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A CASE OF PRIMARY TUBERCULOSIS OF THE LAMINÆ AND SPINOUS PROCESSES OF THE VERTEBRAL COLUMN.

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THIS case seems worthy of record because of the unusual situation of the tuberculous process, the diagnosis of which is substantiated not only by the clinical expression, but by bacteriological investigation. Even before an expert examination of the specimen was made, I had no doubt of the tuberculous character of the lesion until I recently read the statement of Bradford and Lovett, that "the transverse, articular, or spinous processes are rarely affected secondarily, and so far as is known never primarily, their structure of hard bone apparently protecting them from tubercular invasion."²

The child, a girl of ten or twelve years, a native of Russia, was unable to give a very clear account of herself because of her ignorance of German and English. She was admitted to the Jewish Hospital in July, 1892, with the statement that three months previously she had fallen down two steps, and had subsequently experienced pain in the side and the abdomen, for which she had walked to the Pennsylvania Hospital for treatment. She was admitted to that institution. The pain in the abdomen gradually left her, but she subsequently suffered from increasing pain in the legs. Two weeks later she had fever on a certain day, and on the following day was paralyzed from the hips downward. There was incontinence of urine and fæces, and bed-sores soon developed upon the hips. There

¹ Read before the Orthopædic Section of the College of Physicians of Philadelphia, January 19, 1894.

² Orthopædic Surgery, p. 3.



was loss of sensation as well as motion below the brim of the pelvis. There was slight scoliosis in the dorsal region, with tenderness on pressure. No history of scarlet fever or diphtheria was obtained, and, according to the statements made, the patient had been well up to the time of injury. At the time of admission to the Jewish Hospital the child's appetite was good, the tongue slightly coated, and the bowels regular. The urine had an alkaline reaction, contained no albumen, and no sugar. These notes I obtained from Dr. J. C. Knipe, the resident physician of the Jewish Hospital.

After the death of the patient I applied to the Pennsylvania Hospital for an account of the condition of the girl while in the wards of that institution. The notes of the physician who had charge of her state that the child was brought in by the police patrol with the history of having been overcome with the heat. The patient was conscious and said that she had been feeling well until about three hours before admission, when she fainted while working in a hot room. Her temperature was $105\frac{1}{2}^{\circ}$ F. in the rectum, 99° F. in the axilla, and her pulse 104, respiration 30. The following day her condition appeared normal, and she was discharged, the pulse being 80, the respiration 24, temperature $98\frac{1}{2}^{\circ}$ F. It will be seen, therefore, that no marked disease existed at the time she was admitted to the Pennsylvania Hospital. The discrepancy as to the character of the fall is probably due to the difficulty in obtaining an accurate history from the patient.

She remained under treatment in the Jewish Hospital, being given potassium iodide and tonics. Electricity was also employed. Her temperature was very variable, and the complaint of pain in the feet and back was almost constant. Sometimes the pain was very severe, and accompanied by nausea and vomiting; and elevation of temperature amounting to two or three degrees occurred.

When I first saw her, in October, 1893, I found a sickly-looking child, with bad bed-sores partially cicatrized, and a marked prominence in the dorsal region, which did not look like the ordinary kyphosis of Pott's disease, because the bulging was more marked on each side of the spinous processes than over them. The testimony of the nurses and doctors seemed to be that there was little or no deformity in this region when the child was admitted. I presume, therefore, that the statement in the notes is correct; that there was appearance of lateral deformity or scoliosis only when she was admitted. I ordered a plaster-of-Paris jacket to be applied, and that,

if possible, extension and counter-extension in bed should be made. The latter seemed impracticable, but the jacket was worn for about ten days. The deformity in the back increased, and I thought I obtained a sense of indistinct fluctuation. The bed-sores, under careful nursing, though they were very deep and extensive, became healed. The patient presented marked swelling about the middle of the dorsal region of the back. It was evident that this was no ordinary kyphosis, because the swelling was most marked on each side of the median line, and there was a hollow over the spinous processes of the vertebræ. The tumefaction on the right side of the spinous processes was more marked than that on the left, and the two were divided by a groove due to the normal attachment of the integument to the apices of the vertebral spines. This swelling had been gradually increasing for five or six weeks. It gave an elastic sensation on palpation, and showed evidences of being a tubercular abscess.

I believed that the case was one of tuberculosis of the middle dorsal region attacking the laminæ of the vertebra and not the bodies, and that there was probably an abscess within the spinal canal causing the paraplegia present, which had developed early in the history of the case. The fact that no deformity, except some little deviation (lateral (?)) of the spine, was noticed when the child came into the hospital seemed to verify this conclusion.

After watching the case for six weeks I concluded to make an exploratory incision with preparations for doing laminectomy. My friend, Dr. H. Augustus Wilson, agreed with me in the diagnosis and propriety of operative interference. A one-inch incision was made over the more prominent portion of the swelling,—namely, to the right of the median line, and when the skin and fascia were divided, an elastic swelling similar to a cystic tumor presented itself. This I believed to be an abscess-sac, and I had a basin brought to receive the fluid which would escape upon puncture. I incised the distended deep fascia and found it to consist of broken-down cheesy material and a considerable quantity of fluid blood. As I put my finger into the opening so made, I found some bone fragments, which were, however, very small. I bored my finger through the soft tissues to a considerable extent. There was no puriform fluid in the cavity, though there was some disintegrated bony material. The blood was dark in color and seemed to come from an active venous hæmorrhage. I could stop the bleeding by pushing my finger into the bottom of the wound close to the laminæ. In the endeavor to control this hæmor-

rhage I enlarged the wound, while I held my finger upon the bleeding-point. When the parts were laid open there was general oozing, but no special vessels were found that needed ligation.

