CLINICAL STUDIES OF FIVE CASES OF SUPPURATIVE LABYRINTHITIS.*

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The various tests of vestibular irritability have been the subject of so many papers during the past few years that universal appreciation of the facts and theories upon which they depend may be assumed. The surgical significance of loss of caloric reaction is in some cases obvious. In others it presents problems of considerable difficulty. In bringing the subject before you again, my purpose is to recite briefly a few cases from my own experience in which caloric irritability was absent.

Case I. DIFFUSE SUPPURATIVE LABYRINTHITIS COMPLICATING MEASLES. This case is reported somewhat in detail as presenting in regular sequence all the classical symptoms of the disease from the onset to the final recovery following a labyrinthine operation. Miss A. W., trained nurse, 21 years of age, was admitted to the Willard Parker Hospital in December, 1908, suffering from a severe type of hemorrhagic measles. The ears, examined on admission, were reported to have been normal.

On or about January 5, 1909, she developed acute purulent otitis media of right ear with some mastoid tenderness. Myringotomy by the resident physician. Two days later, when I first saw her, a mastoid operation was clearly indicated. Removal of the cortex revealed pus in the antrum and extensive inflammatory changes throughout the mastoid cells.

Five days after the operation, when still very ill from the systemic infection, she developed the following additional symptoms, viz.: Marked rotary nystagmus to the left, which was most pronounced when the eyes were voluntarily turned to the left. She complained much of subjective vertigo. She was nauseated and vomited several times during the day. These symptoms underwent gradual but progressive diminution. During the dressing of the wound as she lay with the left ear buried in the pillow, the deafness of the right ear was very noticeable. During the month following the operation, the patient gained strength very slowly and the wound showed hardly any signs of repair. The bone remained comparatively bare of granulations, and such granulations as did

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form were of the type characteristic of bone disease rather than of repair. To correct this condition, a secondary operation was performed on February 17. This operation, which was essentially a curettage of the original wound, showed extension of bone necrosis in various directions. Following this the wound took on a healthy appearance except at the aditus where pus continued to collect. During the month following, the patient rapidly gained weight and strength, and was soon the picture of health. She now experienced absolutely no vertigo, and there was no disturbance of equilibrium. There was no nystagmus.

On March 22, the condition of the right ear was as follows: A large perforation was seen in the upper posterior quadrant of the membrana tensa. Into the mastoid wound pus still escaped through the unclosed aditus. Functional examination showed complete deafness of right ear. Caloric reaction absolutely negative. On March 24, a radical labyrinthine operation was performed. No trace of malleus, incus or stapes was found. The oval window was therefore open. A fistula leading into the horizontal semi-circular canal was present.

The labyrinthine operation included opening of the vestibule, the lower wall of the horizontal canal being used as the surgical guide to its position, removal of the promontory and careful curettage of the cochlear space thus laid bare. The patient recovered with a dry tympano-labyrinthine cavity, but, of course, with absolute unilateral deafness.

Case 2. DIFFUSE SUPPURATIVE LABYRINTHITIS, LATENT STAGE, WITH BEGINNING CEREBELLAR INVOLVEMENT. S. M., a girl of 14 years, had been under my care for chronic middle-ear suppuration. In July, 1908, during my absence in Europe, a radical operation had been performed by a competent surgeon which, however, had not resulted in a cure. She was discharged from the hospital, but kept under treatment in the dispensary. Her condition later becoming unsatisfactory, she was re-admitted to the Manhattan Eye and Ear Hospital, on November 26, 1908. From this time she was continuously a hospital patient, and for some weeks before she again came under my care was bed-ridden.

