Original Articles.

TYPHOID SPINE.¹

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THE name "typhoid spine" was given by Gibney to a condition at times following enteric fever, which was characterized by great pain and sensitiveness of part of the vertebral column, simulating rather closely Pott's disease. Gibney described four cases and subsequently a fifth, but only the first three can be accepted as authentic instances of this condition. Gibney believed it to be due to a perispondylitis, meaning an acute inflammation of the periosteum and the fibrous structures which hold the spine together. Osler analyzed Gibney's paper, and reported three cases of his own under the title, "On the Neurosis Following Enteric Fever, Known as the Typhoid Spine." He was rather inclined to regard the condition as a neurosis, in some cases at least, on the ground that prolonged periostitis lasting for weeks and months and not coming to suppuration was unlikely. He may be quoted as follows: "While, of course, it would be very illogical to assume that all of the instances are due to the same cause, yet I cannot help feeling that many of them are examples simply of the painful neurosis formerly known as spinal irritation." The three cases observed by him he was inclined to regard as neurotic in character. Quinke reported two cases, like the others in every respect, under the name of "spondylitis typhosa." As to its nature he was inclined to believe that Osler was partly right, although he thought that Gibney's view might have a correct basis. Another case was reported by Knitzer, where a blacksmith, twenty-five years old, four or five months after the beginning of a severe typhoid, was seized with very severe pain in the back, which kept him in the hospital some two months. The case presented nervous phenomena, but no unusual symptoms, and followed the general type of the cases of Quinke and Gibney.

These apparently are all the contributions of literature on the subject. The nine cases (three of Gibney, three of Osler, two of Quinke and one of Knitzer) reported are all much alike and present the following characteristics, so far as one can generalize from so few cases. The patients affected are young adults (males in all reported cases). The spinal affection occurs late in the convalescence, or after it is apparently ended, often after the patient has returned to work. It may follow an accident or may occur spontaneously. It affects the lower dorsal or lumbar region. It is attended by curious nervous symptoms, such as paresthesia, variation in surface reflexes, etc. Pain is excessive and rigidity of the spinal column is due more to voluntary muscular contraction, holding the spine steady, than to the involuntary muscular spasm, as in tuberculous spondylitis. No system of treatment has been formulated. The prognosis is favorable.

The case to be reported is of interest in connection

with previously reported cases for the following reasons: Deformity resulted, which must have been due to a destructive osteomyelitis; nervous phenomena of two kinds were present: first, certain signata of hysteria; second, phenomena of another kind, showing pressure. Taken altogether, it would seem that in this case, at least, the lesion was a mild, self-limited osteomyelitis of the bodies of the vertebra, which for some reason is attended with nervous symptoms of a character simulating hysteria, yet having some basis in pressure phenomena.

The patient is a physician, aged thirty-five years; tall, rather spare, with good muscular development, and at one time a teacher of physical training. He belongs to a family of rather exceptional longevity and vigor, and is one of ten children, all of whom, with the exception of three who died in infancy, are, with the parents, living and well. One aunt on the father's side died of epithelioma of the breast, and another of sarcoma of the humerus. An aunt on the maternal side died at twenty-five of pulmonary tuberculosis, this being the only instance of that disease in the family. The patient has had no illnesses except pneumonia in 1886 and dysentery in 1891. He had never had any trouble with his back. He was assistant surgeon of United States Volunteers during the Spanish War and served in the Cuban campaign. In camp before Santiago he was taken sick July 17, 1898, and had a continuous high temperature with watery diarrhea for two weeks, and an intermittent temperature for two weeks more, during which the bowels were more regular. The diagnosis of the division hospital was tropical malaria. On August 14th he left Santiago for Montauk, being at the time very weak, but free from fever. After remaining there in the same condition for five days, he came to his home in Central Massachusetts, arriving there on August 26th. The next day he had a sharp chill, but it was not repeated and he began rapidly to gain strength.

About the 25th of September he began to notice lameness in the lumbar region, and October 6th, after getting very tired, had severe cramps in the same region, which required a hypodermic injection of morphia. He remained in bed for three days, then rapidly improved and began medical practice. He continued to feel perfectly well till November 26th, when he had a slight chill. That day he came to Boston. The next day the cramps in the back returned and grew rapidly worse. He remained in bed at a hotel till December 3d, when he entered the City Hospital.

