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THE LATE EPIDEMIC OF

CEREBRO-SPINAL MENINGITIS

IN MASSACHUSETTS.



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SOME ADDITIONAL REFLECTIONS UPON THE NATURE
AND CAUSES OF CEREBROSPINAL MENINGITIS

By A. HAYES LEECH, M.D. of London.

Read before the Association of Physicians, London, June 17, 1848.

It is not my intention to enter into a discussion of the nature of the disease, which forms the subject of this paper, during its progress in an epidemic form, or in any of the states of the system. The purpose of my examination here was to inquire more especially into the circumstances attendant upon the return of the disease, with a view to ascertain if possible its origin, or supposed cause. In the course of this inquiry, I obtained from personal observation, and a somewhat extensive correspondence with the Fellows of this Society, a mass of facts which I have thought not to perhaps be of much further use to the profession. Under this idea, I have selected the most complete of the cases comprised in the tables annexed, and with a view to a more careful analysis of some of their important features, it will be my aim not to insert what I have so roughly sketched upon this subject, although I must necessarily, however, to some extent, trespass upon the rights of others.

And in reviewing the above, I my limited powers in this field of research, I am struck with the apparent facility for obtaining even the most essential information which may be the object of general enquiry. The able and intelligent committee, who were charged with the inquiry into the causes and history and modes of treatment of the fatal epidemic of this disease, to which we have recourse in this country, that of 1816, framed with great care and conscientiousness a series of questions under several heads, which were sent in behalf of the Massachusetts Medical Society to all its Fellows and other gentlemen of character in whose vicinity the disease had prevailed. They were published, also, in the principal newspapers of the day, in order, as the report says, that any persons possessing useful information on this subject might be induced to communicate it.

In reply to this circular, the committee inform that they received communications from twelve persons, all Fellows of the Society; and likewise, indeed, numerous communications from several gentlemen of respectability in the State of Connecticut. And upon their respective answers, reports together with the few cases which formed the basis of the committee's investigation were also prepared, and furnished that most interesting and instructive report on "Epidemic of 'Spotted Fever,' which appeared in the second volume of the Medical Communications and Discussions of this Society, under date of June 21, 1818.

SOME ADDITIONAL REFLECTIONS UPON THE LATE
EPIDEMIC OF CEREBRO-SPINAL MENINGITIS.

By J. BAXTER UPHAM, M.D., of Boston.

Read before the Massachusetts Medical Society, June 2, 1874.

GENTLEMEN,—It fell to my lot in the last year to investigate, with some care, the disease which forms the subject of this paper, during its prevalence in an epidemic form in various parts of the State. The purpose of my examination then was to inquire more especially into the circumstances attendant upon the advent of the disease, with a view to ascertain, if possible, its origin or supposed cause. In the course of this inquiry, I obtained, from personal researches and a somewhat extensive correspondence with the Fellows of this Society, a mass of facts which I have thought might perhaps be of some further use to the profession. Under this idea, I have selected the most complete of the cases comprised in the tabular returns received, with a view to a more careful analysis of some of their important features. It will be my aim not to repeat what I have so recently advanced upon this subject, although I must, necessarily, traverse, to some extent, the same ground.

And, in reviewing the labors of my honored predecessors in this field of research, I am struck with the superior facility for obtaining accurate statistical information which we of the present generation enjoy. The able and indefatigable committee, who were charged with the inquiry into the causes and history and modes of treatment of the first epidemic of this disease, of which we have record, in Massachusetts—that of 1810—framed with great care and conscientiousness a series of questions, under seventeen heads, which were sent in behalf of the Massachusetts Medical Society to all its Fellows and other gentlemen of character, in whose vicinity the disease had prevailed. They were published, also, in the principal newspapers of the day, in order (as the report says) that any persons possessing useful information on this subject might be induced to communicate it.

In reply to this circular, the committee affirm that they received communications from twelve persons, all Fellows of the Society; and, likewise, indirect communications from several gentlemen of respectability in the State of Connecticut. And upon this somewhat meagre return, together with the few cases which the members of the committee themselves were able to inspect, was founded that most interesting and instructive Report on “Spotted or Petechial Fever,” which appears in the second volume of the Medical Communications and Discussions of this Society, under date of June 21, 1810.