On February 24, 1909, when I had an opportunity of examining her again, her condition was about as follows: While not exactly emaciated, she had very noticeably lost flesh. She was unable to stand without support, this inability being apparently due to muscular paresis rather than to any characteristic ataxia. She fell not forward, backward nor laterally, but as by muscular collapse, her

legs simply bending beneath her. She complained somewhat of vertigo. There was no characteristic vestibular nystagmus. The effort with eyes closed to bring the tip of the index finger quickly to the tip of the nose showed very marked inco-ordination ataxia, and in this there was no noticeable difference between the two hands. At this time she complained chiefly of very severe headache. She had vomited frequently during the past few days. Her condition was evidently grave, and the advisability of an exploratory operation upon the brain was under consideration.

At this point, it was decided to test her caloric reactions. Prolonged irrigation of the right ear alternately with hot and cold water produced absolutely no reaction. Irrigation of the left ear quickly induced a strong normal reaction. The right ear, tested with the aid of the Bárány noise apparatus, was absolutely deaf. On the deafness and absence of caloric reaction, it was decided to investigate the condition of the right labyrinth.

Operation: On opening the old mastoid wound, the sigmoid sinus was found extensively exposed. Behind this, bone was removed over a considerable area of cerebellar dura; and here the dura was eroded, or at least covered with granulations, over a circular area as large as a nickel. On exposing the inner tympanic wall no trace of the stapes could be found, and granulations were seen protruding from the eroded oval window.

The labyrinthine operation included opening of the horizontal semi-circular canal and vestibule, removal of the promontory and curettage of the cochlear space thus exposed. This completed the operation. Neither the anterior nor the posterior vertical canal was opened. Sterile gauze was placed against the cerebellar dura, and the tympano-labyrinthine cavity was packed with iodoform gauze. The patient made a slow but satisfactory recovery.

In this case the symptoms, though indefinite, suggested a brain lesion rather than labyrinthine disease. The negative "caloric," in directing attention to the labyrinth, deterred me from an unnecessary exploratory operation upon the brain, and probably saved the patient's life.

As far back as 1907, the Vienna school had already formulated the dogma that in chronic purulent otitis media accompanied by signs of suppurative labyrinthitis, acute or latent, the labyrinth should be opened and drained, or no operation should be performed. The two following cases bear upon this creed.

Case 3. LATENT DIFFUSE SUPPURATIVE LABYRINTHITIS OF LONG STANDING, ULTIMATELY LEADING TO CEREBELLAR ABSCESS. J. F.,

laborer, 60 years of age. History and physical signs of chronic purulent otitis media of right ear, dating from childhood. Patient complained of pain in region of right mastoid, which also was somewhat sensitive to pressure. Hearing tests showed apparently complete deafness of right ear. Caloric test absolutely negative. There were no symptoms of vestibular irritation, and the patient denied ever having experienced marked dizziness in his life. From this negative history I argued that the patient at some time in the past had suffered a suppurative invasion of the labyrinth, the symptoms of which he had long since forgotten; and that the labyrinthine lesion had very possibly undergone resolution, leaving its results, however, in the deafness and loss of vestibular irritability. I decided, therefore, to do a radical operation, and to open the labyrinth only if physical evidences of labyrinthine disease were found.

Operation, April 30, 1909. During the course of the operation, the regions of the oval window, the promontory and the horizontal canal were carefully scrutinized, but no evidences of a labyrinthine fistula were found. The operation was completed by the usual steps of the radical operation. The patient was dismissed from the hospital on June 7, but the ear still discharged, and he complained of frequent headache.

Late in September, 1909, during my absence from the city, the patient was re-admitted to the hospital complaining of severe headache which he associated with his aural lesion. A secondary operation by a hospital colleague did not relieve the patient, who died suddenly on September 30. Autopsy revealed a cerebellar abscess of the size of a hazel-nut and surrounding purulent meningitis. The labyrinth was filled with pus.

I believe that this patient's death was directly due to my error of judgment in not having operated upon the labyrinth at the time of the original radical operation.

