Familial trigeminal neuralgia (case report)

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Summary

Reports of trigeminal neuralgia occurring in more than one member of the same family are rare. The authors report a family with two members (father and daughter) afflicted by this disease. The clinical features, neuroimagistical and laboratory findings and treatment are presented toghether with literature review.

Key words: familial trigeminal neuralgia.

Background

Trigeminal neuralgia (TN), also known as “tic douloureux”, is characterized by stabbing unilateral facial pain that is triggered by chewing or similar activities or by touching affected areas on the face; the pain is often accompanied by a brief facial spasm or tic. Pain distribution is usually unilateral and follows the sensory distribution of cranial nerve V, typically radiating to the maxillary (V2) or mandibular (V3) area. Signs of cranial nerve dysfunction or other neurologic abnormality excludes the diagnosis of idiopathic TN and suggests that pain may be secondary to a structural lesion.

The mechanism of pain production remains controversial. One theory suggests that peripheral injury or disease of the trigeminal nerve increases afferent firing in the nerve; failure of central inhibitory mechanisms may be involved as well. Pain is perceived when nociceptive neurons in a trigeminal nucleus involve thalamic relay neurons. Abnormal vessels, aneurysms, tumors, chronic meningeal inflammation or other lesions may irritate trigeminal nerve roots along the pons. An area of demyelination, such as may occur with multiple sclerosis, may be the precipitant. In most cases, no lesion is identified, and the etiology is labeled idiopathic by default. Lesions of the entry zone of the trigeminal roots within the pons may cause a similar pain syndrome. Thus, although TN is typically caused by a dysfunction in the peripheral nervous system (the roots or trigeminal nerve itself), a lesion within the central nervous system may rarely cause similar problems. Infrequently, adjacent dental fillings composed of dissimilar metals may trigger attacks.

TN is a rare condition. Statistics vary, but TN occurs in approximately 150 per million people per year. Medical literature notes this condition is rare for anyone under age 50 but in reality, TN is known to exist in many younger individuals, including children.

No racial risk factors have been identified. The male-to-female ratio is 2:3. Age of onset typically is 60-70 years; thus, advanced age is a major risk factor. Multiple sclerosis and hypertension are the two risk factors found in epidemiological studies.

The goal of pharmacologic therapy is to reduce pain. Carbamazepine is regarded by most as the medical treatment of choice. Some advocate a trial of baclofen since it has fewer adverse effects. The synergistic combination of carbamazepine and baclofen may provide relief from episodic pain. Other anticonvulsants, including phenytoin and gabapentin, reportedly are beneficial in some patients; however, controlled trials have not been performed. A small study reported topiramate beneficial in refractory cases; again, controlled trials are needed.

Natural history and prognosis: after an initial attack, the disorder may remit for months or even years. Thereafter the attacks may become more frequent, more easily triggered, more disabling, and may require long-term medication. Patients may find immediate and satisfying relief with one medication, typically carbamazepine. However, over the years, they may require a second or third drug to control breakthrough episodes and finally may need surgical intervention.

Case report

Case 1:

- A 67-years-old male with history of trigeminal neuralgia for the last 3 years;
- General examination: partial edentation, arterial hypertension;
- Neurological examination: normal, except for hypoesthesia in left V1 and V2 divisions; severe, paroxysmal pain shooting from the left corner of the mouth to the eye (pain attacks usually provoked by exposure to cold, mastication and speech);
- Lab tests: dyslipidaemia;
- Cranian CT and brain MRI (including posterior fossa neurovascular relationships) were normal;
- The patient initially had relief with carbamazepine (600 mg/day) but in the last year the combination of carbamazepine (300 mg/day) and gabapentin (900 mg/day) was needed for pain attacks prevention. A microvascular decompression of trigeminal nerve was considered but the patient refused the surgical intervention.

