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Trigeminal neuralgia and posterior fossa meningioma: case report and review of literature

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Abstract

Trigeminal neuralgia may be idiopathic or may involve other causes. It can be secondary to posterior fossa tumors many times. In the present case, posterior fossa meningioma was detected with trigeminal neuralgia together. However, relevant meningioma is not seen as a cause of trigeminal neuralgia clinic with posterior fossa settlement. Tumor localization and the story of the patient suggest that the two diseases are completely separate processes. Meningioma was completely incidentally visualized during magnetic resonance imaging. In our article, we present this coexistency. We also performed a brief review of the literature investigating the relationship between trigeminal neuralgia and intracranial lesions during this case report.

Keywords: Trigeminal neuralgia, Posterior fossa meningioma, Microvascular decompression

Background

Trigeminal neuralgia (TN) has been defined by the International Association for the Study of Pain as "sudden, severe, brief, stabbing and recurrent pain in the distribution of the trigeminal nerve" [24]. In this case, it is usually not associated with any focal deficit. Or, if the TN is due to a structural cause (e.g., multiple sclerosis or petrous meningioma), then focal deficits are more common. Overall, the incidence of TN is around 4–5 per 100,000 per year [11, 18, 19].

Pathophysiology of TN is not fully known. This disease is usually idiopathic but may also be due to a structural lesion. TN has various management options related to the patient's age, symptomatology, radiological findings, and general health status. These options include medical management, percutaneous ablative procedures, microvascular decompression surgery, and radiosurgery [1]. The most prominent of trigeminal neuralgia formation theories is the vascular pressure in the root entry zone. Patients who do not respond to medical treatment microvascular decompression surgery can be performed [4, 15–17, 30, 32, 33].

Meningiomas are usually benign, slow-growing tumors. The origin of meningiomas is considered to be arachnoid cap cells that are associated with arachnoid villi at the dural venous sinuses and their tributaries [2, 6]. They are the most frequently diagnosed primary brain tumor accounting for 33.8% of all primary brain and central nervous system tumors reported in the USA between 2002 and 2006 [34]. Most symptom-free meningiomas (approximately 60%) are stable in imaging. If progression occurs, it grows about 2–4 mm per year [9, 25, 28].

In this article, we will talk about microvascular decompression surgery due to TN, as well as posterior fossa meningioma excision.

Main text

A 54-year-old male patient admitted to polyclinic with severe facial pain. The pain spreading to the right upper jaw and right lower jaw was exacerbated by eating, drinking, and facial washing. The pain of the patient who had been taking care in the neurology clinic for 3 years was directed to the neurosurgical clinic so as not to respond to the drugs anymore and to detect the lesion covering the incidental intracranial space. The patient's examination revealed severe pain in the right

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trigeminal nerve that fits the ophthalmic and maxillary branch and was triggered by mild stimulation.

The cranial magnetic resonance imaging of the patient revealed trigeminal nerve compressed by a vascular structure (Fig. 1) and in addition to this a 1-cm diameter contrast-enhancing tumor (Fig. 2). Surgery was planned for the patient who was diagnosed as TN due to vascular compression and incidentally detected tumor.

The patient was taken to the operating table in the lateral decubitus position. With the left retrosigmoid approach, the tumor was totally excised (Fig. 3). Then, the trigeminal nerve was exposed. The vascular structure causing pressure was separated, and a Teflon pad was placed in between. Postoperative complication was not observed in the patient. There was total resection of the contrast-enhanced cranial MR taken early postoperatively. After a normal postoperative period, the patient was discharged on the fifth day. Histopathological evaluation revealed transitional type meningioma, WHO grade 1. It was observed that the pain due to trigeminal neuralgia was completely passed.

TN can be secondary to intracranial tumors or other space-occupying lesions. When we review the literature, it is seen that especially posterior fossa and pontocerebellar angle tumors and lesions may cause TN (Table 1) In the literature review, intracranial lesions associated with trigeminal neuralgia include meningioma, trigeminal nerve schwannoma, facial nerve schwannoma, vestibular schwannoma, cerebellopontine angle epidermoid cyst, cerebellopontine angle lipoma, venous angioma, squamous cell carcinoma, adenoid cystic carcinoma, nasopharynx carcinoma, adenocarcinoma, acinic cell carcinoma, Hurthle cell carcinoma, ameloblastoma, B cell lymphoma, hairy cell leukemia, osteochondroma, osteoid osteoma,

Fig. 2 Posterior fossa MR imaging: more caudal sections show contrast-enhanced lesion attached to the dura

