

MURPHY (J.B.)

Surgery of the Gasserian Ganglion, with Demonstration and Report of Two Cases.

Stenographic report made at the meeting of the Mississippi Valley Medical
Association, at St. Paul, Minn., September 15, 1896.

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SURGERY OF THE GASSERIAN GANGLION,
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By J. B. MURPHY, M. D.,

CHICAGO, ILL.

In speaking of the surgery of the gasserian ganglion, I will confine my remarks largely to the technique of the more recent operation, after reviewing some of the results of operations which have preceded or led to the operation which is adopted at the present time. The gasserian ganglion, situated, as it is, on the petrous portion of the temporal bone, is in a very inaccessible position. It is desirable in some cases to remove this ganglion for the purpose of curing intractable neuralgias of the facial nerve, or what is commonly known as migraine. As you know, all methods of treatment by internal medication with all the varieties of anodynes, and more recently the medical treatment now in vogue, large doses of castor oil, have failed. If a case had been relieved by the anodyne treatment, it was only temporary, and was followed by another attack of increased intensity. The operations for its relief may be classified as follows: 1. Division of the branches of the trifacial in the face or mouth. 2. Division of the nerves at the base of the cranium (Kroenlein). 3. Extraction of the ganglion from the base (Rose). 4. Intradural extraction of the ganglion (Horsley). 5. Extradural excision of ganglion (Hartley-Krause). The operation most effectual and least dangerous before the present one (Kroenlein's) consisted of division of the zygomatic process, turning it down with the

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most important muscle, dividing the coronoid process of the inferior maxillary, dividing the temporal muscle and reflecting it upon the cranium, finally dividing the nerve at the base of the cranium, that is, dividing the third branch of the nerve at the foramen ovale and the second branch at the foramen rotundum. The operation was almost as extensive and, if not as dangerous, was more difficult than the operation for the removal of the ganglion itself. The results with this operation were only temporary relief in a very large proportion of cases; for that reason it was deemed advisable to attack the nerve within the cranium. Dr. Rose, of London, in 1890, was the first to open the cranium from the base. He followed the same procedure as Kroenlein, making a division of the parts mentioned, passing into the base of the cranium at the foramen ovale, and chiseling out an opening sufficiently large to permit of the extraction of the ganglion through the opening. The opening was necessarily small, consequently the operator had very imperfect light, and it was very uncertain whether the ganglion was extracted *in toto* in any of these operations. The Rose method was performed, I think, for the first time in America by Dr. Edmund Andrews of Chicago. He has performed the operation three times. On account of the difficulty and dangers of this operation, coupled with the uncertainty of incomplete extraction of the ganglion, it was necessary to abandon the procedure. The next method was devised by Victor Horsley, of London (1891), who reasoned that as the ganglion was situated between the two layers of the dura, with its roots on the inner side of the dura at the base, it could best be reached by incising the dura and elevating the convolutions. In the Horsley operation an opening should be made in the cranium above the zygomatic arch, with a horseshoe-shaped osteoplastic flap; finally incise the dura and elevate it with a

retractor, as I show you here. Pass this long curved retractor beneath the convolutions and gently elevate the brain, so that the ganglion and motor root on the inner side can be reached and extracted from the side of the medulla. We can readily see that this is a difficult procedure, as the brain is not a resisting substance and the retractors tear or lacerate the brain tissue before the ganglion is exposed at its base. The operation was performed by Horsley with a fatal termination.

In the latter part of 1891 Frank Hartley, of New York, conceived the idea of attacking the ganglion from within the cranium and without the dura. This is the operation to which I shall direct your attention to-day, and is the one which I will perform, with the assistance of Dr. Mayo, so that you may see how readily the ganglion and root of the nerve can be reached and extracted by this method.

We will next consider the dangers of the operations. In the operation from the base (Rose's operation) the dangers were found to be hemorrhage and infection; in the majority of fatal cases found in the literature on the subject, infection was due to injury to the eustachian tube, as the channel which the surgeon follows in getting to the base of the cranium at the foramen ovale is in close proximity to that tube. The mortality of the operation was eighteen per cent. In Horsley's operation there was danger from hemorrhage, infection, and mutilation and laceration of the brain. He performed the operation once and the patient died six hours after.

We will now consider briefly the technique of the Hartley operation. In this operation, after we have made our incision through the skin and exposed the bone, we chisel an opening through the cranium, and if we have a De Vibiss instrument we can remove as large a piece of the cra-

nium as we desire, in a very short time. The chisel of Hartley or Krause's saw, which is very convenient, may be used. The De Vilbiss instrument has the advantage that it does not cut the dura when the instrument is pressed; when it is opened it pushes the dura out of the operative field. Last week I used it in excising a large depression in the skull. It worked admirably and



FIG. 1.—Primary incision.