Case 4. L. M., Italian, 36 years of age, had suffered from a chronic suppurative lesion of his left ear since early childhood. Twelve years ago, he experienced a severe attack, the symptoms of which he remembers as nausea, frequent vomiting, and severe dizziness, and which confined him to bed about ten days. Since this attack, he has been deaf in left ear. Three years ago the patient contracted syphilis, for which he is still under treatment. Functional tests showed absolute deafness of left ear, normal in right. In this case it was decided to combine surgical opening of the labyrinth with the "radical" operation.

Operation, December 6, 1909. The preliminary radical operation was performed upon a sclerotic bone of unusual density. The more or less soft cellular bone usually surrounding the bony capsule of the labyrinth was replaced by hard, dense bone, rendering the labyrinthine operation more difficult. Opening of the horizontal semicircular revealed a canal of abnormally small caliber. The excavation inward and downward through or behind this canal toward the vestibule was made difficult by the unusual density of the bone. The vestibule, when opened, was found to be a minute cavity containing thick pus, and apparently not more than two mm. in any diameter. In order to ensure drainage, the promontory was removed.

Apparently in this case the suppurative lesion had been followed by a process of osteo-sclerosis, as a result of which the labyrinthine spaces had been encroached upon, and considerably reduced in size. The patient is still under treatment for a slight discharge, which comes, apparently, from the Eustachian tube.

Case 5. A woman, 35 years of age, had suffered from chronic left middle-ear suppuration of many years' duration. The present condition is as follows: The left membrana tensa and Shrapnel's membrane are practically destroyed. The inner margin of the roof and posterior wall of the bony meatus is to a very considerable extent eroded, providing a wide opening into the vault and aditus. The inner wall of the tympanum is covered with epidermis. Hearing tests, with the sound ear closed, by means of a Bárány instrument show useful hearing power in the left ear. Caloric reaction of left ear,—absent two months ago, possibly by reason of granulations in vault and aditus which have disappeared under treatment,—is now normal, being induced well within fifty seconds. Fistula test: Compression induces marked horizontal nystagmus toward diseased (left) ear; suction produces similar but less active nystagmus toward right ear.

In this case, we have evidently to do with a suppurative lesion which has produced a defect (fistula) in the bony capsule of the labyrinth, probably communicating with the horizontal canal, but which has not resulted in infection of the membranous labyrinth.

Case 6. This is an unusual example of the results of neglect. J. H. is a boy of 4 years. He contracted measles during his first year, which was followed by a constant discharge from the left ear. When about three years old, he developed facial paralysis of left side, soon becoming complete, but later making a slow, partial recovery. When first seen at the Manhattan Eye and Ear Hospital,

the condition was as follows: Typical subperiosteal abscess behind the left ear; profuse offensive otorrhea; a small mass of granulations (polyp) had its origin from about the middle of the denuded posterior wall of the bony meatus.

Operation: Exposure of the left mastoid revealed two cortical perforations, one near the tip, the other above and behind the spine of Henle. On attempting to use a curette, a large sequestrum, including the postero-superior wall of the bony meatus, detached itself and was removed. The radical operation was therefore predecided for me. The facial canal was open throughout the horizontal portion. A fistula was present in the anterior part of the promontory. A necrotic tract extended from the antrum inward behind the semi-circular canal system. This I curetted as well as I could without entering the labyrinth from behind. Owing to the patient's youth, and not having tested the labyrinthine function, I was averse to operating upon the labyrinth, but kept the posterior wound open in order to have the wound cavity in better view. Following this operation, the condition of the wound at each dressing was so foul that I was literally forced two weeks later to perform the usual labyrinthine operation. The facial paralysis is again complete, but the patient is otherwise making satisfactory progress toward recovery.

This short series of cases suggests certain points for discussion, e. g., the stage of the disease most favorable for surgical intervention; the dangers of the labyrinth operation itself; the merits of the Vienna theorem, that in suppurative labyrinthitis we should operate upon the labyrinth or not at all.

