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Trigeminal Neuralgia Caused by Compression from Petrosal Vein Transfixing the Nerve

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Introduction

The involvement of a vein in the aetiology of trigeminal neuralgia is not rare (7 to 14%) [3], while compression by the vein that penetrates the nerve is extremely rare (0.8%) [2]. We report on a case with trigeminal neuralgia due to compression by the petrosal vein which penetrated the trigeminal nerve.

Case Report

A 65-year-old man presented with an 8-year history of toothache-like pain of his left lower jaw. The symptom was precipitated by eating and talking. His attending dentist found no evidence of dental lesions and referred him to our department. The patient had been treated for right hemifacial spasm by microvascular decompression 5 years ago. His pain was partially controlled by oral carbamazepine (600 mg/day) but he opted for surgical treatment. Skull roentgenograms, CT scans, and MR images were normal except for the existence of the Ivalon sponge used at the previous surgery.

A left retromastoid suboccipital craniectomy was performed. Intra-operative findings revealed that the petrosal vein, which drains from the pons and cerebellum, had transfixed the trigeminal nerve and compressed it at the entry zone (Fig. 1). The trigeminal nerve was split and the vein was dislocated to a more distal part of the nerve away form the root entry zone by Ivalon sponge. The patient had complete pain relief without resorting to the use of carbamazepine.

Fig. 1. Intraoperative photograph. The petrosal vein, draining from the pons and cerebellum, passes through the trigeminal nerve and compresses the root entry zone at this point. *PV* Petrosal vein; *V* trigeminal nerve, *VII, VIII* facial nerve and acoustic nerve complex

Discussion

Venous compression of the trigeminal nerve is not very rare but no other case of penetration of the nerve by a vein has been reported since the report by Dandy [1]. The question yet to be answered is: how does trigeminal neuralgia develop with age when a congenitally aberrant vein already penetrates the trigeminal nerve, thus constantly applying certain stress to the nerve? It is believed that veins, in comparison to arteries, are less likely to undergo sclerotic changes with age; but in this particular case it may be possible that the condition was brought about because the vein which had penetrated the trigeminal nerve somehow approached the root entry zone due to an age-related change.

The next question is the choice of method for nerve decompression when a petrosal vein which penetrates the trigeminal nerve is responsible for the development of trigeminal neuralgia (as in the present case) and a venous return is recognized between the brain stem and the petrosal vein in question. As a rule, one must not let a new neurological deficits develop after a functional surgical procedure (such as microvascular nerve decompression) and the petrosal vein has to be preserved. In choosing an optimum procedure, one faces a choice between horizontal and longitudinal

splitting partial rhizotomy (the latter was our choice for the present case). The efficacy of the latter technique was described when an artery had penetrated the trigeminal nerve [2]. We also believe that the transposition of the vessel to a more distal part by a longitudinal splitting of the nerve is an effective method when a compressing vessel penetrates a cranial nerve.

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