Congenital Epidermoid Cyst Presenting as Isolated Painful Trigeminal Neuropathy: Indications for Neuroimaging in the Diagnostic Process

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This article reports a case of a cerebellopontine angle epidermoid cyst presenting as isolated painful trigeminal neuropathy. The indolent nature of these uncommon benign tumors leads to frequent delays in their presentation and diagnosis, with patients often initially undergoing dental procedures. This is illustrated in the present case reported here, which highlights the difficulties in identifying trigeminal neuralgia (TN), particularly in its early phases, and supports current recommendations for routine neuroimaging in suspected cases of painful trigeminal neuropathy, which, unlike classic TN, is caused by a disorder other than neurovascular compression (even in the absence of additional neurologic symptoms or signs) and is present particularly in younger patients with atypical features. Additionally, this case report offers a unique patient perspective of living with TN, with a detailed description by one of the authors of the nature of the pain and its impact. *J Oral Facial Pain Headache 2017;31:e10–e14. doi: 10.11607/ofph.1949*

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Trigeminal neuralgia (TN) is the archetypal craniofacial pain syndrome characterized by episodes of intense pain along the distribution of one or more branches of the trigeminal nerve, usually affecting its second or third divisions. It is a relatively rare disorder, with a prevalence of 3 in 1,000 to 10,000 individuals and a predilection in women.[1] Most patients are diagnosed between 37 and 67 years of age.[1] The International Classification of Headache Disorders (ICHD) defines classic TN by more specific diagnostic criteria, including *(a)* severe paroxysms of unilateral, electric shock–like, stabbing, or sharp pain lasting up to 2 minutes; *(b)* absence of radiation beyond the trigeminal distribution; *(c)* precipitation by innocuous stimuli (eg, talking, washing the face, shaving, tooth brushing) to the affected side of the face; *(d)* absence of any neurologic deficit; and *(e)* at least three episodes fulfilling criteria *(a)* and *(b)*.[2] In addition, a subform of classic TN includes persistent facial pain of a less severe intensity in the affected area.[2]

The classic form of TN is often considered to be caused by vascular compression of the trigeminal nerve root, usually by the superior cerebellar artery, leading to local demyelination.[1,3,4] Treatment includes medical management using neuropathic pain medications (eg, gabapentin), anti-epileptics (eg, carbamazepine, oxcarbazepine, lamotrigine), surgery (microvascular decompression, percutaneous nerve ablation), or stereotactic radiosurgery, all with varying degrees of success.[4,5] When TN is caused by a factor other than neurovascular compression, such as demyelination (eg, multiple sclerosis) or cerebellopontine angle (CPA) mass lesions, this is termed painful trigeminal neuropathy.[2] This presentation can account for up to 15% of TN cases,[6] and a routine magnetic resonance imaging (MRI) exam is now recommended to exclude these factors as part of the diagnostic process.[2,3] Besides symptoms not fulfilling classic TN criteria, younger age, abnormal trigeminal reflexes (eg, the corneal reflex), sensory deficits, and other cranial neuropathies (eg, hearing loss, dizziness, vertigo, tinnitus, and visual changes) are all indicative of the possibility of trigeminal neuropathy rather than classic

TN.[6,7] However, the evolution of pain in emerging trigeminal neuropathy may not always be typically neuropathic, which may lead to significant delays in diagnosis, as illustrated here by a case of TN initially presenting atypically in a young adult patient who was subsequently found to have a CPA epidermoid cyst requiring neurosurgery.

Case Report

A 32-year-old Chinese male presented to the maxillofacial surgery department with a 6-month history of intermittent, unpredictable right jaw pain, which had increased in frequency from two episodes 3 months apart to occurring daily. Initially, the pain was described as a dull aching sensation that was difficult to localize and arose from deep within the oromucosal surface of the right mandibular angle. Over the ensuing 6 months, this evolved into more intense episodes with occasional sharp lancinating pains that were felt down toward the midline of the lower lip and up toward the external auditory meatus. The pain was not consistently relieved by nonopioid analgesics or nonsteroidal anti-inflammatory medications, and the patient had resorted to applying topical local anesthetic gel (containing lidocaine hydrochloride 0.66%), with some temporary relief of symptoms.

Dental radiographs revealed a mesio-angularly impacted third molar in the right mandible and suggested distocervical caries or resorption of the adjacent molar with a close relationship to the inferior alveolar nerve canal. A cone beam computed tomography (CBCT) scan confirmed these findings, and a coronectomy was performed on the third molar.

