a normal gait and cerebellar and vestibular test results. Other findings were unremarkable. Routine laboratory tests were within the reference range. Blood tests were within the normal 60 ranges. In the MRI report, an approximately 4x3.3 10 mm lesion with a hyperintense signal on T1 and T2-weighted images was observed on the quadrigeminal cistern adjacent to the tectum (Figure 1A-E). Due to susceptibility artifacts, the lesion was hypointense on fat-saturated T1 and magnetic susceptibility weighted imaging sequences without post-contrast enhancement compatible with lipoma. No malformations or hydrocephalus were detected. The patient's condition was consulted with the neurosurgeons. Neurosurgery and neurology consultations resulted in symptomatic medical treatment and non-surgical follow-up. Betahistine 24 mg three times daily was planned and there was a slight improvement in the patient's vertigo complaint at 24-month follow-up.

DISCUSSION

ILs are very rare tumors whose development is poorly understood, with an incidence of about 0.1-0.5% of all brain tumors [2,4,6,7]. They are usually located in the midsagittal

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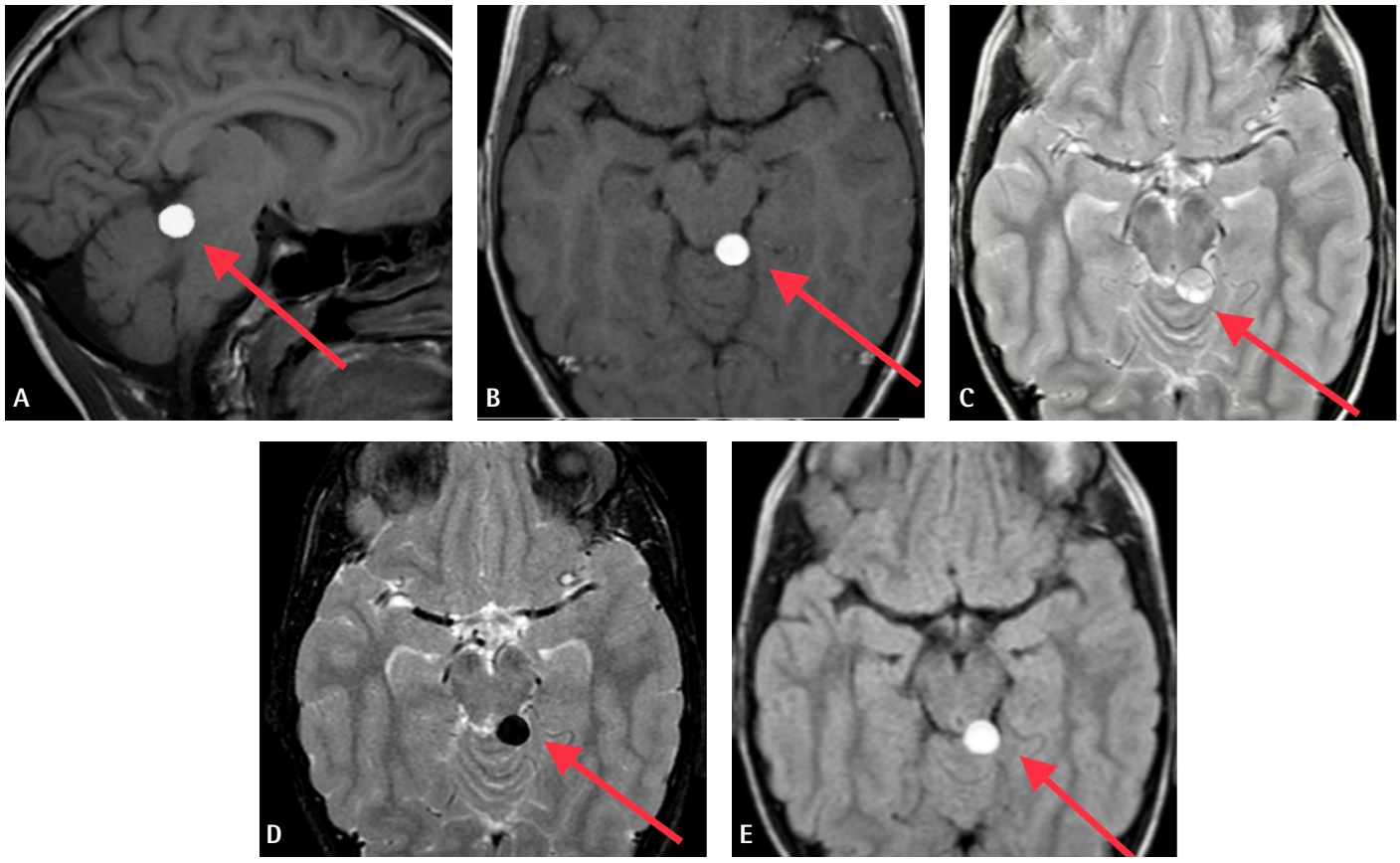

Figure 1. MRI images of the lipoma of the quadrigeminal cistern (the lesson is shown with a red arrow). (A) Sagittal T1, (B) axial T1, (C) axial T2, (D) axial T2-fat sat, (E) axial T2 FLAIR

MRI: Magnetic resonance imaging, FLAIR: Fluid-attenuated inversion recovery

region, mostly in the corpus callosum, quadrigeminal cistern, suprasellar cistern, cerebellopontine angle cistern, intercerebellar fissure, and Sylvian cistern regions [6-10].