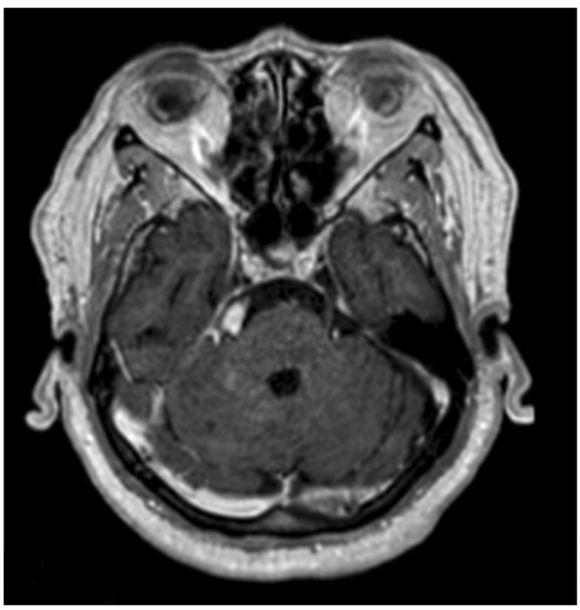

Fig. 1 Posterior fossa MR imaging of the right trigeminal neuralgia patient. The lesion on the right side of the V. nerve (possibly vascular structure) is visible. This structure during surgery has been found to be compatible with the superior cerebellar artery

Fig. 3 Photo of tumor after resection

Table 1 Trigeminal neuralgia and concomitant intracranial lesions reported in the literature

Author	Pathology
Balasundram S et al. 2012 [3]	Cerebello pontine angle epidermoid cyst, trigeminal nerve schwannoma, Ameloblastoma, vestibular schwannoma, B cell lymphoma, hairy cell leukemia, osteochondroma
Bekar A et al. 2004 [5]	Pontine abscess
Celik SE et al. 2000 [7]	Cerebellopontine angle lipoma
Egemen E et al. 2017 [8]	Cerebellopontine angle lipoma (children)
Guo H et. 2018 [10]	Osteoid osteoma
Ishi Y et al. 2015 [13]	Meningioma
Marinelli JP et al. 2018 [22]	Facial nerve schwannoma
Niwant P et al. 2015 [26]	Meningioma
Phan J et al. 2018 [27]	Squamous cell carcinoma, adenoid cystic carcinoma, nasopharynx carcinoma, adenocarcinoma Acinic cell carcinoma, Hurthle cell carcinoma
Samadian M et al. 2015 [29]	Venous angioma
Shulev Y et al. 2011 [31]	Cerebellopontine angle lipoma, meningioma, Vestibular schwannoma, Cerebellopontine angle epidermoid cyst

and pontine abscess [3, 5, 7, 8, 10, 13, 22, 26, 27, 29, 31]. According to the study of Afridi et al. the proportion of pontocerebellar angle tumors presented by TN is 10.4% [20]. Besides, in the series of 35 patients of Liu et al., the number of TN cases associated with meningioma was 16 (45.71%) [21].

Hasegawa et al. classified CPA tumor-associated mechanisms into four types: type A, the nerve is totally encased by the tumor; type B, the nerve axis is distorted by the tumor; type C, the nerve is shifted by the tumor and contralaterally compressed by the artery, and type D, the nerve is compressed by the tumor-displaced artery [12]. Furthermore, a large and distant tumor can rarely cause contralateral TN remotely as a result of a distorted brainstem [13, 23]. In addition to these mechanical factors, chemical irritation of the nerve has also been proposed as a possible pathogenesis of TN associated with dermoid or epidermoid tumors [14]. In our case, the size, localization, and histopathological features of meningioma do not appear to be capable of creating a trigeminal neuralgia clinic. Moreover, vascular compression to V. nerve to explain the findings of TN has been shown both radiologically and perioperatively. In light of these data, we think that there is no etiological connection between the posterior fossa meningioma and trigeminal neuralgia we presented.

Conclusion

As a final assessment, in this case, we resulted that TN findings were not secondary to meningioma. They seemed to be completely independent processes. We presented these two completely independent diseases that exist together in single patient.

Abbreviation

TN: Trigeminal neuralgia

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Availability of data and materials

The manuscript has no associated data or the data will not be deposited.

Authors' contributions

YO, MA, and AET edited the available data and prepared a draft text. HBG transformed the draft text into an article. EE participated in this process as a supervisor. All authors read and approved the final manuscript.

Ethics approval and consent to participate

I confirm that ethical approval was not required for reporting this case and reviewing literature.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Competing interests

The authors declare that they have no competing interests.

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