Case 2:

- A 31-years-old women (daughter of case 1) presented with history suggestive of trigeminal neuralgia in left V2 and V3 divisions of trigeminal nerve for the last 2 months;
- General examination: normal;
- Neurological examination: normal, except for slight hyperesthesia in left V2 and V3 divisions and lancinanting pain attacks shooting from the left corner of the mouth to the left angle of the jaw; pain was triggered expecially by mastication;
- Lab tests: seropositive for anti-HBC and HBS antigen, increased serum transaminases;
- Cranian CT and brain MRI (including posterior fossa neurovascular relationships) were normal;
- Gabapentin (900 mg/day) completely relieved her of pain.

Discussion

Nearly all cases of typical TN are caused by blood vessels compressing the *trigeminal nerve root* as it enters the brain stem. This neurovascular or microvascular compression at the trigeminal nerve root entry zone may be caused by arteries or veins, large or small, that may simply contact or indent the trigeminal nerve.

Pulsation of vessels upon the trigeminal nerve root does not visibly damage the nerve. However, irritation from repeated pulsations may lead to changes of nerve function, and delivery of abnormal signals to the trigeminal nerve nucleus. Over time, this is thought to cause hyperactivity of the trigeminal nerve nucleus, resulting in the generation of TN pain. The superior cerebellar artery is the vessel most often responsible for neurovascular compression upon the trigeminal nerve root, although other arteries or veins may be the culprit vessels. TN may be cured by an operation that effectively relieves the neurovascular compression upon the trigeminal nerve root *(microvascular decompression).*

To a certain extent, trigeminal neuralgia runs in families. About five percent of patients have a family history of it. Few reports of trigeminal neuralgia occurring in families *(Table 1)* and two reports of secondary trigeminal neuralgia occurring in families associated with Charcot-Marie-Tooth disease could be found in literature.

Current knowledge about pathophysiology and etiology of trigeminal neuralgia is limited. There is a lively debate going on between those who believe in a peripheral cause, i.e. vascular cross compression of a root exit/entry zone causing ephaptic transmission, and those who believe that all hyper dysfunctional syndromes are caused by a central cause, as they often respond to anticonvulsants. Moreover, vascular compression has also been found in asymptomatic individuals at autopsy. There appears to be a small but significant group of patients, where no con-

vincing evidence of vascular compression has been found at surgery. Moller, in a recent review, speculated that in addition to vascular compression there might be a second unknown factor, which may cause trigeminal neuralgia.

Kirkpatrik observed that if the disease is truly random, then such familial clustering would be infinitesimally rare, but this does not seem to be the case. He postulated that there appears a specific organic or anatomic cause of trigeminal neuralgia that usually occurs sporadically, but is occasionally consistent in certain genetic groups. Familial clustering of trigeminal neuralgia has been noted to be more common in women thus leading to the speculation of dominant pattern of genetic transfer. Familial trigeminal neuralgia has been reported in association with Charcot-Marie-Tooth disease and with multiple sclerosis.

The same author suggested that the mechanism of trigeminal neuralgia in these familial patients is somewhat different from that of a typical patient, or it may be that the mechanism is the same, but some unknown factor influences final common pathway. He postulated premature atherosclerosis of vascular network of posterior fossa, with ectasia causing kinking of the vessel leading to vascular compression of the nerve. The occurrence of familial vascular malformations or aneurysms has also been recognized. Other pathological conditions suspected to be associated with familial trigeminal neuralgia include genetically inherited abnormal myelin which is more susceptible to pulsatile compression, prior illness such as systemic vasculitis or viral disease.

References

Table 1. Reports of familial trigeminal neuralgia (after Gupta et al., 2002)

Kirkpatrik	3 sisters
Harris	9 patients in 3 generations of the same family; 9 siblings in 1 family; 1 parent + 1 child (9 families); Grandparent + 1 child (2 families)
Allan	1 Maternal uncle + 1 nephew
Knucky and Gubbay	Grandfather (TN) + father (TN + GN) + daughter (GN)
Herzberg	Father + 2 daughters + Grand daughter
Braga et al.	2 brothers + 2 sisters
Duff et al.	Mother (TN + HFS) + 5 of the 10 children (TN) + 1 nephew (TN)
Gupta et al.	Mother + father + elder son

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