Unfortunately, 48 hours after the coronectomy, the pain returned and intensified further, with episodes lasting up to 30 minutes and becoming biphasic in nature, changing in character midway through the episodes from electrical shock–like to throbbing, as well as extending superiorly to the right temporal region. The episodes were preceded by an aura of the right cheek and paresthesia of the lower lip, which included sensations of crawling and pins and needles. The patient remained completely pain free and asymptomatic between episodes, with symptoms never occurring at night. Due to persistent pain, the mandibular right second molar was also removed.

Despite this, the paroxysms of pain persisted, triggered inconsistently by chewing, tooth brushing, and yawning. In between episodes, neurologic examination findings remained completely normal, and sensation to light touch, pain, and two-point discrimination throughout all trigeminal dermatomes were never affected. A trial of gabapentin was started with rapid escalation from 100 mg to 300 mg three times daily. Although gabapentin resulted in reduction in intensity and duration of the episodes, it also resulted in the side effect of increasing lethargy, which was not well tolerated by the patient. While carbamazepine is usually considered for the treatment of TN, due to the increased risk of Stevens-Johnson syndrome in association with the HLA-B*15:02 allele in patients of southern Chinese origin,[8] lamotrigine was instead added at a dose of 25 mg and then 50 mg twice daily, initially leading to nearly complete relief of symptoms. A plan for subsequent reduction of the gabapentin dose was made, but this was never successfully achieved, as the severe paroxysms of pain returned. An MRI scan was subsequently performed due to the persistent symptoms, revealing a large epidermoid cyst in the CPA distorting the trigeminal nerve (Figs 1a to 1c). A near total resection was achieved by using an endoscopic retromastoid approach. Histology confirmed necrotic fragments containing keratin lined by stratified squamous epithelium in keeping with an epidermoid cyst. The postoperative course was complicated only by a methicillin-resistant *Staphylococcus aureus* (MRSA) wound infection requiring further debridement and a 6-week course of intravenous teicoplanin.

Following near-total resection, the patient noted immediate relief of his symptoms. He made a gradual recovery and was weaned entirely off his medications. Two years after the initial procedure, he remains symptom free with no neurologic deficit, and his MRI scans demonstrate only a small volume of residual tumor exhibiting restricted diffusion, which has remained stable over this period (Fig 1b). He continues to undergo annual MRI surveillance to monitor for tumor regrowth.

An interesting aspect of this case is that the patient is himself (H.W.G) a clinician, and he provided the following perspective:

> *"Time is a great diagnostician," a senior colleague once told me, and in my case, this certainly rang true. The evolution of my pain took months before it became distinctly neuropathic—I still remember the day I experienced my first textbook electric shock–like paroxysm in its full excruciating knock-the-wind-out-of-you moment, after multiple episodes of what was no more than a vague, dull jaw ache. At its peak, so many daily activities we take for granted became a conscious, laborious effort: from chewing (I eventually developed an ache in my contralateral jaw due to constantly using that side to eat), to giving up using my electric toothbrush (the vibrations would trigger episodes and I had to use a soft handheld*