The locations where lipomas frequently occur appear to correspond to a temporal sequence in which the primitive meninx, the embryonic tissue from which the meninges develop, dissolves during fetal development. This supports the idea that ILs form due to the meninx's abnormal persistence and differentiation. This developmental explanation for the formation of ILs also accounts for the frequent occurrence of brain hypoplasias [7]. CT and MRI can be used to diagnose IL, but MRI is an excellent imaging modality to accurately characterize these lesions and possible associated anomalies that can be considered more valuable than CT. The diagnosis is usually made based on imaging findings and doesnot require histological confirmation [2,4]. QL usually shows hyperintense on T1-weighted and mixed intensity on T2-weighted MRI [11,12]. Our case imaging findings are characteristic of a fat-containing lesion located in the quadrigeminal cistern. CT demonstrates a non-enhancing fat attenuating (HU: -50 to -100) mass in the quadrigeminal cistern without any peripheral calcification. MRI reveals high signal intensity signal characteristics of fat in T1 and T2, no enhancement in T1 C+ (Gd), and low signal intensity fat-saturated sequences.

They are mostly asymptomatic, self-limited, slowly growing lesions, diagnosed incidentally, and require no therapy. However, they may sometimes present with headaches, seizures, dementia, tinnitus, diplopia, visual hallucinations, trochlear nerve palsy, or dropping of the eyelid that needs conservative or surgical treatment [11,13-18]. Symptomatic treatment with periodic follow-up is the main management of these cases. Surgical tumor excision is considered if the lesion causes several clinical symptoms.

Studies have reported that ILs, especially corpus callosum-located lipomas, are associated with central nervous system anomalies [2,4,19,20]. QLs are usually self-limited tumors, unlike this [11]. The mean age was 36-43 years [3,11,12,14,19]. Our patient was a 56-year-old male, older than reported in the literature. Most of the QLs were tubulolobular shapes [14]. In this study, the lesion was of the same shape. There is no significant difference between males and females regarding the incidence of IL [12,14,19].

The differential diagnosis of QL includes tectal plate cysts, arachnoid cysts, epidermoid cysts, gliomas, and pineal gland tumors within the differential diagnosis [21,22-24]. Subacute hemorrhage may show similar T1-weighted (W) MRI patterns. T2-W images and hypointense appearance in T1-W images with fat saturation are helpful in the differential diagnosis (4). QL may mimic intracranial air on CT; MRI is helpful in that situation [22].

Total excision of the lesion is the treatment option in symptomatic patients [5,25]. Ventriculoperitoneal shunt placement is an alternative in cases with hydrocephalus [24]. Surgical excision of tumors has risks for postoperative complications and morbidity because of proximity to the critical neural structures in the midbrain. Cerebellar ataxia, 6th cranial nerve paresis, and diplopia were reported as postoperative complications [23]. The infratentorial supracerebellar approach is preferred as the surgical approach to minimize the risk of complications [5,23,26].

Moreover, surgical tumor excision is considered only if the lesion causes several clinical symptoms. In the case of a patient with an asymptomatic QL, symptomatic treatment with periodic follow-up is the main management approaches. Alternative treatment options for symptomatic QL include ventriculoperitoneal shunt placement in cases with hydrocephalus. However, this option only relieves hydrocephalus symptoms, not the tumor itself. Additionally, it is important to note that conservative management is the best approach for asymptomatic lipomas. Diagnosing and managing them accurately is essential to prevent misdiagnosis and unnecessary procedures [27-29].

Our case presentation has some limitations that should be considered. First, we have no long-term patient outcomes. As it is an infrequent cause of vertigo, there is a lack of discussion on the possible causes or mechanisms of quadrigeminal cistern lipoma formation and their relation to vertigo. Despite these limitations, the case report provides valuable information on the rare condition and can serve as a starting point for future studies

Clinicians must know the characteristics of a quadrigeminal cistern lipoma to prevent misdiagnosis and unnecessary procedures. Based on current literature, this is the first reported case of a QL causing vertigo. We hope that this case report will make a significant contribution to the scientific community and increase awareness among clinicians in outpatient clinics.

Ethics

Informed Consent: The patient consented to the publication of this case report.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: A.A., Concept: Z.K., A.A., S.M., Design: Z.K., A.A., S.M., Data Collection or Processing: Z.K., A.A., S.M., Analysis or Interpretation: Z.K., A.A., S.M., Literature Search: Z.K., A.A., S.M., Writing: Z.K., A.A., S.M.

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