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Resolution of Trigeminal Neuralgia Following Ventriculoperitoneal Shunt

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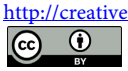

Abstract

Trigeminal neuralgia is a neurological disorder marked by severe, stabbing pain in the face, often resulting from vascular or tumor-related compression of the trigeminal nerve. In rare instances, it can be linked to hydrocephalus. We present the case of a 42-year-old woman with both trigeminal neuralgia and hydrocephalus. MRI scans did not show any neurovascular compression at the trigeminal root entry zone. After treating the hydrocephalus, the patient's trigeminal neuralgia symptoms were effectively managed. We suggest that the trigeminal neuralgia, in this case, may have been caused by traction on the trigeminal nerve due to the hydrocephalus.

Subject Areas

Surgery & Surgical Specialties

Keywords

Trigeminal Neuralgia, Hydrocephalus, Obstruction of Aqueduct of Sylvius, Ventriculoperitoneal Shunt

1. Introduction

Trigeminal neuralgia (TN) is a chronic pain disorder characterized by sudden, intense, electric shock-like pain episodes affecting the fifth cranial (trigeminal) nerve, which innervates the forehead, cheek, and lower jaw. TN is typically unilateral and may involve one or more branches of the trigeminal nerve [1]. The condition, often referred to as "tic douloureux," was first described by French physician Nicolaus Andre in 1756 due to the facial spasms that can accompany

the painful episodes, while TN is commonly caused by vascular compression of the nerve, it can also be associated with conditions such as multiple sclerosis or tumors.

Although rare, trigeminal neuralgia (TN) has been reported in association with hydrocephalus, relieved after the placement of a ventriculoperitoneal shunt or ventriculocisternostomy.

This paper presents the case of a patient who developed TN with an insidious onset, which was ultimately diagnosed as hydrocephalus. Her symptoms were completely relieved following the placement of a ventriculoperitoneal shunt, shedding new light on this rare but potentially significant association.

2. Patient and Observation

A 42-year-old female was diagnosed with left-sided trigeminal neuralgia (TGN) affecting the V2/V3 branches. She presented with a 3-month history of severe, intermittent facial pain on the left side, described as an electrical shock, potentially causing significant discomfort in daily activities such as speaking, eating, and facial expression. Neurological examination revealed preserved touch, pinprick, and temperature sensation. The patient had been treated with Carbamazepine, Pregabalin, and Gabapentin, but these medications provided inadequate relief, and the pain significantly impacted her daily activities. Surgical management options, including exploration of the right cerebellopontine angle, were considered.

MRI did not show significant vascular compression of the left trigeminal nerve, but it did reveal hydrocephalus secondary to an obstruction of the aqueduct of Sylvius, with marked dilation of the third and lateral ventricles.

Although the hydrocephalus was clinically asymptomatic, the patient underwent ventriculoperitoneal shunt placement as the first step in treatment for the hydrocephalus. Following the procedure, her neuralgic symptoms gradually improved, and she became pain-free without the need for medication within six months. (See Figure 1)

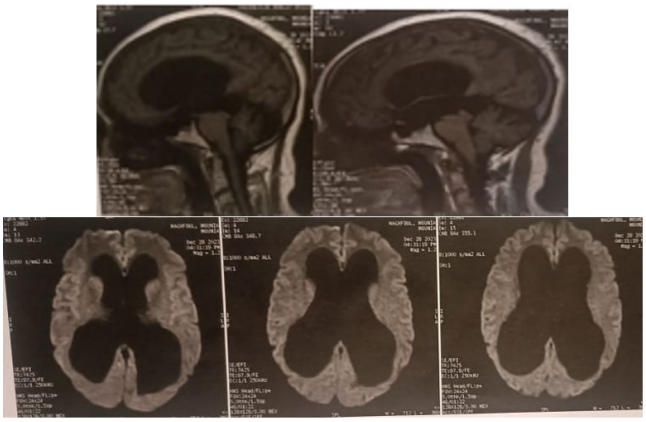

Figure 1. MRI revealed hydrocephalus secondary to obstruction of aqueduct of Sylvius, with marked dilation of the third and lateral ventricles.