The physical examination at his entrance was for the most part negative. Though there had been occasional chills, the temperature was normal. The abdomen was tense, tympanitic and slightly tender; no rose spots. A search for plasmodia was made on December 3d, and again on December 13th and 30th, but with negative results. He complained chiefly of severe pain in the lumbar region, coming on in spasms of great intensity. These were much aggravated by getting out of bed, which, as he was unable to use the bed-pan, he had to do daily. These dorsal pains were very excruciating and several times required the use of morphia. The effect of massage was to aggravate the pain, partly because the treatment involved his turning upon his side, which was likely to start up the cramps. Faradism

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also proved useless or injurious, and day after day the pain continued to be distressing, with some loss of sleep. Blood examination soon after entrance showed 7,450 whites, and on December 30th a characteristic typhoid serum reaction was present, clumping occurring in two minutes. Throughout the month of January the pain was still complained of; at times, especially toward the end of the month, the patient thought it was less intense when at rest, but all attempts to sit up in bed or move at all caused great distress.

Examination, January 30th, showed on the outer surface of both thighs, extending from trochanter to knee, an area of diminished sensation to pain and touch, most marked on the right leg. Patellar reflexes lively; plantar and abdominal, normal; cremasteric, sluggish. The spines of the lower dorsal and the upper lumbar vertebrae were tender to pressure. The muscles of the loin were rigid. Three or four days later there was noted a tenderness over the posterior part of the ilium. No swelling to be seen. Considerable muscular spasm. No prominence of any vertebral spines at this time. On being made to stand, patient cannot hold himself erect, and after standing a minute the pain in the back becomes worse. On sitting in an armchair he rests his weight as far as possible on the elbows. Cannot bear to sit up without such support. After an hour in this position the pain becomes severe but passes off when he goes back to bed. He contrives to sit up altogether about two hours per day. No rectal or vesical symptoms. Eats and sleeps well.

February 5th. Patient walks about a little with a cane, but moves with great slowness and caution. Rises with much difficulty from the chair, and gets his balance slowly and carefully. In the course of the next four days he could walk the length of the corridor with two crutches, showing some gain in the ability to use the lower extremities. About this time a distinct projection of the spines corresponding to the eleventh and twelfth dorsal and first lumbar vertebrae was for the first time noticed. There was also noted a considerable tenderness over the transverse processes of the second lumbar vertebra, worse on the left side. Meantime the patient continued to walk slowly and stiffly with crutches daily. He felt more comfortable when standing or lying than when in a chair. After a day or two he himself discovered the "knuckle" and was much alarmed thereat.

The patient was first seen by Dr. Lovett in consultation with Dr. Withington February 11, 1899. At that time he was in bed most of the time and was able to go about with crutches. There was a well-marked prominence of the spinous processes in the lower dorsal and upper lumbar region, involving apparently two or three vertebrae; the spine was almost absolutely rigid in passive and active movements; getting from the bed into the erect position was accompanied by intense spasm of the spinal muscles and very severe pain, more so than in Pott's disease, even of a severe type; the knee-jerks were moderately increased and motion in the legs was apparently good. A provisional diagnosis of "typhoid spine" was made. As movement was evidently attended by great irritation and pain, it was decided to put on a plaster jacket, which was applied on February 17th, with the patient lying prone in a hammock. Less relief followed than is customary after the application of the jacket to pa-

tients with Pott's disease, although the patient was somewhat better.

As the patient was evidently hospitalized, he left the hospital on February 24th and went to a hotel. At this time, although movement was attended with less pain than without the jacket, he was still very uncomfortable and the erect position was painful. He walked fairly well with crutches.

