Neurosurgical Classic—XIII

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During the final two decades of the nineteenth century, a few general surgeons began the development of neurological surgery. Among the diseases that these surgeons sought to cure was tic douloureux, which had been resistant to all forms of treatment attempted previously. The independent efforts of four men—Victor Horsley, Frank Hartley, Fedor Krause, and Charles Frazier—were rewarded by the development of an excellent operation for the permanent relief of this condition.

By 1890, tic douloureux had been known as an entity for more than two centuries. But even after its relationship to the trigeminal nerve had been discovered, no treatment of lasting value had been developed. Various medicines had been tried, systemically and locally, without effect. Counterirritation had been proved worthless, and the destruction of the peripheral trigeminal branches by injection or operation had been shown to afford only temporary relief. Numerous ingenious operations then had been devised for the interruption of the major trigeminal branches close to their initial exits from the skull. However, none of these procedures gave lasting relief. For more than a century prior to 1890, many intelligent attempts at the cure of tic douloureux had been made, but all had been unsuccessful. The problem was solved by a combination of advances over the ensuing eleven years.

After it had been demonstrated that intracranial operations could be performed successfully, two related types of operations for tic douloureux were proposed. At first, extirpation of the gasserian ganglion was attempted. William Rose, in 1890, developed a procedure for the piecemeal avulsion of the ganglion through an enlarged foramen ovale. Because of poor exposure, frequent hemorrhage, and incomplete removal of the ganglion, this operation proved unsatisfactory. In 1891, Frank Hartley devised an extradural temporal approach to the gasserian ganglion to facilitate intracranial neurotomy of the second and third trigeminal divisions. This approach proved to be the technical key that opened the way for later advances. Six and a half months after Hartley’s first operation, and unaware of it, Fedor Krause duplicated this operation. However, Krause carried the operation a step further in 1893 when he first completely removed the gasserian ganglion successfully. Two years later, he analyzed 51 gasserian ganglionectomies (performed by the Hartley-Krause approach) which had been reported in the medical literature. The over-all mortality for these 51 cases was approximately 10 per cent. Harvey Cushing then modified the Hartley-Krause approach by minimizing traction on and subsequent hemorrhage from the middle meningeal artery. The result was a reduction in mortality to 5 per cent by 1905. After this, extirpation of the gasserian ganglion was abandoned in favor of the second type of operation which had been developed for tic douloureux.

Foreseeing the probable difficulties of gasserian ganglionectomy, Victor Horsley proposed retrogasserian neurotomy instead. He and William Macewen worked independently to develop such a procedure. After trial operations on monkeys and human cadavers, Horsley in 1890 attempted avulsion of the trigeminal root in a very ill woman who had had two previous extracranial operations for tic douloureux. Because of the unfortunate operative death of this patient, and the simultaneous early successes with gasserian ganglionectomy, similar attempts at dividing the trigeminal
root were abandoned temporarily. David Ferrier (1890),9 William Spiller (1898),17 and Lewellys Barker (1900) each proposed that section of the root might afford a permanent cure, but it was not until 1901 that this again was attempted. In that year, Charles Frazier performed such an operation, using the Hartley-Krause approach to the nerve.21,22 His successes established retrogasserian neurotomy as the operation of choice, and later refinements minimized its morbidity and mortality.4,6,11,14,17,28,30,33–36

Victor Horsley’s description of his first retrogasserian operation is reproduced below, followed by the report of the first extradural temporal approach to the gasserian ganglion by Frank Hartley, and the translation of the paper by Fedor Krause describing the first gasserian ganglionectomy by the Hartley-Krause approach. The classical paper by William G. Spiller and Charles H. Frazier in 1901, which established retrogasserian neurotomy, will be reproduced in a subsequent issue of the Journal of Neurosurgery.

References