saved time. Make an omega incision (see Fig. 1) in the flap and cut the bone so that the base of the other incision will be just above the zygoma; elevate the bone and its fractures below the level of the zygoma. Press the Kocher blunt dissector between the dura and bone, lift the bone gently, and push the dura back. As soon as this is done we are liable to have hemorrhage from the middle

meningeal artery. Should this occur we can compress the bone with forceps or push the artery into the canal and introduce a catgut plug. The hemorrhage from the dura is considerable when the flap is elevated. The flap is now turned down and allowed to remain. As soon as the bleeding has ceased, pass the finger along beneath the dura, gently elevating it until the base of the fossa is reached. At this stage there is profuse hemorrhage from the vena santorini and the arteria meningeal media. This artery occasionally enters the base through a separate foramen, and has been ruptured in elevating the dura from the bone. Whenever rupture takes place the foramen should be packed with catgut and allowed to remain. The venous hemorrhage may be so excessive that it may become necessary to stop the operation at this point and plug the fossa with gauze, allowing it to remain three days before completing the operation. Excessive hemorrhage was encountered in three of Dr. Keen's cases. The doctor, in commenting on the cases, stated that he introduced a piece of gauze sixteen by twenty inches, which did not produce sufficient pressure on the brain to cause unpleasant symptoms. As soon as the base is exposed, introduce the retractor, which holds up the dura. As the specimen is passed around, notice the foramen ovale where the inferior maxillary division finds exit, and just in front of it the foramen rotundum for the superior maxillary division. After both openings have been exposed, divide the layer of the dura between the two divisions of the nerve, allowing the periosteal portion to remain attached to the bone beneath the roots of the nerves. The upper layer can then be elevated from the surface of the nerves and ganglion with very little danger of perforating it. This is a very important point in the operation. Proceed along the upper surface of the nerve to the ganglion, which is situated between the two layers of

the dura, one beneath and the other above. As soon as this point is reached the blunt dissector is used to elevate the dura; with it separate the two layers of the dura, following along up the nerve. Peel the dura off until the ganglion is thoroughly exposed. After the dura is peeled off a short distance it may possibly be torn; there will then be an escape of cerebro-spinal fluid. If the sinus be torn the hemorrhage will be profuse. Control it with the finger or with a compress on the retractor. Cleanse the cavity with a sponge until the parts become dry. With two of these retractors the sinus can be readily compressed if torn. The opening in the dura can be compressed in the same manner to suppress the flow of cerebro-spinal fluid. If necessary the optic division of the nerve can be removed; it is difficult, as it is situated in the wall of the cavernous sinus. If an endeavor be made to remove the optic division from the cavernous sinus, the chances are the sinus will be opened and hemorrhage will follow, thus compelling the suspension of the operation for the time being, to be completed at another sitting. As soon as the ganglion is exposed, pass the blunt hooks which we have for that purpose under the roots of the nerves, elevate the nerves, and make considerable traction from the openings toward the center. As soon as the roots are thoroughly drawn in and divided close to the foramen, elevate the ganglion from its fossa and grasp it with a pair of large hemostatic forceps. I have found the eight-inch forceps of Billroth good for this purpose. The nerves being divided, the distal ends are pushed out of the foramina. This is done to lessen the possibility of subsequent regeneration of nerve tissue in case the ganglion is not completely removed. When the roots are divided remove the hooklets which have been used for the purpose of elevating; separate the roots and the ganglion from the periosteal portion of

the dura by gently elevating it; make a turn and a half of the Billroth forceps on the ganglion and the motor root will come in one mass with the ganglion.

In the first case which I operated I was annoyed considerably by hemorrhage. It retarded me for five or six minutes after I had the nerve exposed and had placed the forceps on the ganglion. As soon as the hemorrhage was under control I proceeded and the nerve was extracted.

This method is very advantageous, as it affords an excellent view of the field of operation. I like the position suggested by Keen, *i. e.*, placing the patient on the back and operating from the side. In this position we can have a strand of gauze in the lower part of the wound, which will siphon the blood out as rapidly as it appears. When the ganglion is extracted it should be examined to see if it has all been removed. The ganglion is not a large body; it is much smaller than is generally supposed. In some of the recorded cases a part of the ganglion was removed. This should not occur if the dura be retracted sufficiently with the blunt dissector. In both of my cases the permanent arrest of hemorrhage was produced with a plug of gauze, which was removed forty-eight hours after the operation through a small opening left in the bone. The osteoplastic flap was replaced and retained by periosteal and cutaneous sutures. In the second there was some escape of cerebro-spinal fluid when the gauze was extracted; the provisional suture which was inserted at the time of the operation was tied and prevented the further loss of fluid. The danger of injury to the brain is not great. The danger from sepsis when the dura has been lacerated is considerable; in these cases the drain should always be used. It is surprising in such cases how quickly patients rally from the operation. The first patient on whom I operated left the hospital two weeks after

the operation. The first operation consumed forty-two minutes, the second fifty-seven. This is an operation of considerable anxiety, because we are at a disadvantage in controlling hemorrhage; if the carotid be injured its control is almost impossible.

