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Compression Myelitis from Pott's Disease.

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COMPRESSION MYELITIS FROM POTT'S DISEASE.

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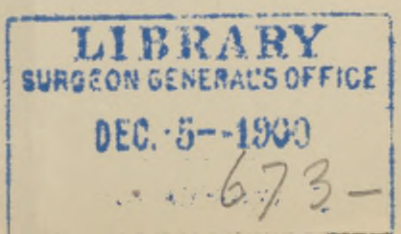
The twenty-two cases of compression myelitis here reported, were under the observation of the writer during his connection with the Hospital for Ruptured and Crippled, New York City; twelve of the cases were under his immediate care.

While it is intended to make this a clinical paper, a brief review of the etiology, pathology, and clinical history will be given, which it is hoped will serve to refresh the memories of those who have never made this subject one of special study.

Etiology: There are many pathological processes that develop in the vicinity of the spinal cord, and by exerting a gradually increasing pressure upon it, inhibit the conduction of nervous irritation and also cause mechanical injuries in the substance of the cord itself. The most common seat of such affections is the membranes of the cord. By far the most common cause of pressure paralysis of the spinal cord, and practically the most important, is caused by tubercular caries of the vertebræ, spondylitis, or Pott's disease. It is an acknowledged fact at present that Pott's disease is of tubercular origin; this is confirmed beyond all doubt by discovery of tubercle bacilli in the cheesy nodules in the vertebral caries. The spontaneous recovery of compression myelitis in Pott's disease contra-indicates the inflammation of the membranes of the cord, which causes the compression, being



of a tubercular nature; this is doubtless an inflammation from contiguity, and not by a direct invasion of the membranes by the tubercular process in the vertebral caries. Pott's disease occurs at all ages, rare only in old people. History of traumatism is of no significance, except probably as an exciting cause of the beginning of the tubercular inflammatory process.

Pathological Anatomy: For details of the pathology of Pott's disease the reader is referred to the text books on that subject; only a few of the details that have direct bearing on the compression will be here given. In the extension of this pathological growth consisting of granulation tissue, the vertebral processes, inter-vertebral disk, and in fact all of the articular connections are involved. It can be easily seen how the deformity (kyphosis) of Pott's disease is thus brought about by change of position of the adjacent vertebræ, caused by the crushing of the diseased vertebræ from the super-incumbent weight, and in this way a contraction of the spinal canal is produced, thus limiting the space for the spinal cord and its membranes. This is one of the factors in the mechanism of compression of the cord. Another factor, and by far the most important, is caused by the extension of the diseased process to the soft structures of the canal. As the tubercular inflammatory process involves the periostium, the collection of cheesy pus pushes it into the canal; later the dura-mater becomes involved, also aiding in the pressure, and as a result we have a pachymeningitis externa, and not infrequently a pachymeningitis interna following. The cord itself rarely becomes involved, but it can be easily seen how it can be compressed by either of the above factors, or as is often the case, by both; and as a result have its nervous function inhibited.

The theory that the paralysis is due to a "secondary myelitis" is not supported by recent investigations and examinations of post-mortem specimens; microscopic examinations of the cord show nothing that points to an inflammatory process, or anything that may not be entirely the result of mechanical compression.

The writer has been able to find but three cases of paraplegia that have been recorded as due to direct pressure on the cord by bony angle itself (*Gibney, Medical Record*, Oct. 24th, 1885). In cases in which there is sudden crushing of the bodies of the carious vertebræ, paralysis may be induced at once by fragments of bone impinging on the cord. It is undoubtedly a fact, that by far the large majority of cases is due to the inflammation of the soft structures. This theory is well supported by the fact, that in many cases the paralysis comes on before any deformity is seen at all; many cases have been recorded in which paralysis aroused the first suspicion of the existence of vertebral caries. And by no means is it the rule that paralysis follows the most prominent deformity; in fact, quite the opposite is the case, which is probably accounted for by the fact that the most prominent deformities are produced very gradually, thus giving the cord more time to accommodate itself to its changed position. The writer has not been able to find any record of a case of paraplegia being due to compression in scoliosis.

The liability to compression myelitis varies with seat of the disease, being most common in upper dorsal region, next in frequency in the cervical region, and rare in the lumbar. The explanation of this is that the canal is narrower in upper dorsal region, and is more liable to aggravated forms of the disease with accumulation of pus. The seat of the disease in all of the cases here reported is above the ninth dorsal vertebra. Dr. Gibney, of New York, has reported 295 cases of spinal caries in which there were sixty-two cases of paraplegia; in 189 of this number the disease was in upper dorsal and cervical spine, there were fifty-nine cases of paralysis; in the 103 remaining cases the disease was in lower dorsal and lumbar spine, there were three cases of paralysis.