In contrast with the above, the circular issued under the auspices of the Massachusetts State Board of Health, in the month of May, one year ago, brought replies from about two hundred physicians, representing seventy-seven towns and cities, and containing the data, more or less complete, of upwards of five hundred cases of the disease. And I am happy to improve the opportunity, which I may not again have, to tender my sincere thanks to those members of this Society—many of whom are now before me—who have responded so fully and so promptly to the demands thus made upon their time and patience. The consciousness of duty well performed, and the satisfaction of aiding in the elucidation of an obscure and terrible disease, must be your abundant reward.

But to my subject:—It is well known that the disease we are now considering has prevailed to a limited extent, within the last few years, in our own and several of the adjoining States. Dr. Parks, in the able and exhaustive report made to this Society in 1866, has given us a detailed account of all the cases he could collect in the eight or ten years preceding that date. Since 1870, it would appear that the number of cases rapidly increased, till they culminated in the somewhat extensive epidemic of 1873.

I am convinced that I have been able to get together only a minority of the cases that occurred in that year, and of these the data, as a whole, are by no means as complete as could be wished. But the returns are widely distributed over the State, and may be said to fairly represent the ordinary phenomena of the disease. The name which has, of late years, been given to this affection—that of cerebro-spinal meningitis—conveys the idea of its essential nature, as manifested in its prominent symptoms and revealed by *post-mortem* inspection; and it points, likewise, to the principal indications to be aimed at in its treatment. It was not possible, within the scope of my communication to the State Board of Health, to more than glance at the general characteristics of the malady in question—to give, in briefest form, an idea of its history, its habits and progress, and gain some hints for prophylactic management in times of its epidemic prevalence.

It will be my object at this time more especially to present a condensed view of the symptoms and pathological manifestations of the disease, based upon the series of cases I have selected, and to consider a few of the many modes of treatment adopted. The number of these selected cases is 315, of which 173 recovered and 139 died,* the ratio of mortality being $44\frac{2}{3}\%$ per cent. This percentage is almost precisely the same as that of the 517 cases comprised in my recent report to the State Board of Health, and it is interesting as containing, so far as it goes, the statement, already published, that the recent epidemic was a mild one in comparison with many others on record.

In the tabular statements to which I have alluded, the symptoms are grouped under two heads, according to the time of their appearance, whether in the earlier or later stages of the disease. In this way, I believe we are more likely to obtain, from a multitude of observers, such minuteness and particularity of record as will conduce to a more reliable analysis of this important chapter in the history of any epidemic disease. And in regard to these symptoms, as I have elsewhere said, they exhibit great diversity of manifestation; it cannot be expected in any given case that a majority, even of those which legiti-

* Three cases were incomplete.

mately belong to the disease, will be present. This has, no doubt, tended greatly to obscure its diagnosis, on the part of those especially who are not familiar with the affection, who have learned its habits from books mainly. Hence it is important to find out, if we can, the most constant and prominent of the signs and symptoms which pertain to the affection.

The relative frequency of these symptoms, as applicable to the list I have in hand, may be seen by the following tables:—

Table showing the Relative Frequency of some of the more Marked Symptoms in the Early Stages of 315 cases of Cerebro-spinal Meningitis indicated in the foregoing series.

NOTED IN HOW MANY CASES.	EARLY SYMPTOMS.
61	Chills.
223	Headache.
44	Nausea.
147	Vomiting.
102	Pain in nape of neck.
86	Delirium.
64	Irregularity of the pulse.
57	Pain along the spine.
50	Stiffness of muscles (of neck especially).
49	Retraction of head.
40	Spasms or convulsions.
39	Stupor or drowsiness.
37	Anomalous pains.
30	Opisthotonos.
29	Restlessness.
27	Tenderness over spine.
24	Hyperæsthesia.
19	Prostration.
18	Muscular twitchings.

Table showing the Relative Frequency of the more Prominent among the Advanced Symptoms in 315 cases recorded in the preceding series.