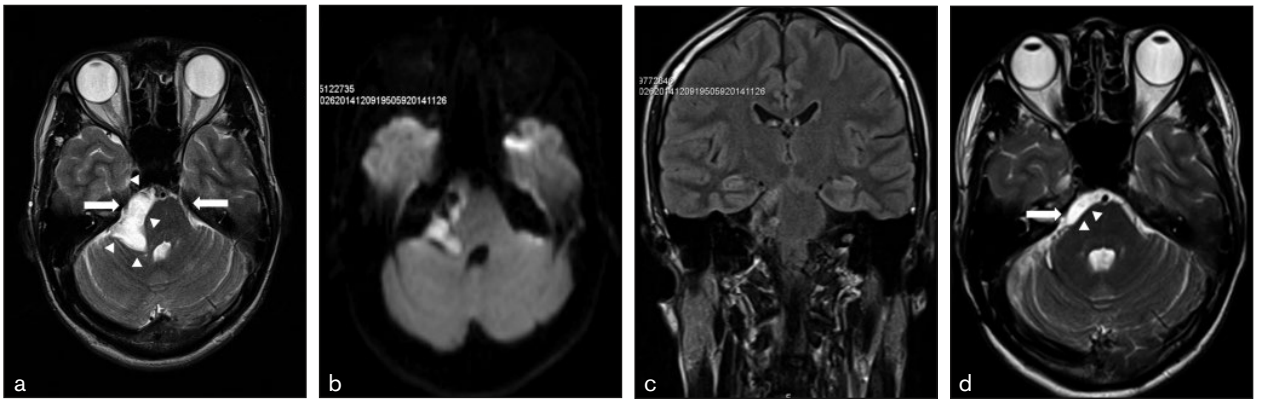

Fig 1 T2-weighted axial MRI scans with gadolinium contrast of the patient's epidermoid cyst. **(a)** Before surgery. A 3.4 × 2.2 × 3.2–cm mass is visible in the right CPA cistern *(arrowheads),* which **(b)** demonstrates restricted diffusion (increased signal intensity on diffusion-weighted imaging) and is **(c)** partially suppressed on coronal FLAIR sequences, causing mass effect on the pons and right superior cerebellar hemisphere. The trigeminal nerve is just visible on the right, and its path is much more tortuous compared to the left *(arrows in* **a***)*. Other sections not demonstrated here showed full encasement of the abducens nerve with slight displacement of the facial and audiovestibular nerves. **(d)** 16 months postsurgery. Only a tiny amount of residual cyst is visible in the right CPA cistern *(arrowheads)* with continued mild distortion of the pons, but the trigeminal nerve is in a much more normal position *(arrows).*

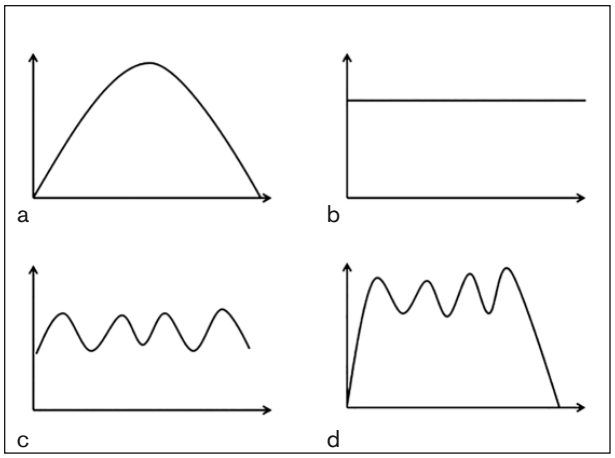

Fig 2 Line diagrams illustrating different patterns of pain. **(a)** Episodic pain with gradual onset of each episode and complete resolution between episodes. **(b)** Constant pain with no change in severity. **(c)** Pulsating pain with no resolution. **(d)** Episodic pain with gradual onset of each episode and repeated pulses or periods of waxing and waning before complete resolution.

toothbrush instead), to kissing my wife. All of these could trigger episodes, which at their worst would leave me rolling around on the floor in tears. The unpredictability also meant that holding conversations with patients became difficult–they probably wondered why their doctor had to keep running to the toilet mid-conversation to hide my grimaces of agony. One then realizes how much of our communication with patients depends on nonverbal facial expressions, which rely on a full range of movement to be able to display emotions from happiness to empathy. Strangely enough, my symptoms were never triggered by cutaneous stimuli (unlike classical TN), and I was still able to shave. I found eventually that I could "control" the propagation of an episode by grinding my teeth or holding myself slack-jawed, lending new meaning to the term tic douloureux. Doctors are trained to take a pain history even before their first clinical encounter as medical students, but being on the other side of the fence, and having to actually put into words the agony I was going through each day, made me appreciate what a monumental task we have in teasing out a patient's "pain story." Like most patients nowadays, I spent hours scouring the internet in poor attempts at self-diagnosis, but the more difficult task initially was finding the right adjectives to type into the search engine! The episodic nature of my pain made it even more difficult, as I spent a fair few consultations finding it frustrating that people could not see how terrible my affliction was when I was pain free at that very moment, and I even found myself willing a paroxysm to occur in front of my doctors' eyes so they could see what I was talking about. Dr Chong's line diagrams certainly helped me visualize the pattern of my pain much more clearly than any words could (Fig 2)*, and I will certainly be taking that lesson back to my own clinical practice!*

Discussion

In this case, isolated painful trigeminal neuropathy was a presenting feature of a congenital epidermoid cyst. These cysts are uncommon, benign, slow-growing congenital lesions accounting for 0.2% to 1.8% of all primary intracranial tumors.[9] They are most commonly found in the CPA (33% to 50%) and are the third most common mass in this region after acoustic neuromas and meningiomas.[9–11] Other less common sites are the sellar and parasellar regions (10% to 33%), cerebral hemispheres (up to 25%), fourth ventricle (17%), cerebellum, pineal gland, or extradural sites such as the skull and spine.[9–12] Epidermoid cysts are usually located off-midline and arise as a result of abnormal inclusion of ectodermal epithelial cells during neural tube closure. This results in cysts lined with stratified squamous epithelium typically containing keratin, hemorrhagic debris, granulation tissue, and cholesterol crystals, but no dermal appendages such as hair or sebaceous glands (in contrast to dermoid cysts, which also present in the midline).[9,11,13]