Clinical History: The diagnosis of paraplegia caused by Pott's disease, is readily made, except, probably, in those cases in which paralysis precedes development of the kyphosis. In these cases a careful examination of the spine should

enable one to locate the seat of compression who is thoroughly familiar with diagnostic symptoms of early Pott's disease. Pain will be felt at or near seat of compression, due to irritation of nerve-roots, and extending, according to seat of affection, into shoulders and arms, lateral portions of the trunk, or into lower extremities. With the pains the motor disturbances begin to appear, first in one leg and then in the other, increasing gradually, often rapidly, until in many cases there is complete motor paralysis. If the seat of the affection is in the dorsal region, lower extremities only are affected; but if in cervical region, the arms are first and chiefly affected. Only in the most severe cases is there any disturbance of sensibility; probably this is due to the fact that the position of the sensory nerves in the gray matter of the posterior cornua protects them better than is the case with motor fibres in the pyramidal tract.

The condition of the reflexes is very interesting. An exaggeration of patella reflex is an early symptom. If the seat of compression is above the patella reflex arc in the upper lumbar region, there will be an exaggerated patella reflex, due to the inhibitory influence being cut off. The tendon reflexes vary from a slight exaggeration of the normal to so great a degree as to show in the lower extremities a pronounced type of spastic paralysis; likewise the degree of ankle clonus varies; often there is a general tremor of the legs.

Trophic disturbances are often found in the paralyzed parts, bed sores being common in patients that are improperly cared for.

Disturbances of rectum and bladder occur in almost all cases of severe pressure paralysis. Prognosis of paraplegia from Pott's disease under efficient treatment is very favorable, even after the paralysis has lasted for a year or a year and a half, death occurring only in those cases that develop fatal complications, such as amyloid degeneration of kidneys, liver, etc., a general tuberculosis, tubercular meningitis, etc.

Treatment: The treatment as here given is the one that

has been pursued at the Hospital for Ruptured and Crippled for the past ten or twelve years with extremely satisfactory results.

The treatment may be divided into three parts, viz.: First, to relieve the pressure of superincumbent weight on the seat of the disease; second, to aid the absorption of the inflammatory exudations; third, to build up the patient's general health. The first is accomplished by means of the plaster-of-Paris jacket with jury mast; second, by increasing doses of iodide of potash; third, by general tonics, good, nutritious food, plenty of fresh air, etc.

The patient at once has a light, neat and well-fitting plaster jacket with jury mast applied; jacket must extend well up on back and chest, being well scalloped in the axillæ to give free use of arms, and well over the pelvis, thus immobilizing the dorsal and lumbar spine; if all points of pressure are well padded, the patient will be thoroughly comfortable. The writer has seen no brace that equals the plaster jacket for either comfort or efficiency when properly applied. To apply a plaster-of-Paris jacket properly requires a great deal of experience and the exercise of considerable skill, and for this reason it is an unpopular method of treatment, both among physicians and laity. The great advantage of this method over the extension frame is, that the patient is kept out of bed, can roll himself about in rolling chair, and be taken out in open air. If care is taken in seeing that the jacket fits well and that the jury mast is kept in good order, a cure can be expected in from two to eight months—latter time for worst cases. Jacket should be renewed every four or six weeks.

Iodide of potash is given in small doses at first, and is increased gradually to about the maximum dose for each patient.

Case I.—Age, twelve years. Developed Pott's disease when about four years old. Unable to get any history as to when the paraplegia first came on. On admission to hospital the child is totally unable to stand unsupported; has marked exaggeration of patella reflex and ankle clonus; some atro-

phy and impairment of sensation of lower extremities. Has plaster-of-Paris jacket with jury mast applied, and is put on iodide of potash, beginning with five drops t. i. d. and increased to twenty.

At the end of five months the child is able to walk fairly well; at the end of six months is transferred to out-door department. Child walks well, reflexes normal. Had jacket changed about every six weeks.

Case II.—Age, eight and a half years. Developed Pott's disease, involving third and fourth dorsal vertebræ, when five years old. Paraplegia came on one year after the inception of the Pott's disease. Has had no orthopædic treatment. On admission to hospital, one month after inception of paraplegia, presents very slight kyphosis, exaggerated reflexes, and is totally unable to stand unsupported. Has plaster jacket and jury mast applied, and put on iodide of potash.

In six months the patient recovers perfect use of her lower extremities, reflexes normal. Is to be kept under observation in hospital because parents will not bring her to the dispensary regularly.