NOTED IN HOW MANY CASES.	ADVANCED SYMPTOMS.
74	Headache.
84	Delirium.
75	Retraction of head.
62	Opisthotonos.
56	Spasms or convulsions.
54	Coma.
54	Prostration.
46	Irregularity of the pulse.
39	Stupor.
36	Pain in nape of neck.
34	Rigidity of muscles (of neck especially).
34	Dilated pupils.
34	Anomalous pains.
32	Paralysis.
31	Hyperæsthesia.
31	Pain in spine.
55	Petechial spots.
26	Restlessness.
20	Strabismus.
15	Herpes.
15	Deafness.

It must be remembered that I am only attempting to show, by this analysis, the comparative frequency of such symptoms as are sufficiently marked to attract the attention of observers in the series of cases I have adduced. Unfortunately, we are, for the most part, without the negative evidence which, if obtained, would have added greatly to the interest and value of the tables. We can only take them as we find them.

It appears from these tables that chills, headache, nausea, vomiting, pains at the nape of the neck, delirium, irregularity of the pulse, stiffness of the muscles (of the face or neck more particularly), retraction of the head, spasms or convulsions, stupor or drowsiness, and anomalous pains were among the most constant of the early symptoms, being noted respectively in 61, 223, 44, 147, 102, 86, 64, 57, 50, 49, 40, 39 and 37 cases; and, in the later stages, the symptoms and phenomena more frequently observed were headache, delirium, retraction of the head, opisthotonos, spasms or convulsions, coma, irregularity of the pulse, stupor, pain in nape of neck, rigidity of muscles, dilated pupils, anomalous pains, paralysis, hyperæsthesia, &c., these symptoms being noted in 74, 84, 75, 62, 56, 54, 54, 46, 39, 36, 34, 34, 34, 32 and 31 cases, respectively.

It may be interesting to append here a tabular statement, showing, in condensed form, the relative frequency of these more prominent symptoms as noted at some period of the disease in all the recorded cases, as follows:—

Table showing the Relative Frequency of the Prominent Symptoms noted at some Period of the Disease in the cases recorded in the preceding series.

NOTED IN HOW MANY CASES.	PROMINENT SYMPTOMS.
61	Chills.
238	Headache.
147	Vomiting.
132	Delirium.
102	Pain in nape of neck.
102	Retraction of head.
92	Irregular pulse.
90	Pain in spine.
79	Opisthotonos.
70	Rigidity of muscles.
68	Spasms or convulsions.
66	Stupor or drowsiness.
61	Anomalous pains.
58	Coma.
57	Prostration.
55	Petechial spots.
51	Restlessness.
46	Nausea.
44	Dilated pupils.
41	Tenderness of spine.
35	Paralysis.
34	Hyperæsthesia.
27	Muscular twitchings.
22	Herpes.
22	Irregular breathing.
21	Deafness.
20	Strabismus.
13	Contracted pupils.
12	Intolerance of light.

As I have before said, it is not to be supposed that even in a majority of the cases from which these tables are deduced all the important symptoms of the disease have been set forth. I do not claim, therefore, for these numerical statements anything more than a comparative exhibition of the facts and phenomena that more particularly arrested the attention of the physician in his earlier and later visits. Nor can we attach any very great value to such chronological statistics in a disease of so uncertain duration. Its onset is for the most part sudden and unheralded, and, as will appear from an inspection of the returns, the physician's services are generally demanded at once. His first visit dates, usually, within a few hours from the time of the attack. I have classed the early symptoms, therefore, among those which appear in the first three or four days of its course. With this explanation, the summary I have given will, I hope, afford some aid in the prompt diagnosis of this oftentimes obscure affection.

