

## SIX CASES OF EPIDEMIC CEREBRO-SPINAL MENINGITIS.\*

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Of the six cases briefly detailed in this communication, five were observed at the Falls of Schuylkill, Philadelphia, and one in the southwestern portion of Philadelphia. At the Falls of Schuylkill several other cases have recently been observed, and it is interesting to recall that it was in this neighborhood, during 1864 and 1865, that the disease was widely prevalent and very virulent. In the first case an elaborate autopsy was made, which gives the case a distinct scientific value; in the other cases, certain special points of interest make them worthy of being recorded. They are reported briefly so as not to load the paper with unnecessary details. The first four cases occurred in the practice of Dr. Cahall, and two of them were seen by Dr. Mills in consultation; the fifth was a patient of Dr. J. Y. Kelley, of Manayunk, Philadelphia; the sixth was a patient of Dr. J. W. Dick, and was seen several times by Dr. Mills in consultation.

CASE I.—Mrs. W., aged thirty, the mother of three children, had had bad health since the birth of her last child, now two years old. She was greatly depressed in spirits and imagined she had all sorts of diseases, but for a few months she had regained, to a considerable degree, her former health and spirits.

February 21, 1888, she was taken with chills and headache, and on the morning of the 22d, when first seen by Dr.

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Cahall, she complained of acute pains down both legs, but more intense in the posterior aspect of the knee-joints, any movements of the limbs causing her to scream with pain. She already had headaches, contraction of the muscles of the neck; and ten to fifteen irregularly shaped spots of a color from pink to purple, and from the size of a pea to a silver dime, were scattered over the legs and abdomen. Diarrhœa, abdominal distention, and tenderness were present from the first. Delirium came on by the morning of the 23d, with lucid intervals, when she said she saw everything double. All the other symptoms were intensified.

On the 24th she was totally blind and partially deaf, but when aroused could give sensible answers to questions. She still complained of the headache, but not of the pain in the legs unless pressure was made along the course of the nerves, when she would cry out as though suffering great pain. The pulse was rapid, but the temperature was never over 103°. There was general hyperæsthesia.

On the 26th she sank into a stupor, from which it was gradually more difficult to arouse her. She died upon the morning of the 29th on the eighth day of her sickness.

Dr. Mills saw her in consultation the day before her death.

*Autopsy.*—Drs. A. H. P. Leuf and Judson Daland performed the autopsy, at which the writers were present, and examined the specimens. The following are the results of the megascopic examination.

*Brain:* The pericranium was very vascular. The veins of the dura mater were gorged with dark venous blood on the outside, and the inner side of the membrane showed marked arterial injection. It was adherent to the convexity of the right hemisphere at the upper border of the quadrate lobule. In front of this on both sides, were Pacchionian adhesions of the dura to the brain. The anterior lobes of the brain, especially on their convexity near the great median fissure, were œdematous, with a few slight opacities of the pia. At the base was seen liquid and semi-liquid pus about the optic chiasm, interpeduncular space, pons, and oblongata. The auditory and facial nerves were bathed in

pus, as were, in fact, all the nerves at the base of the brain except the olfactories. All the cranial nerves were soft, especially the olfactory and optic. Softening of the crura cerebri, pons, crura cerebelli, and oblongata was also decided. The pia covering the isthmus was intensely injected, but this could only be seen by the removal of the pus that covered it. The arachnoid between the medulla and cerebellum was also covered by a thick layer of pus.

The puncta cruenta were well marked, numerous, and dark. The basal ganglia were normal, except some venous puncta. The fornix was softened. The fissure of Sylvius presented nothing abnormal on either side when opened for inspection; and all the cerebral vessels appeared normal.

*Spinal cord:* On opening the spinal canal, the cord lay flat and spread out in its membranes, instead of being narrow for the canal, and bulging with well marked convexity. The dural vessels were well injected externally and internally. On section of the dura pus exuded freely. The membranous coverings of the spinal nerves within the canals were almost ecchymotic. This was most noticeable in those given off opposite the lumbar enlargement, and especially on the left side. The whole cord was surrounded with yellow creamy pus. The lower half of the back of the cord was covered with a yellow gelatiniform pus layer, while the same covering was found on only the lower two inches in front. All the pus was situated between the dura and pia. The anterior and posterior spinal vessels were gorged with blood, and there was a fine injection of the arterioles of pia and dura. A few adhesions between the pia and dura were noticed behind, but many throughout the whole length of the cord in front.