As regards the most favorable time for the labyrinthine operation, I am firmly convinced that the latent stage of the disease is the period in which the labyrinth can be operated upon with least risk. Of the operative cases which have come within the range of my personal knowledge, nearly all the deaths have occurred in cases operated upon during the acute stage. There are admittedly certain cases in which the onset is followed by such pronounced signs of meningeal irritation that one is obliged by the urgency of the symptoms to operate. Such cases, I believe, are comparatively rare. One must bear in mind that vomiting, headache and elevation of temperature are distinctly characteristic of vestibular irritation, and are not necessarily indicative of meningeal disease. When these symptoms are not excessive or too prolonged, surgical intervention should be delayed. In typical cases the clinical picture will show marked improvement within a few days or a week. In the

first case cited, had I operated upon the labyrinth during the acute stage,—i. e., while symptoms of vestibular irritation were still present—I very much doubt whether the patient would have recovered.

As to the dangers of the operation itself, I do not believe that it is a particularly dangerous procedure if performed during the latent stage, and if the surgeon has formed a rational and conservative view of the mechanical results to be attained. What we wish to accomplish is in most cases free drainage of the labyrinthine spaces, and this is accomplished when the vestibule is freely opened and a counter-opening is made by removal of the promontory below. It matters not by which route the vestibule is reached, provided it be freely opened, and no important structures injured in the approach thereto. Obviously a fistulous tract leading into one of the semi-circular canals should be followed up as the logical guide to the original pathway of infection. Further than this, the separate opening of each semi-circular canal is not called for and adds nothing to the patient's chances of recovery. These little canals open only into the vestibule, and when the latter is opened and drained, all that can be accomplished, so far as the canals are concerned, is attained. When the promontory has been removed, granulations within the cochlea should be removed by means of a curette. To attempt more in this particular field reduces, rather than adds to, the chances of recovery in the great majority of cases.

As to the question of operating in cases of chronic middle-ear suppuration with evidences of past suppurative labyrinthitis:—is it safe in such a case to perform a radical operation without at the same time opening and draining the labyrinth? Personally I believe that it is not. While in Case 4 of this series, the labyrinthine condition exposed by the operation hardly seems to have called for so extensive a procedure; in Case 3, the symptoms were not more urgent, and in this instance failure to open the labyrinth cost the patient his life.

With regard to Case 5, in which a fistula leads to a functioning labyrinth, I am still somewhat in doubt as to the best plan of treatment in such cases. Would a radical operation ensure the patient's safety? Apparently there are two sides to this question. If by careful surgery epidermization could be obtained after thorough removal of all diseased bone, including that lining the fistulous tract, the element of danger would seem to have been removed. On the other hand, if the operation should fall short of complete removal of the fistulous tract, epidermization might add greatly to the dangers of labyrinthine infection. A further possibility in such

a case lies in the chance—probably rather remote—that any operation might excite acute inflammatory changes along the tract of the fistula leading rapidly to suppurative labyrinthitis. In view of the above considerations and of the fact that the tympanic condition has greatly improved under local treatment, it has seemed to me that a radical operation would be unwise in this case.

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A SET OF ANTRAL CANNULAE.

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None of the instruments best adapted for specific work in the upper air-passages accomplish their object so unsatisfactorily and with so much difficulty as the antral cannulae with which I am acquainted. The difficulties met with in the use of those on the market caused me to have constructed by Messrs. Geo. P. Pilling, Son and Co., of Philadelphia, the set here illustrated. The accompanying wood-cuts make necessary very little in the way of verbal description. The set consists of six tubes. Three of them, num-

bers 3, 4 and 5, are for use in the frontal sinuses; two, numbers 1 and 2, are for use in the maxillary and sphenoidal sinuses and for flushing the region of the middle turbinates; number 6 has been added and is useful in certain abnormal conditions which readily suggest themselves. The cannulae are six inches long and have a screw attachment to a rubber bulb, of a size small enough to allow easy manipulation while the tubes are being inserted. The curves of the frontal cannulae are adapted from that of the frontal duct curette of Dr. T. C. Worthington, of Baltimore.

314 East Franklin Street.