Before leaving this part of my subject, I will dwell somewhat upon a few of the symptoms above enumerated. It will be seen that the disease is not uniformly ushered in by chills or rigors, as is commonly the case with purely febrile affections; and my own experience has been that when such symptom is present it is rather a *sense of chilliness* than a well-defined chill. Headache is an early and an almost constant accompaniment, and it is generally of the severest kind. It is variously denominated in the preceding returns as "intense," "very severe," "excruciating," "tearing," "horrible," &c. &c. The delirium may be severe, but it is oftener than otherwise of a kind which, for want of a better term, I will call superficial—by which I mean that the patient can usually be roused so as to answer questions logically, even in the worst cases. There are, of course, exceptions to this rule. Vomiting is an early and pretty constant symptom, with children especially. Pain in or about the nape of the neck, it will be seen, is noted as among the most frequent of the early symptoms. This is oftentimes accompanied with a peculiar sense of stiffness and of tenderness to the touch, and with that other characteristic, oftentimes pathognomonic, sign, retraction of the head. Conjoined with these last, may usually be found the rigidity of muscles referred to in the tables. Irregularity of the pulse is a marked symptom. It indicates, of course, the erratic action of the heart, which has many times sadly confused the diagnosis. So closely, indeed, does this latter symptom simulate valvular disease of the heart as to deceive the most wary. A labored, panting respiration is very naturally joined with the symptoms just mentioned. And I cannot help thinking that it must have existed in more instances than the preceding tables would indicate. Under the head of anomalous pains may be classed the painful sensations alluded to by various writers on this disease, which come on, for the most part, suddenly and unexpectedly, and affect the arms, legs, feet, hands, the stomach or bowels, the joints, &c. &c., without seeming connection or cause. We might speak, also, of anomalous *motions* as pertaining to this disease. One patient is spoken of as indulging in "small, convulsive movements, such as no Christian ever made." Another is represented as striking and spitting at his father. Others are described as "clutching," "kicking," "gyrating," &c." The petechial spots, which are reported as having been present in a limited number of cases, are generally of a hæmic character, and resemble

those seen in the worst cases of typhus. Restlessness and jactitation, with hyperæsthesia, do not assume that prominence in the foregoing tables which my own experience has given to them; and it is quite likely that, in the greater prominence of more important symptoms, these may have passed unnoticed. There is oftentimes great nervous agitation, and a dread of being moved or even touched. The bowels are usually torpid; indeed, constipation is very generally alluded to as the ruling condition in the preceding tables. The temperature is not given as often as could be wished, and when indicated, the period of the day or the stage of the disease has not been particularized. In several cases, however, a very high temperature has been noted, as high as $108\frac{4}{10}^{\circ}$ by Dr. Wm. Read, and in one instance (that of a boy eight years of age), by Dr. Ira Russell, as high as 110° .

We come now to the anatomical characteristics of the disease, which, as might be inferred from the symptoms above detailed, belong mostly to the brain and spinal cord. In fifteen cases only were *post-mortem* examinations obtained. But, so far as they go, they tend to confirm the generally received pathology of this affection. In twelve cases, there was either purulent effusion or a deposit of lymph on some part of the surface of the brain, most often at its base—in one instance, “like fibrine” in substance. In seven cases, there was an increased quantity of fluid in the ventricle, or beneath the arachnoid. In seven cases, there was congestion of the membranes to a greater or less extent. There was a deposit of lymph upon the spinal cord in six cases. In three cases, there was apparent suppuration of the cord. Opalescence of the arachnoid was manifest in three cases; and in one case the membranes at the base of the brain and spinal cord were thickened and adherent. It is much to be regretted that so few autopsies could be obtained. But such as we have will afford a fair opportunity to judge of the average character of the anatomical lesions. And they tally, in the main, with my own observations in other and more limited epidemics of the same kind. According to my former experience, however, it sometimes happens that the most undoubted manifestations during life leave no perceptible trace after death; more especially is this to be anticipated in cases sudden and violent in their accession, and of brief duration.

In reviewing the tabular statements of the list of cases to which I have called attention, I have studied with much care the record of treatment. And I am struck with the manifold and various plans of therapeutic management which have been adopted, and the evident earnestness and faith with which, sometimes, very opposite methods are advocated. Indeed, almost every known mode of treatment, in its every kind and degree, seems to have found its representative here. Thus: one physician, of high standing and influence, gives morphia, Dover’s powder, tartrate of antimony and aconite, with calomel and opium, but “*no stimulants*,” and brings his patient through in about two weeks with a good recovery; another equally eminent practitioner, in the same town and in the same space of time, reports a perfect recovery upon beef-tea and milk, quinine, carbonate of ammonia and brandy. In the practice of a Boston physician, two cases having the same symptoms, were treated with ergot and the bromides early; later, with opium, quinine and wine, conjoined with milk diet and occasionally a warm bath. The result was, in the one case recovery,