As to the results obtained from operative interference: There have been fifty-seven cases collected up to date, and of this number there were five deaths. Two of the patients were seventy years of age. One died shortly after the operation as a result of shock, the other six days after the operation, without any special symptoms. Nothing was revealed post-mortem to account for the patient's death. For an operation which affords relief from such great suffering the mortality is small, one in eleven, and an idea of the suffering of these patients can only be gathered from those who are afflicted. They are willing to undergo any operation in the hope of obtaining relief. One of my patients, when informed of the dangers of the operation, expressed himself as follows: "Anything you can get out of this better than death is clear profit."

Fig. 2 shows the line of complete anesthesia three weeks after the operation.

Recent reports from my cases show that there has been no return of the neuralgia, and neither have they suffered from ocular symptoms.

Mrs. Kate M., Lincoln Neb.; housewife; age 53. Family history: Mother 85 years old, living, and healthy; father deceased, the result of an accident; two sisters are living and enjoying good health; husband and one boy are well. Patient enjoyed excellent health until sixteen years ago, when she was attacked with the present trouble. Was married at the age of twenty. Had one child; no miscarriages nor abortions. Never suffered from gout, rheumatism, nor any kind of disease. Had sustained no injury to the head. Had

not suffered from severe emotional excitement nor mental over-taxation previous to present illness. Menstruation normal.

Present history: Sixteen years ago, after a hard day's work, patient was attacked with a "stroke" or "shock" which prostrated her to the floor. The "shock" consisted of a severe sharp pain in the



FIG. 2.—Line of complete anesthesia.

entire right side of the face. The pain was intense and lasted about ten minutes. She could not open her jaws and remained for a time as though completely paralyzed. This was the onset of the attacks of chronic neuralgia for which she now seeks relief. The "attacks" occurred every few hours in the beginning, but for the last six years a spasmodic contraction of the muscles of

the right side of the face, with closure of the right eye, accompanied by intense pain, occurs every fifteen or twenty minutes, day and night. Excitement, pressure on the face, or a slight draught will bring on an attack. In the interval between the attacks the face is painful. The right half of the tongue appears to be the most painful spot. For that reason conversation is carried on in a low muttering tone, and has to be interrupted frequently when the attacks come on.

EXAMINATION.—No deformities or irregularities in the head or face; sight normal; nose free from obstruction. Teeth on the right side had all been extracted with the hope of relieving the neuralgia. No defect in the mouth or fauces; external meatus and drum normal. Heart and lungs normal; no irregularity in abdominal organs; pelvic organs normal; urine normal; no enlargement of glands; epitrochlear glands normal. The area of pain extends from right superciliary ridge down the entire right side of the face to the lower margin of mandible, from the anterior border of the ear forward to the middle line of the forehead, nose, lips, and tongue. An electrode placed over any part of the face produced intense pain.

The patient's condition was really pitiable, and when on the table, before the anesthetic was administered, she said: "Doctor, promise me that you will do one of two things; either cure me of this neuralgia or kill me."

OPERATION.—The patient was operated upon December 24th, 1895; chloroform was used. The head was placed in a somewhat elevated position and turned to the side. The details of the operation were as described above. The evening after the operation the patient was conscious and she said she was entirely relieved from pain, suffering only from the soreness at the position of the wound. Forty-eight hours after the operation the gauze packing was removed. A small quan-

tity of serum, blood and detritus escaped, but no cerebro-spinal fluid. The patient expressed great relief after the gauze was extracted, as she said the pressure seemed to be taken out of her head. At no time did her temperature reach 100 degrees. Her improvement was very rapid. She was able to sit up in a week and in two weeks left the hospital. The accompanying cut shows the line of incision and also the line of anesthesia three weeks after the operation. A letter from the patient, dated August 20th, states that she has had no return of pain. The only inconvenience experienced is the absence of sensation on the right side of the face.

John G., Ossian, Iowa; male, age 52; German; merchant; married; several children, all well. Received a bullet wound in the army. Enjoyed excellent health up to seven years ago, when he began to have attacks of pain on the right side of the face. In the winter time he would have them every day, or at the most, every second day. In summer he might go for a week without an attack. The last winter they increased very much in severity and duration.

He is of phlegmatic temperament; responds slowly to questions; appears to be suffering from some mental disturbance. Complains of pain in an area about the size of a dollar above the right superciliary ridge. When the "attack" is on the pain extends over the greater portion of the face.

Eyes, nose, mouth, and ears normal; has some digestive disturbance; lungs and heart normal; urine negative.

Date of operation, April 9th, 1896. Incision the same as described above. In this case the dura was opened and a considerable quantity of cerebro-spinal fluid escaped. The packing was withdrawn seventy-two hours after operation. That was also followed by a discharge of cerebro-spinal fluid, which was stopped by tying the pro-

visional suture. The patient made a rapid recovery; the numbness of his face annoyed him considerable. There was no pain after the operation. The ganglion and root were removed in one mass; it was given to Dr. Evans for examination.

Information received from patient August 14th states that he is not suffering from pain and enjoys excellent health since the operation. In neither of the patients was there any inconvenience expressed from the loss of sensibility in the eye. Convalescence was rapid; the patient was up and about the room in a week and left the hospital three weeks after the operation.