*Peripheral nerves:* The lower end of the left sciatic in its two divisions (the internal and external popliteal) were removed; they were marked externally by several distended blood-vessels. On the right side this was not so noticeable as on the left. The second, third, and fourth digital nerves of the dorsum of the right foot presented nothing abnormal, but slight pressure at the end with forceps caused some blood to appear. The same was true of the second and third digitals of the dorsum of the left foot.

*Muscles* : A piece of muscle was excised from the lower end of each semi-membranosus. To the eye it presented nothing abnormal.

*Thoracic and abdominal viscera* : Careful examination showed the lungs to be crepitant throughout and apparently entirely normal. The pleural cavities were free from effusion. A few adhesions were present on the right side, and numerous adhesions on the left, many of which were evidently quite old.

So far as could be determined by careful naked-eye examination, the heart and aorta, intestines, liver, and kidneys were normal.

The stomach was normal in size, but here and there, under the mucous membrane, were seen small extravasations of blood. The spleen was twice its normal size, but of firm consistence, and its capsule normal. The uterus and its appendages were normal in size, shape, and position. The endometrium was somewhat thickened, and of a dark red color; there were considerable submucous extravasations of blood.

Marked evidence of recent moderate, adherent peritonitis were found. This was particularly noticeable on the surface and between the coils of the small intestine. At no place did the layer of lymph exceed the thickness of a sheet of paper, and the peritoneal cavity contained no liquid effusion.

A small drop of purulent-looking substance from the thick exudation covering the spinal cord was examined microscopically by Dr. Daland, and showed numerous leucocytes imbedded in a gelatinous-like substance, probably lymph, apparently there was not so much pus as would be expected from the marked yellow color.

CASE II.—N. W., aged eleven, daughter of Mrs. W. (Case I.), was of a nervous disposition inherited from her mother.

Three days before her mother's death the child was taken suddenly ill with pain in her left leg below the knee, particularly severe around the ankle-joint. Slight redness and swelling were perceived about this joint.

Tincture of opium and sodium salicylate were prescribed, and on the following morning the leg was much better, but her neck was painful and drawn to the left side, from contraction of the sterno-cleido-mastoid muscle. There was tenderness along the spine from between the shoulders to the occiput. She did not suffer with headache and had no delirium. The special senses remained normal. The bowels were constipated. In the evening a slight rise of temperature was noticed, but her pulse was slower than normal.

Under ordinary circumstances the case would probably have been dismissed as an ordinary one of rheumatic or neuralgic torticollis, but the patient's mother was lying up stairs with an undoubted attack of cerebro-spinal meningitis, which had commenced in a similar though more violent manner. This aroused suspicion as to a similar cause for the two attacks. An eruption was looked for, but did not appear until the fourth day, when five spots, two pink and three purple, made their appearance on the legs and lower part of the abdomen.

The tincture of opium and sodium salicylate were continued in moderately large doses. Friction and counter-irritation were used upon the neck, but the contraction and tenderness on pressure remained in a marked degree for several days, and did not finally disappear for several days longer.

CASE III.—M. M., aged twenty-four, a mill-girl, had a history both in herself and in the female portion of her family, of a highly nervous temperament. On the 16th of January, while enjoying her usual health, she had gone to her work. During a passionate debate among the employes as to the advisability of a strike, which she opposed, she proceeded, with the others, to the sidewalk, laboring under great mental excitement. The day was very cold, and shortly after reaching the windy street, she fell to the pavement screaming with a pain in her neck. She was taken to the house of a neighboring physician, who gave her two hypodermatic injections of morphia, after which she was brought home. At first she complained of nothing except the intense pain in the neck. The head was drawn back-

ward. She had no fever; pulse 60. The day following her neck was about the same, while an intense headache of a constricting character was added. The mental faculties were clear and all the functions of the body were well performed. Fever was still absent, and pulse 60.

