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The President, DR. L. PIERCE CLARK, in the Chair

SOME FEATURES OF THE GROSS ANATOMY OF THE SPINAL CORD AND NERVE ROOTS, AND THEIR BEARING ON THE SYMPTOMATOLOGY AND SURGICAL TREATMENT OF SPINAL DISEASE

By Charles A. Elsberg, M.D.

The speaker said that during the past year he had made a number of dissections of the human spinal cord, nerve roots and membranes, in order to study their arrangement and relations. He said it was well known that the anterior and posterior nerve roots perforated the dural sheath separately, with a thin septum of dura mater between them. In the cervical region the nerve bundles of the posterior roots remained separate until they had passed through the dura, having a fan-shaped arrangement. In the dorsal and lumbar regions, the arrangement was different, the separate bundles soon combining to form one bundle, which passed outwards to the dural opening as the posterior root. From this arrangement it was clear that a tumor of the cervical cord would, for a long time, make pressure only upon a few of the bundles which formed a posterior root. In the dorsal and lumbar regions the nerve bundles were united into one nerve near the cord, and a tumor in these regions would press upon the whole nerve root from the beginning. Clinical experience agreed with these anatomical facts: the earliest symptoms of pressure upon a cervical nerve root were usually confined to a small area of distribution—one or two fingers, for example—while in the dorsal or lumbar region the classical root symptoms extended over entire root areas. It was more exact, therefore, to speak of "root bundle" and of "root symptoms."

In speaking of the intradural and extradural course of the posterior nerve roots and its significance, Dr. Elsberg said that a careful dissection of the posterior nerve roots showed a very marked difference in their course at different levels. In the cervical and upper dorsal regions the nerve bundles united to form the posterior root, and passed out of the dural sac at almost a right angle to the cord. They then perforated the dura and entered the posterior ganglion. From the ganglion each root passed outwards with a slight inclination upwards. From the 8th cervical to the mid-dorsal region, the course of the posterior roots became changed. The root had an inclination downwards until it reached the dura; then it bent upwards at an angle just as it perforated the dura. In the mid-dorsal region, this angle was often very acute, from 40 to 45 degrees. Beyond the ganglion, each posterior root passed markedly upwards before it

divided into its anterior and posterior branches. In the lower dorsal and lumbar regions, the nerve roots passed downwards and outwards, and perforated the dura in the same directions; beyond the ganglia the direction remained unchanged until each root divided into its anterior and posterior branches. It was probable, the speaker thought, that the movements of the vertebral column, bending backwards and forwards, would increase an existing pressure upon any of the lower dorsal and lumbar posterior roots, as these could not yield as easily as the upper dorsal roots. Root symptoms in the lower dorsal and upper lumbar regions should become much intensified with forward and backward movements of the vertebral column. To a lesser degree, this must also be the case in the cervical region, although here the bundles of the posterior roots are spread over such a large area that all of them are seldom pressed upon at the same time.

Dr. Elsberg also referred to the relation of the ligamentum dentatum to the first lumbar root, and the surgical importance of this relation.

Dr. James J. Putnam, of Boston, said that the question suggested itself, in connection with Dr. Elsberg's highly interesting demonstration, whether the localized symptoms that had been referred to as arising sometimes from pressure on the cervical nerve roots were after all so completely due to the fact that those roots lay in separate bundles. There was a possibility, he thought, that no matter where the pressure was exerted, the evidences of it would be most apparent in the distribution of certain of the nerve roots. Amongst the cervical nerves, more than any others of spinal origin, we find varying degrees of susceptibility; for instance, the ulnar nerve suffers more than others, and the fact can frequently be demonstrated that certain functions of nerves are much more easily disturbed than certain other functions. This suggests that there may be a physiological reason for the different effects produced by pressure upon different portions of the cervical plexus or upon any given group of cervical nerve bundles, and it might, perhaps, help to explain why localized symptoms are more apt to be observed there than in other regions where similar injuries are sustained.

Dr. Joseph Fraenkel said he was particularly interested in Dr. Elsberg's presentation because some years ago he repeatedly named before this Society a condition encountered in studies of compression of the cord which he had then designated as "distant cord symptoms." The anatomic peculiarity which Dr. Elsberg described offered an explanation for this symptom, which consisted of evidences of irritation in the dorsal-lumbar part of the cord when the lesion was located in the cervical region.

Regarding the greater individualism of symptoms in lesions of the cervical cord in conjunction with the anatomic fact that the bundle formation in this part of the cord is more marked, Dr. Fraenkel thought that comparative anatomy might give some clue to the physiological reasons which Dr. Putnam mentioned. It is a known fact that the number of fibers emanating from the cervical enlargement of a horse is very much smaller than the number emanating from the cervical enlargement of man: this is in part due to the greater individualism and separation of the functions. It is, of course, also possible that certain fibers having a more specific function might perhaps show greater susceptibility to pressure.

The President, Dr. L. Pierce Clark, said that Dr. Elsberg's clear presentation of the relationship of the lower lumbar motor with those of the

posterior roots and the ease with which one might accidentally sever both in the operation of dorsal root section to relieve the spasticity of cerebral diplegia might account for the apparent return of spasticity in some of the cases reported, such as those mentioned by Gottstein and Kuttner. If this mishap occurred and this explanation of a return of the spasticity obtains, one is saved the necessity of trying to revoke the well nigh impregnable law that posterior roots once severed never regenerate.

