

# RECOVERY IN TWO CASES OF STREPTOCOCCUS MENINGITIS FOLLOWING LUMBAR LAMINECTOMY AND DRAINAGE

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The mortality of streptococcus meningitis is so very high that any method of treatment which offers even a slight possibility of a cure of this condition is deserving of our consideration. While the treatment which we have employed is not a new one, it has proved so successful and so rapidly ameliorative that we believe it should be given a more extended trial.

In 1914, Barth<sup>1</sup> reported recovery in three cases of streptococcus meningitis following lumbar laminectomy and drainage. It was our good fortune shortly after this to have admitted to the surgical ward of the St. Louis City Hospital the following cases:

**CASE 1.—History.**—L. B., an Italian laborer, aged 65, was brought to the City Hospital, Oct. 27, 1914, at 12:50 p. m., complaining of pain in the back of his neck, vomiting for the last three days, and pains in his legs. He was very stupid and spoke little English. Questioning elicited the following indefinite history: About three weeks before he entered the hospital, he fell about 7 feet from a huckster's wagon, alighting on his head, neck and shoulders. He suffered a laceration of the scalp, and was unconscious for a few moments. Following this accident, he was unable to work because of pain in his head, weakness, nausea, and "whistling in his ears." He remained at his employer's for three weeks under home treatment, until the present attack began, at which time he was brought to the City Hospital. He was a wandering Italian laborer, and unfamiliar with the country. He was injured in a rural district, some miles from the city, and long distance telephone communication with his employer failed to add anything to the foregoing history.

**Examination.**—The patient was fairly well nourished and developed, and was conscious, but dazed. General physical examination revealed nothing, except those changes due to oncoming senility. Neurologic examination: Pupils small, left smaller than the right, regular in outline, react to light and accommodation; facial contraction apparently equal, tongue deviates slightly to the right; neck rigid; upper tendon jerks equal, but very active; abdominal and cremasteric reflexes equal, but active; knee-jerks equal, but very rapid; Achilles active and equal; no ankle clonus, no Babinski, Chaddock's external malleolar sign positive on the right; double Kernig; lower extremities hypersensitive; patient disoriented as to time and person, and speech is rambling if attention is not held. Temperature 97.6, pulse 72.

At 8:30 p. m. or seven hours later, the patient was unconscious, and could not be aroused. Examination revealed a very rigid neck, abdomen retracted and hard, a double Kernig sign, and Babinski with Chaddock's external malleolar sign. Temperature 98.4, pulse 62. On lumbar puncture, a turbid fluid escaped under pressure. Examination of a centrifuged specimen showed numerous pus cells, with extracellular organisms resembling streptococci. Bouillon and agar cultures examined the following day showed pure cultures of streptococci. After lumbar puncture, the diagnosis of purulent meningitis was justified, and immediate operation advised.

**Operation.**—The patient was prepared for operation, and at 11 o'clock, under spinal anesthesia, a typical lumbar decompression was performed. The spinal anesthesia was a complete success. An incision was made over the third and fourth lumbar vertebrae. The muscles were separated from the spines of the third and fourth vertebrae, and when the bleeding was controlled, the spinous processes were removed at the base with bone forceps. The Hudson burr was used to perforate the laminae at the base of the divided spinous process, and the rest of the laminae were removed with rongeur forceps. The ligamentum subflavum was then incised to expose the dura of the cord. In order to prevent the too rapid escape of the spinal fluid, it was thought best to lower the head of the table. The dura was then incised and a free escape of turbid fluid took place, which was readily controlled by gauze sponges. A rubber dam was then inserted to the dura and the wound carefully closed in layers except for the drain in the lower end of the wound.

The postoperative course of this case was uneventful, except for loss of sphincter control for a period of about nine days. His temperature was never above 99 degrees; he regained consciousness after two days and complained of having headache for several days. Neck rigidity disappeared on the fifth day following operation, and Kernig's sign disappeared several days later. The drain was removed on the fifth day following operation. On the fourteenth day, the patient was up in a wheel chair, and was walking two days later. Cerebrospinal fluid escaped from the wound almost until the time of his discharge, but the wound closed externally with slight meningocele. He was discharged, recovered, Nov. 27, 1914.