Despite being congenital lesions, CPA epidermoid cysts typically present between 30 and 40 years of age, most commonly with headaches (6% to 57%), hemifacial weakness (53%), asymmetric sensorineural hearing loss (12% to 50%), or vertigo and/or a loss of sense of balance (28% to 43%).[14–16] Neurologic examination usually reveals cranial neuropathy that most typically involves the eighth (28% to 59%), seventh (6% to 43%), and fifth (26% to 37%) cranial nerves (the latter usually involving the motor component of the mandibular division), cerebellar signs including vertigo (43% to 47%), or other features due to raised intracranial pressure (eg, papilloedema) or local tumor extension (eg, diplopia, hemiparesis, and lower cranial neuropathies).[14,15]

While TN may be present in 12% to 26% of cases of CPA epidermoid cysts,[14–16] isolated TN (ie, with no other neurologic features) as a presenting feature appears to be relatively uncommon, with < 50 cases previously reported in the literature.[17–24] On the other hand, in a cohort of 134 patients who were diagnosed with TN and who underwent further radiologic investigation, 10% were found to have CPA tumors, of which 71% were epidermoid cysts.[25] Similarly, in cohorts of patients undergoing surgery for TN, 1% to 6% were found to have causative lesions, and 41% to 64% of these were CPA epidermoid cysts.[19,26] The ICHD classification makes it clear that when a non-neurovascular cause for TN is found, this is termed painful trigeminal neuropathy rather than classic TN.[2] In this case, the patient's younger age of onset, lack of consistent triggering stimuli, and prolonged episodes lasting more than 2 minutes all point toward the possibility of this former diagnosis and were indications for further neuroimaging, as is currently recommended by the International Headache Society (IHS).[2]

Presentation can be markedly delayed, with cases only being diagnosed up to 23 years from symptom onset.[19] Like the patient presented in this case, multiple initial consultations with dental and maxillofacial teams is not uncommon, and pain may not always be classically neuropathic initially.[17,21–23] Up to two-thirds of patients receive various invasive dental treatments as part of the diagnostic process, which may be unjustified in retrospect.[27] Given the patient's initial pattern of pain, it is difficult to postulate whether the impacted third molar contributed in any way to the symptoms or whether it was a triggering event leading to further compression of an already distorted trigeminal nerve due to the underlying cyst. Additionally, although it might have been difficult to make a decision for neuroimaging based on the patient's initial symptoms, the change in the nature of his pain postcoronectomy may have justified earlier MRI, thereby avoiding the second dental extraction.

Neuroradiologically, epidermoid cysts usually appear as nonenhancing lesions, which are isointense with cerebrospinal fluid on both T1- and T2-weighted MRI.[9,13] Differentiating them from arachnoid cysts requires diffusion-weighted imaging (DWI; epidermoid cysts typically show clear restricted diffusion) and fluid attenuation inverse recovery sequences (FLAIR; epidermoid cysts typically show incomplete suppression). Calcification can be present in up to 25% of cases,[9] and both intracystic hemorrhage and increased cyst protein content can result in atypical appearances with changes in signal intensity.[11,28] Management is predominantly neurosurgical, with incomplete resection being advocated for cases where the tumor capsule is adherent to surrounding neurovascular structures or the brainstem.[14,15,20] Postoperative complications include aseptic meningitis, persistent pain, and new or worsening neurologic deficits, many of which are transient.[14–16,23] Recurrence occurs in 6% to 29% of patients, occurring at an average of 4.5 to 9 years postoperative.[14–16] Some patients remain symptom free for as many as 15 years postdiagnosis.[15,20,28] There is as yet no consensus as to the optimum frequency of MRI surveillance, and the patient described in this case report continues to receive annual scans as part of his follow-up. However, given the benign nature of the tumor, it is very unlikely that intervention will be required in the absence of clinical symptomatology.

Conclusions

Congenital epidermoid cysts and other CPA space-occupying lesions are rare causes of TN and must be included in the differential diagnosis, particularly in cases that do not fulfill ICHD criteria. Although the ICHD classification terms such cases as painful trigeminal neuropathy, this diagnosis is only possible retrospectively once a secondary cause is found. In the present case, this patient's atypical age of presentation, the inconsistency of triggering factors, and the presence of an "aura" prior to each episode all suggest that his symptoms were due to painful trigeminal neuropathy and not classical TN, highlighting the need for consideration of neuroimaging early on in the diagnostic process.

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