in the other death, in about the same period of time. Seven out of nine patients died in the hands of another physician, who assiduously and conscientiously administered opiates and the iodides, together with tonics and stimulants, and counter-irritation to the parts particularly affected. An eminent country practitioner, who had several cases under his charge, reports that he faithfully administered belladonna, ergot, quinine, brandy, wine and iron throughout the course of the disease and found them in every instance to disagree. Another, in speaking of a three months' case which was still pending, tells us that after the bromide of potassium and the application of cold to the head and neck, and irritants to the spine, added to abundant nourishment with milk and eggs, beef-tea, &c. &c., for the last month his patient had "taken no drug," for no treatment, he adds, seemed to be of any avail; and, on the next page, he continues, in grim despondency, "*result, probably fatal.*"

Another adopted a thoroughly rational, expectant treatment; the bowels were kept open by mild laxatives, pain and restlessness were relieved by bromides and opium; irritation was applied to the nuchæ and upper portion of the spine, and, in later stages, quinine, iron, stimulants, with nourishing diet, were given, *secundum artem*. The result in a majority of his cases was *death*. Another sums up his treatment in the one word, "stimulants," and his next record reads as follows: "*No autopsy was permitted.*" Still another puts under the head of treatment the designation "homœopathic;" the inevitable result was "*death.*"

Seriously, gentlemen, I am puzzled, in the abundant experience which the late epidemic has given us, to discover what course of treatment promises the best. At the Massachusetts General Hospital, the iodide and bromide of potassium, ergot, quinine, with milk and beef-tea, formed the staple management. The same general plan, with the addition of ice to the head and croton oil to the nuchæ, with belladonna and ergotine, constituted the treatment at the Boston City Hospital. A well-known physician of this city puts great reliance upon the exhibition of ergotine and the extract of belladonna, in the proportion of a grain of the former to one tenth of a grain of the latter, for adults, administered every four hours during the acute stage. This combination, in connection with tonics and stimulants, a good diet and the application of cold to the head and occasional irritants to the nape of the neck, was followed by recovery in a large majority of his cases. One gentleman reports a highly favorable result in a series of ten cases treated by the application of hot water to the head, blisters to the nuchæ, a sinapism to the spine and hot fomentations to the feet, followed, at a later stage, by the administration of bromide of potash, the fluid extract of ergot, aconite, stimulants and nourishing diet. Another, who had a considerable experience in the disease, resorted to the old-fashioned application of the "hemlock sweat," as it was administered by our fathers a half century ago, and, as he thinks, with positive advantage. Several observers have thought they saw a marked improvement consequent upon the application of irritants, as above described, to the nuchæ and spine.

It would appear, from the foregoing summary, that no positive plan of therapeutic management has been developed by the recent epidemic. This coincides with my own previously expressed views as derived

from a personal experience of the disease in military camps and hospitals, and confirmed by study and observation elsewhere. Yet, after all, I believe that something can be accomplished in the way of treatment. Bearing in mind the essential element of the disease, a morbid poison acting primarily upon the vital fluid and affecting secondarily and rapidly the meninges of the brain and spinal cord more especially, giving rise to symptoms and phenomena which simulate, while they are not identical with, inflammatory action in these parts, the consequent exhaustion of the vital powers and great perversion of the nerve force, as manifested in the irregular action of the heart, the labored breathing, the restlessness and jactitation and extreme sensitiveness of the surface; remembering, also, the material lesions which are so generally revealed on *post-mortem* inspection, the indications for a rational treatment would seem to be these:—

1. To husband the strength.
2. To combat the tendency to congestion of the brain and spinal cord.
3. To mitigate the intense pain.
4. To calm the nervous excitement.
5. To nourish and support the system till the exuded morbid products can be removed by the kindly offices of nature, and to minister, in the meanwhile, by all the ways at hand, to the comfort and relief of the patient. The choice of means for the fulfilment of these manifest indications I leave to the judgment and good sense of those who hear me.

I am aware, gentlemen, that much more might be said upon the subject of this epidemic, and that the analysis of the tabular returns might be pursued to advantage in other directions than those I have attempted; but I have already reached the limit set forth in my paper at the outset, and I will trespass no further upon your patience.

