Overview and History of Trigeminal Neuralgia

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KEYWORDS

• Trigeminal neuralgia • Tic douloureux • Percutaneous rhizotomy • Radiofrequency ablation
• Microvascular decompression • Walter Dandy • Peter Jannetta

KEY POINTS

- Although the earliest descriptions of trigeminal neuralgia as a clinical entity date back as early as the 1600s, the term *tic douloureux* was coined nearly a century after in 1756, by Nicholas Andre.
- Ablative techniques included percutaneous ablation with radiofrequency lesioning, glycerol chemoneurolysis, balloon microcompression, and stereotactic radiosurgery.
- Although Dandy initially observed neurovascular compression during his operation of partial trigeminal neurectomy, it was Jannetta who introduced the operating microscope to confirm these findings culminating in the microvascular decompression procedure.

INTRODUCTION

A horrid affliction in its full fury, trigeminal neuralgia (TN), also known as *tic douloureux*, has been a major neurosurgical concern since neurosurgery first emerged as a distinct surgical specialty in the early 20th century.[1] In its classic form, TN results in episodes of intense, lancinating facial pain followed by a period of relief. However, even during these periods of relief, patients often live in fear and anticipation of the next episode. The earliest descriptions of TN as a clinical entity date back to the 1600s provided by prominent physicians at the time including Drs Johannes Michael Fehr and Elias Schmidt, secretaries of the Imperial Leopoldina Academy of the Natural Sciences, and famous philosopher John Locke.[2] However, the term *tic douloureux* was not coined until nearly a century after in 1756, by Nicholas Andre (**Fig. 1**, left) who believed that the condition stemmed from a nerve in distress and classified it as a convulsive disorder.[1] He conceptualized the disease in terms of convulsions and used the term *tic douloureux* to imply contortions and grimaces accompanied by violent and unbearable pain. In 1773, an English physician, Dr. John Fothergill (see **Fig. 1**, right) presented his experience with 14 patient encounters and deemed the cause to be related to cancer rather than a convulsive disorder, thus coining the term, *Fothergill's disease*. In his remarkable and accurate description, he stated, "The affection seems to be peculiar to persons advancing in years, and to women more than to men…The pain comes suddenly and is excruciating; it lasts but a short time, perhaps a

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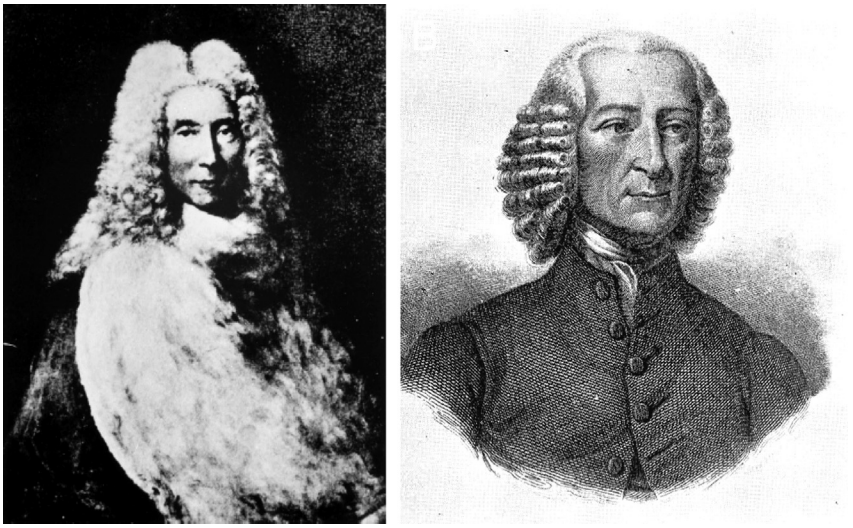

Fig. 1. (*Left*) portrait of Nicolas Andre. (*Right*) portrait of John Fothergill. ([*Left*] *From* Legrand N. Les Collections de la Faculte de Medecine de Paris. Paris: Masson; 1911; and *Courtesy of* the Wellcome Institute Library, London, United Kingdom; and [*Right*] *Reprinted from* Stookey B, Ransohoff J. Trigeminal neuralgia: its history and treatment. Springfield (IL): Charles C Thomas; 1959.)

quarter or half a minute, and then goes off; it returns at irregular intervals, sometimes in half an hour, sometimes there are two or three repetitions in a few minutes…Eating will bring it on some persons. Talking, or the least motion of the muscles of the face affects others; the gentlest touch of a handkerchief will sometimes bring on the pain, whilst a strong pressure on the part has no effect."[3]

Although the clinical description of this condition had been clarified by the end of the 18th century, it was not until the 1820s that Charles Bell localized this pain syndrome to the trigeminal nerve; thus, the condition was ultimately referred to as *trigeminal neuralgia*.[1] Although the cause of TN remained elusive for a long time, a common denominator in most cases was segmental demyelination at the root entry zone of the trigeminal nerve. Some of the recognized causes included vascular compression of the nerve, a compressive mass lesion, postinfectious multiple sclerosis, trigeminal deafferentation, and atypical facial pain that may be related to a somatoform pain disorder. Traditionally, medical therapy is the initial treatment of choice. If the condition becomes medically refractory, various surgical options are described and are available, some with better success rates than others.

Evolution of Therapies for Trigeminal Neuralgia

Medical management

Early medical treatments for the treatment of TN in the 18th and 19th centuries included such compounds as quinine derived from Peruvian bark,[3] mercury, opium, arsenic,[4] and powder of gelsenium.[2] Trichloroethylene and stilbamidine became popular choices for the treatment of facial pain in the early 20th century; however, their side-effect profile precluded them from becoming lasting options.[2,5] The use of antiepileptic medications was first described in 1942 by Bergouignan with the introduction of sodium diphenylhydantoin.[6] By the 1960s, phenytoin and, subsequently, carbamazepine were largely used as the treatments of choice as medical therapies for TN. Several other antiepileptic medications have been introduced to the treatment paradigm including lamotrigine, clonazepam, valproic acid, and even gabapentin. Currently, carbamazepine and oxcarbazepine are the first-line drugs of choice given a near 90% rate of efficacy with a more tolerable side effect-profile followed by phenytoin as a second-line agent.[1,7]

Percutaneous Ablative Techniques

Percutaneous chemoneurolysis

Chemoneurolysis for the treatment of TN with the use of alcohol injections into peripheral nerves was first introduced by Schloesser in 1904.[2] The side effects of this treatment, however, included temporary weakness of the muscles of mastication, transient anesthesia or paresthesias, and recurrence of TN after initial relief.[2,8] Over the years, in an attempt to provide more lasting effects, more toxic or caustic agents were entertained for injection into the Gasserian ganglion,