**CASE 2.—History.**—M. K., a schoolgirl, aged 8, was brought to the City Hospital Dec. 16, 1914, with the following history: Five weeks before, she had become ill with an attack of tonsillitis, to which she was subject. She apparently recovered from this attack, but about three weeks ago her ears began to ache, and a family physician, who was called, put drops in her ears, which gave her relief. At this time, a swelling about the size of a walnut appeared behind her right ear, but soon disappeared. December 13, the patient again became ill, complaining of severe headache, and was brought to the hospital three days later. On her entrance to the hospital, the child appeared quite ill. She was conscious and rational, but cried and moaned from pain in her head. She vomited several times the day of her entrance. General physical examination revealed no gross lesions; pupils were equal and reacted to light and accommodation; tonsils were large and injected; her neck was slightly stiff, but yielded to manipulation with some pain; she had slight tenderness over the right mastoid. Temperature 99.8, pulse 92. Neurologic examination elicited no pathologic reflexes; Kernig's sign was not present. At this time, a provisional diagnosis of mastoiditis was made.

For three days following her entrance to the hospital she rested well, with no medication. An ice bag was applied to the right mastoid region. Rather suddenly on the evening of December 19, three days after entrance, her temperature rose to 100.4, she complained of severe headache, and examination showed a rigid neck and a double Kernig. A lumbar puncture produced 20 c.c. of bloody fluid. By the next morning she had developed an internal strabismus, neck rigidity was marked, Kernig's sign was very pronounced, and her temperature was 103.4, pulse 120. A lumbar puncture resulted in 20 c.c. of cloudy fluid. Examination of a centrifuged specimen revealed many leukocytes with streptococci. Cultures examined the next day showed pure cultures of streptococci. At 6:30 p. m. an operation was advised and lumbar decompression performed.

**Operation.**—Under ether anesthesia a 2-inch incision was made over the third lumbar vertebra. The muscles were separated from the spines and the third and fourth spinous processes were removed with bone forceps. The Hudson burr was then used to trephine through the laminae at the base of the divided spinous process. The ligamentum subflavum was then incised and the dura exposed. At this point

1. Barth: Arch. f. klin. Chir., 1914, cv; abstr., THE JOURNAL A. M. A., Oct. 24, 1914, p. 1509.

the head of the table was lowered to prevent the too rapid escape of the spinal fluid. The dura was then incised and a turbid fluid escaped. A rubber dam was then placed on the dura and the muscles were sutured in place and the skin closed, except at the lower angle where the drain came out.

The postoperative course of this case was much more severe than in Case 1. The temperature varied from 102 to 101 F., and did not reach normal until January 4. The most striking and alarming feature was a rapid pulse, which remained 128 to 140, until January 4, when it dropped to 96. The patient complained of backache and headache for about four days following the operation. For two weeks following the operation, she was rather weak, but while her convalescence was slow and prolonged, attention must be called to the fact that symptoms of meningeal irritation were never prominent, and after the fifth day there was no evidence of meningeal irritation otherwise than a slight rigidity of the neck and a spasticity of the limbs, which remained until about January 10. After the fourteenth day, convalescence was progressive, and the patient was discharged as recovered, Feb. 6, 1915.

The result in these cases was so remarkable that we began to look up the literature on the subject, and found reference to similar operations performed by Barth,<sup>1</sup> Rolleston and Allingham,<sup>2</sup> Wynter,<sup>3</sup> Cushing<sup>4</sup> and others, although it was later on condemned by Cushing along with the operation of cerebellar decompression combined with laminectomy and through-and-through irrigation advocated by Leonhard Hill. The objection to the method of Hill as well as that of laminectomy was that the purulent exudate at the base of the skull sooner or later blocked off the escape of the cerebrospinal fluid from the foramen of Magendie, and thus defeated the purpose of the operation. That this objection is open to argument is seen by the work of Barr.<sup>5</sup> He trephined a patient dead from meningitis and did a lumbar puncture, leaving the cannula in place. Then he tapped the lateral ventricles and allowed a methyl blue solution to flow into the ventricles under a very low pressure, and observed the escape of the fluid from the lumbar cannula, showing that even in this patient dead from meningitis the normal channels of the cerebrospinal fluid were not blocked. Postmortem examination showed that the methyl blue fluid had found free access to the base of the brain, and the exudate was thoroughly stained by this solution. He also did the same thing in a patient on whom he had operated as a last resort, using a normal saline solution, and observed its appearance at the lumbar opening. The patient was in no ways injured by the procedure, although dying shortly after this. On the death of the patient he repeated the same thing with the methyl blue solution, and demonstrated the patency of the normal channels. Several patients have been cured by repeated lumbar punctures,<sup>6</sup> and Gorse<sup>7</sup> reports a case of recovery of a patient on whom he had performed a lumbar puncture with a Rosenthal needle, which leaves the sheath or cannula in place for permanent drainage. The patient recovered after thirteen days of continuous lumbar drainage.