After the use for two or three days of morphia, bromide, and chloral, without the slightest improvement, hysteria was suspected, but later a genuine organic disease seemed manifest. At about the end of a week she complained of great pain in both legs, and especially upon pressure over the nerves. Dr. Mills saw her at this time in consultation. While the pain in the legs continued the headache and neckache were greatly lessened. Morphia, sodium salicylate, and oil of gaultheria were given, under which the pain in the legs disappeared. The headache never returned with its first intensity, but an active delirium took its place. Illusions and delusions kept her in a state of excitement for days with scarcely any sleep, in spite of large doses of anodynes. The drawn state of the neck was persistent. Fever came on, although never high. The pulse continued slow.

The patient drifted from bad to worse. The active delirium gave place to a heavy stupor, when it was difficult to administer either medicine or nourishment; but as nourishment was considered the most pressing need, it was regularly and persistently forced upon the patient. A flea-bite eruption appeared on the arms, face, and neck, but not until after the second week. The eruption would disappear and reappear, but never so distinctly as at first.

For three weeks longer, or to the fifth week of the sickness, the patient's mental condition remained practically unchanged. Iodide of potassium, 5 grains and bichloride of mercury  $\frac{1}{4}$ th grain were given three times a day. In three days the girl's mind was perfectly clear, and she remembered her sickness only as a disagreeable dream.

CASE IV.—R. L., aged nineteen, a mill girl, was taken suddenly ill while at her work upon the 1st of March. An intense headache followed by chills ushered in a high fever. Her temperature was  $103.5^{\circ}$  the first evening. She complained of pain in the limbs and neck, but there was no con-

traction of the muscles of the neck until March 3d. Nausea and vomiting were present during the first three days, and during the nights of the same days the patient was delirious.

Pills of opium and quinine, with an effervescing fever mixture, reduced the temperature by March 4th to 100° F., above which it never again rose. From the 4th to the 9th the case remained at a standstill. The headache was greatly better, but the contraction of the muscles of the neck was increased, fixing the head immovably backward. Hyper-æsthesia and deep-seated pain upon slight pressure were present over the whole posterior region of the neck. The patient complained of feebleness and exhaustion. On the 6th, the opium and quinine were given at longer intervals, and iodide of potassium 5 grains, and bichloride of mercury  $\frac{1}{8}$ th grain, four times a day.

In two days the patient was sitting up, with fever gone, neck greatly relieved, and appetite and sleep returned. Her convalescence was from this date forward rapid and complete. No spots were found in this case.

CASE V.—Notes of the following case were furnished by Dr. J. V. Kelley, of Manayunk, Philadelphia :

The patient, a young man, was first seen February 18, 1888. He was in good health until the preceding day, when in the evening he was taken with a chill, vomited twice, and had two stools. He worked during the forenoon of the day he was taken sick, although feeling very badly. At 2 P. M., when first seen by Dr. Kelley, he was in bed and complained of great soreness. He complained of tenderness confined to the abdomen, so much so that the case was at first thought to be one of enteritis. He was very cold; pulse 134, and he seemed much prostrated. He was placed on brandy and tonics, and the next day in a manner revived.

February 20th, he was seen by Dr. Bruen, who thought the case to be one of cerebro-spinal fever. Herpes labialis was beginning to show. The next day he had some delirium; his pulse was still 134.

On the 22d, he was seen by Dr. Pepper, who agreed that the case was one of cerebro-spinal fever. Herpes labialis

was now profuse, some delirium was present, and hearing and sight both defective. He had two offensive stools, and complained of great general soreness, but had no characteristic spots, although there was a vesicular eruption on the chest. He had no retraction of the head, although his neck was somewhat stiff. His abdomen was tympanitic, and this persisted until death occurred, February 28th.