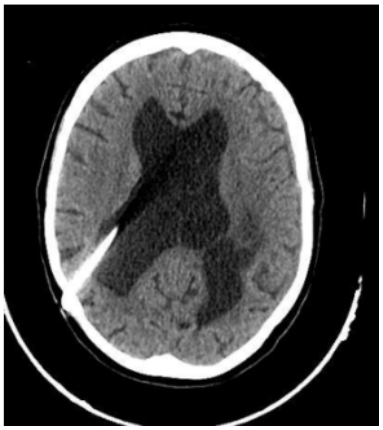

Figure 2. Postoperative brain CT scan showing a regression of the hydrocephalus, with the shunt in place.

However, eight months later, the patient presented to the emergency department with left-sided hemiparesis. A CT scan showed a chronic subdural hematoma, likely due to overdrainage of the shunt. (See **Figure 2**)

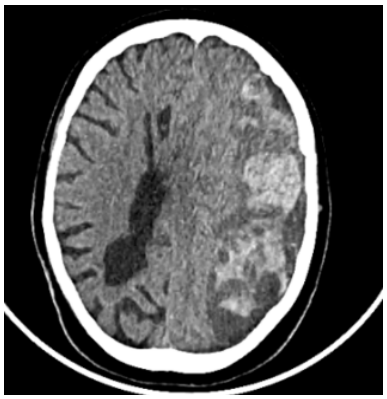

Figure 3. CT scan showing a left chronic subdural hematoma.

She underwent evacuation of the subdural hematoma and an adjustment to the pressure setting of the shunt valve. The patient recovered well postoperatively. (See **Figure 3**)

3. Discussion

The association between trigeminal neuralgia (TGN) and hydrocephalus is rare, with only a limited number of cases reported in the literature. Maurice-Williams and Pilling [2] described three cases where hydrocephalus was linked to paroxysmal facial pain and numbness. In these cases, relief of hydrocephalus through a CSF shunt resulted in the remission of the facial pain. The authors proposed that the paroxysmal pain was caused by stretching of the trigeminal sensory root due to the displacement of the brainstem secondary to hydrocephalus. They further suggested that this stretching might lead to a short-circuiting of electrical impulses between fibers of similar size in the stretched sensory root, which could contribute

to the development of trigeminal pain. Additionally, they postulated that high petrous ridges might exacerbate the stretching effect on the trigeminal nerve [2].

In another case, Findler and Feinsod [3] reported a patient with right-sided facial pain and hydrocephalus resulting from aqueductal stenosis. Following the insertion of a VP shunt, the symptoms resolved. However, when the shunt malfunctioned, the symptoms recurred, and relief was achieved again following shunt revision. Similarly, Tucker *et al.* [4] presented two patients with unilateral TGN associated with aqueductal stenosis-induced hydrocephalus. Both patients experienced relief of TGN after CSF diversion, with recurrence occurring when the shunt failed. The authors proposed that the shift of the brainstem caused by hydrocephalus might exert traction on the trigeminal nerve root, thereby triggering unilateral TGN [4].

However, the rare occurrence of trigeminal pain in hydrocephalus patients casts some doubt on the stretching theory, especially as it does not explain the unilateral nature of the pain.

Yuuki *et al.* [5] and colleagues suggested that the link between hydrocephalus and neuralgic symptoms is not coincidental. They proposed that hydrocephalus alters the dynamics of cerebrospinal fluid (CSF) within the basal cisterns, causing traction on the pre-pontine segment of the trigeminal nerve, which is anchored at the porus trigeminus. The treatment of hydrocephalus with a CSF shunt may modify the pressure gradient along the neuraxis, potentially reversing any micro-shifts in neural structures and alleviating symptoms [5].

4. Conclusion

The combination of trigeminal neuralgia and hydrocephalus due to aqueductal stenosis is a rare but important condition to consider in the differential diagnosis of lancinating facial pain. Relief of hydrocephalus through a VP shunt can lead to complete or substantial improvement of symptoms, suggesting that traction on the trigeminal nerve caused by hydrocephalus may be the underlying cause of the neurological symptoms.

Acknowledgements

Avoid the stilted expression, “One of us (R. B. G.) thanks...” Instead, try “R. B. G. thanks”. Do NOT put sponsor acknowledgements in the unnumbered footnote on the first page, but here.

Conflicts of Interest

The authors declare no conflicts of interest.

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