Case III.—Age, four and a half years. Developed Pott's disease extending from fourth to ninth dorsal vertebræ when two years old. Was paralyzed one year later. On admission, patient presents prominent kyphosis in dorsal spine; total loss of voluntary motor power of lower extremities; exaggerated reflexes.

In eight months, under usual treatment, an uninterrupted and perfect recovery of the paraplegic symptoms is made. Discharged from the hospital at the end of twelve months.

Case IV.—Age, eight years. Developed Pott's disease, extending from sixth cervical to third dorsal vertebræ, at six years old; one year later was paralyzed. On admission presents prominent kyphosis; total loss of voluntary motor power of lower extremities, and exaggerated reflexes. Patient makes perfect recovery in eight months under usual treatment.

Case V.—Age, five years. Unable to get any history as to inception of the disease; patient comes from an orphan asylum. Presents kyphosis involving sixth, seventh and eighth dorsal vertebræ. Totally unable to stand unsupported; reflexes exaggerated. General condition of patient not good.

Has plaster-of-Paris jacket with jury mast applied; is put on cod liver oil and iron mixture. At the end of eight

months the patient walks well, but has developed large psoas abscesses in left iliac fossa. After repeated aspirations abscess is incised, discharge of pus is profuse.

Three years after admission to the hospital, the child died from general tuberculosis and amyloid degeneration of both liver and kidneys. The psoas abscess continued to discharge to day of its death.

Case VI.—Age, six years. Developed Pott's disease in lower cervical spine when three years old. Paraplegia came on two years later. Presents very slight kyphosis at seat of disease; has the usual symptoms of paraplegia well marked. Under usual treatment makes perfect recovery in three months, and at the end of six months is discharged from the hospital with not the least sign of ever having been paralyzed. The paralysis in this case had existed for twelve months before treatment.

Case VII.—Age, five-and-a-half years. Developed Pott's disease extending from sixth cervical to third dorsal vertebræ inclusive, six months previous to admission to hospital. Presents marked impairment in motor power in upper extremities and total loss in lower; has also marked impairment of sensation. Under usual treatment made complete recovery in six months, and is discharged from the hospital at the end of nine months in good condition.

Case VIII.—Age, five years. Developed Pott's disease involving fifth and sixth dorsal vertebræ one month before paraplegia came on. Is admitted to the hospital six months later. Presents very slight kyphosis, but symptoms of paraplegia well marked. Is put on usual treatment and makes uninterrupted and complete recovery in eight months.

Case IX.—Age, four-and-a-half years. No history as to time of inception of disease. Presents prominent kyphosis involving fifth, sixth, and seventh dorsal vertebræ; total loss of motor power in lower extremities, exaggerated reflexes and ankle clonus. Under usual treatment recovery is complete in six months.

Case X.—Age, thirteen-and-a-half years. Developed Pott's disease two years previous to admission; paraplegia came on suddenly in two months after inception of Pott's disease. Presents prominent kyphosis involving seventh, eighth and ninth dorsal vertebræ; complete loss of motor power in lower extremities, with impaired sensation. Patella reflexes are so exaggerated that the least percussion will throw lower extremities into a state of tetanic contraction. In testing ankle clonus, feet can be easily thrown into

rythmical clonic spasms. Power of sphincters much impaired. Patient lies with lower extremities flexed at hips and knees, owing to spastic contraction of flexor muscles of those joints.

Patient is put on extension frame to correct the flexion deformities; has Paquelin cautery applied along the spine bi-weekly; has iodide of potash increased in amount of dose until fifty drops of saturated solution is given t. i. d.

At end of one month is taken off the frame, and has plaster-of-Paris jacket with jury mast applied.

At the end of three months the patient is taken from hospital by parents, at which time condition is much improved, reflexes but little exaggerated, has gained control of sphincters, and can walk fairly well with assistance.

Case XI.—Age, thirteen years. Developed Pott's disease, with paraplegia following in a short time, eight months before admission. Presents prominent kyphosis extending from second to ninth dorsal vertebræ inclusive. All of usual conditions of compression myelitis present in an exaggerated form. Under usual treatment, patient makes a complete recovery in eight months.

Case XII.—Age, eleven years. Developed Pott's disease in upper dorsal spine one year before paraplegia came on, which has existed for one year, with no orthopædic treatment. On admission, child is perfectly helpless as to lower extremities; reflexes markedly exaggerated; almost complete loss of sensation below left knee; much impaired in same region on right. General condition unfavorable on account of pulmonary tuberculosis.

Has plaster-of-Paris jacket with jury mast applied, and put on iodide of potash in increasing doses. At the end of eight months, child was able to walk fairly well, reflexes were normal, but pulmonary trouble continued to grow worse, until death closed the scene eighteen months after admission to the hospital.

