Arterial cross compression of the trigeminal nerve at the pons in trigeminal neuralgia

Case report with autopsy findings

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The autopsy findings in a patient with trigeminal neuralgia who died from unrelated causes are presented. Arterial cross compression of the appropriate trigeminal nerve at the pons was demonstrated. The relationship of arterial cross compression to trigeminal neuralgia is briefly discussed.

KEY WORDS □9 trigeminal neuralgia □9 artery, superior cerebellar

Dandy and Jannetta have proposed that trigeminal neuralgia is associated with compression of the trigeminal nerve by branches of the superior cerebellar artery at the root entry zone near the pons. Their observations in large series of patients operated on for trigeminal neuralgia via the posterior fossa seem to support this proposal. Independent confirmation has been reported by Apfelbaum and Petty and Southby, again in operated patients. Another potential source of information for assessing this hypothesis would be postmortem examination of patients with trigeminal neuralgia. These patients, however, rarely come to autopsy, probably because of the non-lethal nature of their disease. Recently, one of us (S.J.H.) had the opportunity to examine such a patient who died from an unrelated disease. The examination was made with no knowledge of this history except that the diagnosis of trigeminal neuralgia had been made in 1962. The findings are offered as further suggestive evidence regarding the role of arterial cross compression in the etiology of trigeminal neuralgia.

Case Report

This 75-year-old woman entered the hospital in December, 1962, because of right-sided facial pain of several years' duration. The pain was described as episodic and lancinating; it could be triggered by chewing, sneezing, talking, and touching the right nasal ala, upper lip, and upper gum. She had been previously treated with neck manipulations and analgesic injections without change in the pattern or severity of her pain. Past medical history, family history, and review of systems were unremarkable. Physical and neurological examinations, laboratory evaluation, and skull films were normal. The diagnosis of classical trigeminal neuralgia was made.

Operation. She refused to allow her trigeminal nerve to be sectioned. Therefore, she underwent a right temporal craniectomy, extradural approach to, and massage of, the Gasserian ganglion. She was free of pain for several months, but, as her pain returned to its preoperative severity, she consented to section of the right trigeminal nerve. She underwent a second extradural approach to the ganglion in October, 1963, with partial section of the right nerve proximal to the ganglion.

Postoperative Course. The patient was relieved of pain for the remainder of her life. In 1975, she developed carcinoma of the bladder. Several transurethral resections of the tumor and repeated courses of chemotherapy failed to alleviate the disease. The tumor invaded the colon and she died in December, 1977, at the age of 90 years of massive lower gastrointestinal hemorrhage.

Postmortem Examination. The calvaria was opened; the hemispheres were removed by transecting the midbrain, and the tentorium was reflected from its petrous attachments bilaterally. The left trigeminal nerve was normal in size and configuration. No arterial compression of the nerve was noted, the
nearest artery being the marginal branch of the superior cerebellar artery which was more than 2 mm from the nerve. A small vein was draped over the superior surface of the nerve (Fig. 1). The right trigeminal nerve was markedly atrophic. The inferior (marginal) branch of the superior cerebellar artery looped inferiorly between the pons and the nerve, grooving and cross compressing the nerve on its medial surface (Fig. 2). This artery was bloodless and the superior anterior aspect of the right cerebellar hemisphere showed softening. No macroscopic lesion of the ganglion other than atrophy was evident.

Discussion

Definitive demonstration of the cause of trigeminal neuralgia has eluded investigators for many years. Many of the hypotheses have been well reviewed by Gardner. That large compressive lesions in the posterior fossa may be associated with trigeminal neuralgia has long been known. An association with compression by small ectatic arteries has had much slower acceptance, although to our knowledge, precise vascular cross compression of the trigeminal nerve root entry zone has not been reported in the absence of trigeminal neuralgia. In addition, recent experience indicates that tumors causing trigeminal neuralgia...
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often do so by vascular cross compression. The tumor pushes the vessel against the nerve or the nerve against the vessel. 7

A number of authors have studied the vascular relationships of the cranial nerves in the posterior fossa in anatomic specimens, but most of these studies were completed before the availability of surgical magnification systems. Stopford 9 does not describe compression of the trigeminal nerve but concludes from his investigations that arterial compression of cranial nerves may produce symptoms more frequently than textbooks suggest. Watt and McKillop 11 describe a trigeminal artery (large pontine branch of the basilar artery), but do not mention compression of the trigeminal nerve by any vessel. Sunderland 12 documents two cases of compression with grooving of the nerve and one case of perforation of the nerve by the superior cerebellar artery (out of a total sample of 210 autopsied cases). Unfortunately, he was unable to obtain clinical correlation in his series.

Operative findings of trigeminal nerve compression by the superior cerebellar artery have been reported primarily by Dandy 2 and Jannetta 3. The compression in these cases has most frequently been from the superior cerebellar artery.

The findings in this case support the proposed association between arterial cross compression of the trigeminal nerve and trigeminal neuralgia. One must be cautious, however, in drawing conclusions from single cases. A large autopsy series comparing patients with and without trigeminal neuralgia would help to settle the question, but the rarity of autopsies in trigeminal neuralgia makes this a virtually unattainable goal. A study of the normal vascular relations of the trigeminal nerve in the posterior fossa using the operating microscope will provide useful information on the incidence of trigeminal compression in normal persons for comparison with the operative series. Such a study is currently underway.

References


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