The temperature chart, which was carefully kept during his hospital residence, showed for the first two weeks a slight irregularity with elevations not exceeding 99.6°. About December 17th a more marked febrile movement began, accompanied by slight chills on four occasions, December 22d, 23d, 28th and January 4th. As already remarked, repeated examination failed to reveal the plasmodia. The fever during the twenty-five days following December 17th ranged mostly from 100° to 102°, only three times exceeding the latter figure. After January 10th the curve returned to about the same character as during the first two weeks, only once reaching as high as 100°, but showing a constant diurnal variation from about 98° in the mornings to 98½° or 99° in the evenings. After he left the hospital the evening temperature, which was taken at intervals, was always found to be normal.

On March 1st the plaster jacket was opened, a strip cut away to allow it to be brought tighter and it was fastened with straps, but with this he was less comfortable than with the fixed jacket, and on March 8th a second jacket was put on, again in the hammock position. This jacket was purposely put on very tight and each turn of the bandage pulled with all reasonable force. Improvement in the pain immediately followed and he was able to be about more, although able to do very little. As soon as he began to be freer from pain it was noticed that the power in his legs was poor and that he was evidently suffering from some muscular impairment of motion. His knee-jerks were decidedly increased and he had some ankle clonus. At this time another test of the blood gave a positive Widal reaction.

On March 10th he was seen by Dr. Withington in consultation with Dr. Lovett. He was found to be walking with crutches a little better than when he left the hospital, but the getting out of bed and assuming an erect attitude was attended with great difficulty, apparently not so much from pain as from loss of power. When lying recumbent he raised the legs from the bed with great difficulty, the paresis in each being equal. Muscular sense was good. Tactile sensation good, except in the areas on outside of the thighs before noted. No impairment of sphincters. No atrophy. Patellar reflex increased, slight ankle clonus. No rigidity or contractions of legs. Appetite and other bodily functions good. Patient cheerful and hopeful.

On March 11th he was seen by Dr. Morton Prince in consultation with Dr. Lovett. Examination showed very much increased knee-jerks, slight ankle clonus, two anesthetic patches, one on the outside of each thigh, and impaired muscular power in the movements of the legs. In addition to this there was a greater disability in getting about, rising from a chair, etc., than seemed to be explained by the impairment of muscular power. According to Dr. Prince the signs found were confusing, somewhat contradictory, and not characteristic of any type of spinal lesion; at the

same time the anesthetic patches were constant and definite, and Dr. Prince felt that there had been compression present, which accounted for part of the symptoms, but that the present condition as a whole, apart from this, was rather to be classed as hysterical. The patient in other respects although, not a hysterical man, showed the effect of long confinement in bed and severe pain in mental excitability and dread of pain. Dr. Prince's diagnosis was, therefore, some form of compression, with hysterical symptoms. At his advice massage to the legs was given daily and the patient improved rapidly.

The third jacket was put on April 1st, and at that time photographs of the back were taken showing deformity. At this time another examination of the blood showed a positive Widal reaction. The patient left for Virginia on April 6th. On April 11th, 13th and 15th he had chills and high temperature, probably of malarial origin. At the time that he left for the South he was able to walk with crutches or for a short distance with canes.

In July, 1899, he reported to Dr. Lovett, still wearing his jacket. For a month previous to this he had been able to walk a mile or two without assistance, he could play golf, and was unconscious of any pain whatever in his back so long as the cast was applied. The cast was cut and fastened with straps, and on the succeeding day, as the cast was soft and afforded improper support, he began to feel fatigue and discomfort in his back again. An accurately fitted leather jacket, re-enforced with steel, was then made, which immediately relieved his symptoms, and the patient returned South again.

On October 3d, he reported, still wearing the leather jacket. At this time he was able to ride horseback, walk long distances, hunt, and had gained about thirty pounds in flesh. The deformity was still present, although less evident on account of the better development of the muscles. The movement of the spine was perhaps two-thirds of the normal in all directions. When standing with the knees straight he could stoop so that the hands came within sixteen inches of the floor, he had no pain in movements and very slight tenderness in the spine; what there was remained chiefly over the transverse processes of the second lumbar vertebra. At this time he returned to the practice of medicine, the only restriction being that he should lie down for an hour and a half in the middle of the day.