Case XIII.—Age, ten years. No history. Presents, on admission, slight kyphosis involving third and fourth dorsal vertebræ; is unable to stand unsupported; reflexes exaggerated; has three discharging sinuses, result of psoas abscesses.

Has plaster-of-Paris jacket with jury mast applied, and put on iodide of potash, cod liver oil, etc. A perfect cure results with three months' treatment, including closure of all sinuses.

Case XIV.—Age, six-and-a-half-years. Was paralized

within two months after development of Pott's disease. Presents slight kyphosis in upper dorsal spine; all of usual conditions of paraplegia well marked. General condition not good; has a suspicious cough.

Has plaster-of-Paris jacket with jury mast applied, put on iodide of potash, cod liver oil, etc. Five months after admission, had severe attack of measles, but general health had improved, and could walk a little. Twelve months later, had a fall and fractured right femur at junction of upper middle and third. Two weeks after this accident developed diphtheria. In eighteen months after admission to hospital child is discharged, having made a complete recovery from its paraplegia, with greatly improved general health, in spite of all its intercurrent maladies.

Case XV.—Age, four and a half years. Developed Pott's disease when one and a half years old; paraplegia came on one month later. All symptoms of compression, myelitis well marked, has had no orthopædic treatment. Under usual treatment made rapid recovery in three months.

Case XVI.—Age, seven years. Was paralyzed three months after inception of Pott's disease, which has existed for twelve months; no treatment. Presents slight kyphosis in lower cervical spine. Patella reflexes are so exaggerated that the least percussion will cause tetanoid movements; has incontinence of urine. Under usual treatment a complete recovery is made in six months.

Case XVII.—Age, twelve years. Exaggerated symptoms of paraplegia came on two months after inception of Pott's disease. Presents very slight kyphosis at fourth cervical vertebra; motor power of upper extremities much impaired, being worse in hands. Under usual treatment, made a complete and uninterrupted recovery in eight months.

Case XVIII.—Age, six years. Developed paraplegia six months after inception of Pott's disease, which has existed twelve months without treatment. Presents slight kyphosis, involving first and second dorsal vertebræ; all usual conditions of paraplegia well marked. Under usual treatment, made a perfect recovery in three months.

Case XIX.—Age, five years. Developed paraplegia in three months after inception of Pott's disease, which has existed for nine months without any orthopædic treatment. Presents slight kyphosis, involving fourth and fifth cervical vertebræ. Left side was paralyzed first, upper extremity but slightly so; about two months later began to lose motor

power in right side, also worse in lower extremity. All usual symptoms of pressure paralysis well marked. Under usual treatment, made a fair recovery in two months and a complete recovery in six months.

Case XX.—Age, six years. Developed Pott's disease one year before admission to hospital; was paralyzed three months previous to admission. All symptoms of pressure paralysis well marked; the least attempt at passive motion of spine produces violent pain and spasm. In one month after beginning treatment child could walk fairly well with support; in three months recovery almost perfect; spine not so acute.

Case XXI.—Age, five years. Paraplegia with its symptoms well marked came on in two months after inception of Pott's disease. Presents slight kyphosis in upper dorsal spine; kyphosis can only be detected by most careful examination; pain and spasm most prominent feature of the Pott's disease. Under usual treatment, all symptoms of paralysis had subsided in five months; pain and spasm much improved.

Case XXII.—Age, twelve years. Has been in hospital for six years. Was paralyzed in one month after inception of Pott's disease six years ago. On admission presented very prominent kyphosis in mid-dorsal spine; totally unable to stand unsupported; patella reflexes and ankle clonus much exaggerated. Was at once put on iodide of potash thirty drops t. i. d., and had plaster jacket with jury mast applied. At the end of three months iodide had been increased to one drachm t. i. d. At beginning of tenth month of the treatment first sign of return of the motor power is observed; four months later, is able to walk well. Plaster jacket with jury mast is continued for two-and-a-half years when change to Taylor spinal brace with chin piece is made. Ten months later, has return of paraplegia, brace not giving efficient support. Has plaster jacket with jury mast again applied, and is again put on iodide of potash. Six months later walks well, reflexes normal, remains under observation in hospital.

This last case illustrates well the importance of carefully watching the patients and continuing the support to the spine for a sufficient length of time to prevent a return of the paralysis. Unfortunately no definite length of time can be stated, but it should be borne in mind that there is dan-

ger of a relapse just as long as there is any active inflammatory process going on at seat of the caries; hence the support should be continued for some time after all acute symptoms have disappeared.

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