The cavity was then packed with gauze, and an incision from three to four inches long was made on the other side of the spinal column into the second tumor. This was connected with the first incision by a transverse cut across the median line. This enabled me to raise a large rectangular flap, and exposed thoroughly the spinal column and the swelling on both sides. The swelling on the left side consisted of a mass of tissue infiltrated with tuberculous deposit. As this was hard, it was quite different from the soft, moderately fluctuating tumor on the right side, which had been opened first. Bleeding was quite diffuse from the vessels divided on raising the flap. The patient probably lost, through both incisions and from the hæmatocele on the right side, from four to five ounces of blood. The surfaces were pressed with sponges, but no vessels needed to be tied.

The laminae were easily cut with an ordinary scalpel, except at the left side, where at the upper portion of the osseous incision a chisel was used. This, however, required very little force to push it through the soft bone. Two, or perhaps only one, vertebral arches were thus divided. The laminae on the right side of the spinous process in the same region had previously been divided. I had at first determined the position of the first solid spine and arch below, and of the first solid spine and arch above, before I cut into the softened bone. There was no evidence of a bony spinal arch at all in the region of marked external swelling. I could pass my finger into the spinal canal below and above, but could see nothing in the bottom of the wound but the flattened spinal cord, which I at first mistook for the posterior common ligament of the spinal column.

At this point of the operation the child's condition became so serious that the wound was quickly closed. Two hypodermic injections of strychnine, $\frac{1}{10}$ grain each, were given, and about five ounces of water were injected into the subcutaneous tissue of the chest by means of a large hypodermic needle and a fountain syringe. The patient was also inverted. No ether had been given for some time before this stage of the operation. Before the administration of ether a hypodermic injection of morphine, $\frac{1}{6}$ grain, and of atropine, $\frac{1}{20}$ grain, had been given.

The child became conscious and spoke a few words, but died

just as she was taken from the operating-table. Death in this case was evidently due to shock and hæmorrhage. The bleeding was not excessive, but was important in a case of such depressed vitality.

The specimen removed shows that the disease was limited to the arches, and did not involve the bodies of the vertebræ. The evidence seems to support the idea that the destruction of tissue, due to tuberculous degeneration, had opened blood-vessels, the bleeding from which had converted the right swelling into a hæmatocele containing fluid blood. I cannot understand the free bleeding that occurred in any other way, for the tumor was dense when punctured with a knife, and seemed to give exit to little except fluid blood, which was venous in color, and which seemed to fill the cavity as far back as my finger could reach. The tumor or swelling did not resemble a spongy sarcomatous tumor, and had no characteristics of an aneurism.

The portion of the spinal column removed consists of five vertebral bodies and a part of a sixth vertebra. The specimen shows no disease of the bodies, and the spinous processes and laminae of two vertebræ are absent. The gap is due to the removal of the softened bone at the time of operation. The spinal cord which is seen in the foramen of the first and in that of the last vertebræ of the series appears normal, but at the point where the excision of the bone was made, it is so flattened by pressure that the membranes lie close to the posterior surface of the vertebral bodies, resembling ligamentous tissue. An incision through the dura, however, shows the flattened cord within. There are two small openings in the dura at its upper and lower part in this same region, through which some reddish pultaceous fluid escaped when I recently examined the specimen, which had been in alcohol for nearly a year. On the front of the spinal column are two enlarged lymphatic glands.

Pathologist's Report.—By Drs. W. M. L. Coplin and David Bevan.

“After a thorough examination of the specimen (spine) which you sent us, we respectfully submit the following: The specimen consists of five vertebræ, all of which are dorsal; the lowest vertebra contains the extreme upper end of the cauda equina. The upper segment is apparently normal, the second, third, and part of the fourth are the seat of a well-marked pathological process. The laminae are destroyed, and the base of the spinous process is attacked. The muscular and

ligamentous structures of the morbid area are softened and evidently advanced in some degenerative condition. On the anterior aspect, slightly to one side over the body of one of the diseased vertebræ, are two tuberous masses,—presumably lymphatic glands; the larger is one and a quarter inches in its greatest diameter, by seven-eighths of an inch in its transverse measurement; it is ovoidal in outline, with a slightly-flattened anterior surface. On section it is caseous, the centres of caseation being disseminated at several points, although most marked near the middle. There is a moderately-firm capsule surrounding the mass which posteriorly becomes continuous by blending with the anterior margin of the second glandular mass. The latter is largely caseous, and from its contour, the position of the caseous points, and its general appearance, one is led to believe that only a part of the gland is present.

Histology.—The infiltrated areas show a rich cellular exudate of varying age; some points are recent, others old. Caseation is going on at nearly all points. The muscular, fibrous, ligamentous, and osseous tissues are involved. The glands are histologically typical of tubercle.

Bacteriology.—The bacillus of tuberculosis is to be found in nearly all the surrounding structures of which we made sections. The glands are rich in bacilli.”

The pathological report on this case shows, then, that my clinical diagnosis was a correct one. The only other possible diagnosis, it seemed to me, was that of sarcoma of the laminæ, which appeared to me a condition that did not agree with the clinical aspects of the lesion. Dr. William H. Ross¹ gives an interesting discussion on the “Symptomatology of Sarcoma and Massive Tuberculosis of the Spinal Cord.” His article, however, is one referring rather to tuberculosis of the cord than to tuberculosis of the bony arches of the spinal column. Mr. A. Parkin² mentions, incidentally, a case of “Caries of the Spinous Processes in the Dorso-Lumbar Spine.”

¹ Medical Record, August 12, 1893.

² Lancet, July 1, 1893, p. 22.