On November 16, 1899, he reported again. He was engaged in the active practice of medicine and was able to do his full work without discomfort or fatigue. The movements of the spine had improved, and he could go without his jacket two or three hours without discomfort, and with the knees straight he could stoop to within thirteen inches of the floor. Tenderness of the back had disappeared, but the anesthetic patches on the outside of the thigh persisted to a slight extent.

On December 2, 1899, he reported that he was getting along very comfortably, was able to do his full work and that he had no discomfort in his back, was still wearing his leather jacket and spent one hour and a half a day in the recumbent position.

The first questions which arise are whether the patient had typhoid fever, and if so when? To the former we can at once reply affirmatively, on the strength of the unusually prompt and positive response to the

Widal test on December 30th, which seems to be the first date at which the test was applied. This was confirmed by subsequent tests. That he had never had typhoid prior to his Cuban experience we can be sure. Did, then, his typhoid occur in Cuba or soon after his residence at Montauk (where typhoid prevailed), or was it first present during the febrile movement which occurred in the hospital? None of the signs of the disease, in the way of roseola, spleen or diarrhea were noted while he was in the hospital, and it is more reasonable to suppose that his attack in Cuba was, like that of many other soldiers, a mixed infection by malaria and typhoid. The fixing of the disease in July would also be more consistent with the first occurrence of the spinal symptoms in October, and the fever curve of December and January, if not typhoid and not malaria, is quite explainable by the spondylitis, as will be seen by comparison with other cases mentioned hereafter.

With regard to the exclusion of tuberculous disease of the spine it may be said that the clinical aspect of the case was not that of ordinary Pott's disease. The muscular rigidity seemed largely voluntary, the pain was excessive, tenderness of the spine was present and there was pain referred to the peripheral ends of the nerves. The tuberculin test was negative. The Widal test was positive. The subsequent history of the case and the rapid recovery, good mobility of the spine returning within nine months of the most acute period, is not characteristic of severe Pott's disease in the adult.

The so-called typhoid spine means, according to different authors, either (1) a neurosis or (2) a spondylitis or perispondylitis. The former view is held by Osler, the latter by Gibney, and in part by Quinke. In our case some of the symptoms would correspond to a neurosis, as, for example, the distribution of the areas of anesthesia on the thighs, the increased reflexes, ankle clonus, etc. But the character of the projection of the spinous processes of the vertebrae made it evident that in this case there must be present a destructive inflammation of the vertebral bodies in the lower dorsal region. As may be seen in the picture, the projection was of considerable size, the spinous processes could be easily made out and their angular projection could only be accounted for by the giving way of some part of the weight-bearing portion of the vertebral column. A periostitis could not explain it; one must assume an osteomyelitis to have been present. So far as the writers have been able to learn, this is the only case of well-authenticated typhoid spine accompanied by deformity.

The cases of Quinke are of special interest in this connection. In the first case the fever was over on the fifteenth day. On the twenty-first day occurred a relapse, which lasted a week. On the thirty-fourth day occurred a rise of temperature and lumbar pain. There was pain on rising in bed and tenderness over both sides of the spinal processes. This lasted but a few days and the patient sat up at the end of seven weeks. In a day or two the symptoms returned with greater violence and lasted altogether from two to three months. There was chill, irregular fever, swelling in the right lumbar region, girdle sense, retention of urine, and for a short time diminution of the patellar reflex. In the second case the typhoid was milder but more protracted. Towards the end of the fever there was a transient periostitis of the parietal

bone. The vertebral disease showed itself ten weeks after the defervescence, and several weeks after the resumption of work (blacksmithing). During the period of the spondylitis there was fever of an intermittent type. In both cases the lumbar spine was chiefly involved, but covering a large area, namely, four to six vertebrae. In both there was visible swelling of the soft parts and tenderness of the vertebral spines and bodies. Both cases showed paresthesia of the lower extremities and slight rigidity in some of the leg muscles. The limitation of movements was due chiefly to the pain, but it was not certain that there was any true paresis. Quinke concludes from analogy of the visible changes in superficial bones that there was in these cases an inflammatory swelling of the periosteum, with serous infiltration on the inner as well as the outer surface of the vertebral column which compressed the nerve roots of the cauda equina in the second case, while in the first case (in which the process involved the lower dorsal vertebrae), there was also compression of the inferior part of the conus medullaris, which would account for the bladder and rectal paresis in that patient.