Murphy<sup>8</sup> described an operation of drainage of the sacral cisterna with cerebellar decompression and irrigation, and reports a recovery.

Haynes<sup>9</sup> and Kopetsky<sup>10</sup> strongly favor cerebellar decompression and drainage of the cisterna magna, but reported no cures in six cases in which operation was performed in this manner. Day<sup>11</sup> did not get a cure in nine cases with operation by the Haynes method. In spite of strong appeals for the operation, therefore, it does not seem to fulfil the expectations of its advocate.

The successful outcome in our cases was undoubtedly due to the early diagnosis and prompt treatment, and herein may lie the secret of success in this disease. The mortality in acute purulent meningitis is very high, and unless treated surgically is almost invariably fatal. As a rule the onset of the disease is sudden. The symptoms are intense and the course is short, rapidly tending toward a fatal issue. Netter,<sup>12</sup> in a study of sixty-five cases, found that fifty-four died within four days. Death is the result of two factors, increased intracranial tension and toxemia. The first factor can be influenced by repeated lumbar punctures, or by permanent drainage. The second factor of toxemia may be overcome possibly by the dilution of the toxins through the rapid secretion of the cerebrospinal fluid. It is estimated that the normal secretion is replaced every three or four hours by an entirely new supply, and in abnormal conditions, as fracture or lumbar puncture, the alteration in normal tension may result in a very rapid increase in the amount of this secretion.<sup>13</sup>

Streptococcus meningitis is a surgical disease, just as acute purulent peritonitis is a surgical one, and here again we see the analogy; the mortality is extremely high in peritonitis unless we early establish thorough drainage. Therefore we may perhaps draw the conclusion that early operation and permanent drainage will offer a lessened mortality in acute purulent meningitis.

## VISIBLE ACUTE DILATATION OF THE STOMACH DURING LAPAROTOMY

### REPORT OF TWO CASES WITH OBSERVATIONS

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Frequent reports of postoperative dilatation of the stomach are made, but rarely of a case occurring which is visible through the laparotomy wound during operation. The explanations of the postoperative cases are almost as numerous as the number of cases reported. It has been said that probably more than one cause or a combination of causes may be responsible for such a condition.

I have long been of the opinion that none of the reasons heretofore named as the cause of dilatation of the stomach were entirely satisfactory. I have had the idea that in nearly all if not every case the air had been taken in through the mouth in some modified process of deglutition.

As a boy I can well remember an old horse named Charlie which, when approached for the purpose of being saddled, would gulp down large chunks of air (aerophagy), causing such distention of his belly that it was with difficulty that the girth could be properly

2. Rolleston and Allingham: *Lancet*, London, 1899, p. 889.

3. Wynter: *Lancet*, London, 1891, i, 981.

4. Cushing: *Keen's Surgery*, iii, 140.

5. Barr: *Brit. Med. Jour.*, Nov. 26, 1911.

6. Klapp: *München. med. Wehnschr.*, 1915, lxii, abstr., *THE JOURNAL*

A. M. A., March 20, 1915, p. 1039.

7. Gorse: *Bull. Soc. de pédiat. de Paris*; abstr., *THE JOURNAL A. M. A.*, Dec. 17, 1910, p. 2186.

8. Murphy: *Surg., Gynec. and Obst.*, April, 1907.

9. Haynes: *Laryngoscope*, xxii, 865.

10. Kopetsky: *Laryngoscope*, xiii, 797.

11. Day: *Laryngoscope*, xxiii, 1041.

12. Netter: *Osler's Modern Medicine*, vii, 176.

13. Seelig and Hagler: *Interstate Med. Jour.*, March, 1915, p. 248.