About the fifth day of his seizure the patient complained of blindness. On one occasion he bled from the nose and spat some blood. No heart or lung symptoms could be demonstrated by examination, and the man died from prostration on the eleventh day of the disorder. He showed typhoid signs, but the case was certainly not typhoid fever. The treatment was by stimulation and tonics, with full feeding. Brandy, quinine, digitalis, opium, and turpentine were given.

CASE VI.—The following interesting case occurred in the practice of Dr. J. W. Dick, and was seen by Dr. Mills several times in consultation. The patient, R. A., a boy eight years old, in the latter part of October, 1887, had an attack of mild scarlet fever, followed by slight nephritis, which kept him in the house until the last of December. After this time he began running out of doors in all sorts of weather, in his play sometimes lying down in the snow. He seemed to be in the best of health until February 2d, when he was suddenly taken sick at school. He came home complaining of violent headache, and was taken down also with vomiting and high fever, with marked delirium. The delirium soon subsided, and he sank into a semi-conscious condition. He would not answer, as a rule, any question or demand, but sometimes asked for a drink, and he would give notice when he wished to evacuate the bowels or bladder. On the fourth day an eruption appeared over the entire body, more especially marked on the face, neck, and upper extremities. The eruption consisted of small pin-point, fleabite-like spots, which did not disappear on pressure. It faded in about four days after its first appearance.

His temperature varied at first from 103° to 105° F., sometimes higher in the morning than in the evening, and



sometimes the reverse. The following is the temperature record from February 17th to 26th :

February	Morning.	Evening.
17th	104.4°	104° F
18th	104.4	103.8
19th	103.6	103.6
20th	102.6	103.2
21st	102.4	102.6
22d	102.4	101.6
23d	102	102
24th	101	101
25th	101	101
26th	101	101

After this his temperature showed a tendency to fall, and came down to 95.5°.

His pulse was weak, but regular, varying usually from 112 to 120. His respirations ranged from about 30 to 40. The vomiting lasted only during the first day, after which he took and retained both food and medicine. His bowels were usually slightly constipated, but responded freely to enemata. After February 22d he did not attempt to speak, but lay in a comatose condition, with frequent sudden outcries, as if in pain. His abdomen became decidedly scaphoid. He was troubled with a cough throughout his entire sickness. There were abundant mucous râles, with a little dulness on percussion on the right side.

In the beginning of his sickness the slightest movement gave rise to intense pain. This gradually subsided ; but he continued throughout to have great tenderness on pressure in the region of the neck and in the legs. The pain in his lower extremities was a very marked symptom ; handling them, and pressure along the nerves or squeezing of the muscles, caused great suffering. No swelling of the joints was present. He exhibited some pain and tenderness in the upper extremities, but not nearly as marked as in the lower ; the knee-jerks were retained. He could move the legs up and down freely, but the feet had a tendency to assume the

equino-varus position ; this foot-drop was more marked on the right side. No paralysis of the cranial nerves was present. For three weeks before his death he was apparently both blind and deaf; for a short time he had a slight discharge from the left ear. He died on the thirty-sixth day.

REMARKS.—These cases are of considerable interest from various points of view, but we shall only be able to call attention to a few of the most important features. At a former meeting of the Society it had been suggested by Dr. Mills that neuritis was probably present as a complication or coincidence in some of the cases, and in others the infectious agent caused a multiple neuritis rather than a cerebro-spinal disease. As no microscopical examination has yet been made from the specimens of Case I., we are not able to say positively that neuritis was present, but the gross examination of the sciatic and other nerves led to the suggestion that either congestion of the nerves or neuritis was present.

A few words might be said with reference to treatment. Bromide of potassium, in half-drachm doses, failed to relieve the headache or produce sleep in the severe cases (the same result followed chloral). Nothing definite can be said as to the effect of quinine. Sodium salicylate and oil of gaultheria gave relief to the neuritic pains in the legs, but produced no appreciable benefit to the head and neck. Opium and morphia did positive good in every case, but after the more acute symptoms had passed the good effect seemed to be lost. In the two cases where iodide of potassium and bichloride of mercury were used by Dr. Cahall, the effect was surprising to patient and physician alike. The improvement was too rapid to be the result of the alterative properties of the drugs, but more like the action of specific remedies.