Numerous observers have now demonstrated the occurrence of the typhoid bacillus in bone marrow, and this organism has come to be recognized as one of the many morbid agents concerned in bone inflammation. In those cases of "typhoid spine," therefore, in which spondylitis has a part, the latter may be considered as one phase of the bone involvement of typhoid, which in the case of the tibia, the ribs and the femur we have learned to expect. It is, therefore, interesting to recall that in one of Quinke's cases there had been earlier in the typhoid a periostitis of the parietal bone, which had undergone resolution. If we are to assume, in addition to the massing of typhoid bacilli in the vertebra, some local strain or injury involving those parts, it is likely that laborious work, undertaken before the bodily strength is fully re-established, may serve as such a factor. In one of Quinke's cases such a strain might have come from the occupation of the patient, who walked and climbed stairs carrying a peddler's pack, and in the other from his trade as a blacksmith, in which he had resumed swinging a heavy hammer for some time before the onset of the spinal symptoms. The same is true of Knitzer's patient, also a blacksmith. In our patient the active practice of medicine had perhaps been taken up too soon. In Gibney's first case the pain in the back began during convalescence; in the second case after a railroad journey undertaken during convalescence; in the third case spinal symptoms began after a fall in skating after convalescence seemed ended. In these cases there is no mention made of any unusual nervous condition.

Is the so-called typhoid spine a neurosis or a bone lesion? Two of the prominent authors who have recently answered this question have given their replies in accordance with their respective points of view, Osler, from the medical side, considering it a neurasthenic phenomenon, and Gibney, from the surgical, a perispondylitis. Osler's minor cases² especially suggest neuroses, in the brevity of their course and their onset at about the beginning of typhoid convalescence. His first group of cases,³ however, are more similar clinically to Gibney's, coming on from three to eight

weeks after convalescence, and lasting each for several months. He also includes a case in which there was diminished sensation in the legs with paresthesia, but no pain or tenderness of the spine, occurring in an alcoholic and venereal subject, after typhoid.

The longevity of the typhoid bacillus in certain parts of the body is well known, as for example, in the gall-bladder and in bone marrow of some of the typhoid bone lesions.

Dr. Parsons⁴ emphasizes this lateness in the evolution of typhoid osteitis and periostitis, saying that they vary from one to sixteen months after the fever. With one exception they have never been known to

occur during the course of the fever. Necrosis and suppuration do not always take place. Parsons thinks that such cases as Gibney's perispondylitis are perhaps to be considered as belonging to the same category with the more common typhoid lesions in the tibia, and other long bones, the sternum, etc., though the bacteriological proof is wanting.

The case upon which this paper is based had been considered, up to the time of the development of the knuckle, to be a post-typhoid neurosis. Had the deformity not appeared it would probably have continued to be so regarded. Reasoning from the analogy of

² Johns Hopkins Hospital Reports, vol. v, p. 315.

³ Ibid, vol. iv, p. 73.

⁴ Johns Hopkins Hospital Reports, vol. v, p. 417.

other post-typhoidal bone lesions, we may conclude that an osteomyelitis or possibly periostitis of the vertebrae is present in some of the cases which have been supposed to belong in the neurotic class of typhoid spines.

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IDIOPATHIC PNEUMOHEMATOTHORAX, WITH RECOVERY AFTER ASPIRATION.¹

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Mr. T. is thirty-four years of age, married. Born in Maine. Never seriously sick, except some eight years ago, when he was confined to the house two or three weeks with the "grip." During early manhood he followed the sea, and at this work gained the summit of his weight, 170 pounds; present weight about 150 pounds. After he gave up going to sea he worked as a marble cutter for some time, but gave this up by the advice of his physician, as there was some premonition of lung trouble. Of late years he has been at work in a grocery and provision store, meat cutting, etc. Sometimes has felt pain in right side when he had to shoulder or carry a heavy quarter of beef. He is erect, spare, active and strong, of temperate habits, and takes good care of himself. Family history is negative as to phthisis. Father alive and well at sixty-four; mother died at thirty-five; cause of mother's death not known. He was in his usual health and did his work on July 20, 1899. That evening, while sitting near an open window—it being very warm—he felt some pain about the waist on the right side. After this he remembers he got up, stretched himself vigorously and went to bed, where he slept a few hours. When, during the night, he awoke he felt very severe pain in the right chest in front, and had "a feeling of wind escaping there," and found motion of any kind made it worse, and felt weak and was feverish and short of breath, and suffered much until morning.

When I found him at 8.30, July 21st, he was lying on his left side, and could not sit up or turn without great pain and dyspnea. Pulse 108, temperature 102°, respiration 28 and shallow. There was a pale, cyanotic tint in the face. Most free from pain when lying quiet in bed, and found the changes of position needed for a physical examination very severe. Pain most severe over the right chest, a little below and rather internal to the nipple. In this area could be heard a peculiar amphoric sound to be detected nowhere else in the chest. Over the right apex and thence down about two inches below the clavicle a modified respiratory murmur could be heard, and in the corresponding area in the axilla and back also. Over the entire lower part of the right chest, front, side and back no respiratory sounds could be heard; no fremitus nor tubal breathing. Percussion gave a tympanitic note over the area. The physical signs were so marked that, though I had never seen a case of pneu-

mothorax before, I had no doubt of the diagnosis here. The dominant symptoms being pain and dyspnea on motion, he was given small doses of morphine and antifebrin and kept in bed, with mild counterirritants over the affected area.

The next day he was somewhat easier as to pain, and pulse and temperature were both a little lower. On getting him into an erect position, however, it was evident that some effusion was accumulating in the lower part of the air-filled chest cavity. He was less markedly cyanotic and when quiet in bed he was so easy that it was hard to get him and his wife to realize the gravity of his condition and my urgent request for counsel was only reluctantly acceded to. As he was feeling even easier the next day when Dr. Vickery was kind enough to call and see him in consultation, the welcome we got was not effusive. Not wishing to bias Dr. Vickery's mind I told him nothing of what I had found; in fact, unintentionally misled him by telling him the left side was at fault. The doctor, however, very soon sized the case up, as his notes will show, and, in fact, it was hard at this stage not to be struck by the pronounced pathological conditions present,—the effusion having increased in amount and, owing to the large air chamber above it, shifted its level with every change made in the patient's position. (We speak of the liquid as an effusion here, as at this time neither of us believed it was other than the usual pleuritic fluid.) Some tiresome cough having come with the development of pressure from the fluid a sedative mixture was advised, as also the continued use of the rubefacients. As the pain was less sharp since the fluid came and the dyspnea no worse, the patient was allowed to sit up and, as it was warm, to go out in a limited way. He was beginning to eat and his pulse and temperature did not go up, nor were there any rigors. At Dr. Vickery's suggestion, aspiration was delayed in the hope of absorption. However, at the end of twenty-two days, as his general condition did not improve and there was no evidence of the fluid receding, it was thought best to aspirate. The largest needle of the aspirator, after being boiled, was introduced in the posterior axillary line between the seventh and eighth rib, and held, after penetrating the chest wall, approximately parallel with the diaphragmatic floor. As soon as the vacuum was connected I was dismayed to see a stream of dark red blood pour into the bottle, where only serum or, at most, pus was expected. Visions of anomalous venous channels flashed through my mind, and I heartily wished I had continued to temporize, but I felt I was in for it, and had better make the best of it, as I could not be held responsible for anomalies. The large needle caused great pain, and after about thirty-four ounces had been withdrawn and the flow was becoming intermittent, the needle was withdrawn and the puncture sealed up aseptically with sterile cotton and collodion. No air was withdrawn and after the immediate pain of the operation was over the patient felt easier, and in a day or two was out and about again. The line of flatness was reduced by this aspiration about two and one-half inches. At the end of fifteen days the effusion had reaccumulated and the line of flatness was as high as ever. The resonant air layer seemed practically unchanged—possibly a little less. A second aspiration was done with the large needle in the seventh interspace, but a little further posteri-

¹ Read at the meeting of the Boston Society for Medical Improvement, December 18, 1899.

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