In addition to the purely pressure symptoms concerned with spinal cord lesions mentioned by Dr. Elsberg, the possibility of other contributing factors, such as a localized meningitis, edema, etc., should not be lost sight of. Clinically, from a neurological standpoint at least, the syndrome would be less exact than the rather diagrammatic presentation shown in Dr. Elsberg's drawings.

PARTIAL ANALYSIS OF A CASE OF HYSTERIA OR DEMENTIA PRÆCOX

By W. C. Garvin, M.D.

The case was that of a young Hebrew girl, who at the time of her admission to the Manhattan State Hospital, in October, 1910, was fifteen years of age. In the analysis of the case it was ascertained that at the age of eight she met an Italian ice and coal peddler, about 40 years of age, who had a shop in a cellar. He enticed her there, fondled her genitals and attempted to have intercourse with her, but was unsuccessful. Later, he succeeded, and between the ages of eight and ten they had connection every other day. When she passed her urine, he fondled her genitals, and this gave her a pleasurable sensation. During his first attempt at intercourse she experienced considerable pain, felt weak, became dizzy and screamed. Between the ages of ten and fourteen she frequently visited him and states that at first she refused to have intercourse with him, whereupon he threatened to kill her, and she finally consented. At this time he also talked to her about the birth of babies and asked her to sleep with him. She admitted being fond of him because he was kind, gave her money and kissed and fondled her. She kept all these experiences to herself, acknowledged that she knew she had done wrong, but did not speak to her mother about it until the age of thirteen, but inasmuch as her mother became quite upset at the tale, she thought it best not to tell her the whole story.

From the facts presented, it would appear that the psychosis in this case had developed on a basis of sexual traumata, and the conflict between two wishes was apparent: first, to abandon her lover; second, to return to him. Of importance, also, was the feeling of shame of having done wrong, the fear of her mother, and, of late, apparently realizing her inability to extricate herself from her difficulties, a desire for death.

The clinical symptoms in this case, Dr. Garvin said, presented a rather complex picture, neither typical of hysteria nor dementia præcox. On the hysterical side we found restlessness, emotional instability, excitements, stupors, tonic spasms, amnesias, anesthetics, and a certain amount of the voluntary element. As opposed to hysteria, there was no suggestibility in the true sense, nor somnambulisms, paralyses, palsies, contractures, hyperesthesias, blindness, and no fixed ideas, with perhaps the possibility that

the statement that her lover would kill her might be regarded as such. Further, the complex was not repressed; it was all on the surface. Then again, in contra-distinction to hystericals, she was not benefited by any form of therapeutic treatment, and despite all efforts over a period of two years, her condition had gradually become more aggravated. Therapeutic efforts had been hampered by the patient's immaturity, her instability and inability to entertain a serious grasp on the situation.

Pointing to dementia præcox were the continuation of the hallucinations for over two years, the gradual diminution of the free intervals, the prolongation of the hallucinatory excitements, her resistance to therapeutic treatment, and, finally, a tendency to break down, to give up the struggle and seek refuge in suicide. Further, as pointing to dementia præcox, there was the element of wish-fulfilment, which seemed most dominant. She constantly saw her lover, heard his voice, etc. Against dementia præcox, we did not find the shut-in personality—all that was present was some lowering in the emotional and intellectual spheres, but inasmuch as the sexual experiences began as early as the age of eight, we could not positively exclude the sexual conflict as being the cause of her instability, lack of attention to her studies, the desire to divert her mind by indulging in pranks, etc., and thus avoid the fixation of attention, which all hystericals seek to avoid. Then again, while the conflict had evidently existed for a number of years, the hallucinatory condition appeared in full bloom rather suddenly; furthermore, the personality was still quite well preserved, and her interest in the external world remained fairly acute. There was no mannerism nor disorder in her stream of thought; no ideas of persecution and no delusions based upon the hallucinations. In all these respects the case was quite different from one of dementia præcox.

One might say, then, that the clinical features were: a personality perhaps somewhat defective in the emotional and intellectual spheres; a psychosis which developed upon the basis of sexual traumata, presenting a number of hysterical features, which, however, were not quite typical, and on account of the long duration, continued hallucinations, resistance to therapeutic treatment and a tendency to break down under the conflict, the prognosis was in doubt.

Dr. August Hoch agreed with Dr. Garvin that the case illustrated certain mechanisms very well. In regard to the diagnosis he believed that although hysterical states may deepen into dementia præcox states, and although transitions probably occur, this case was essentially on the side of hysteria, for this spoke not so much of individual symptoms as the reaction of the personality as a whole; on the one hand, her attitude towards the environment in which, so far as he could see, there was much coquettishness, rather natural liveliness, a fondness of praise and admiration, and on the other hand, and connected with it, the relationship of the personality as a whole to the symptoms, the latter being a very important principle in psychiatry. He pointed out that whenever this girl had very glaring erotic fancies, they occurred only in a state of a mental clouding, whereas in clear consciousness, only more superficial fancies occurred. Both of these traits form a marked contrast to dementia præcox; that is, the deteriorating states where the interest in the environment is markedly interfered with, and where the symptoms stand in the mind like foreign bodies. Of course there are chronic hysterics which, in spite of the fact that they do not recover, retain the characteristics of hysteria.

Dr. James J. Putnam said that no evidence had been adduced as to

this patient's intellectual ability before her trouble came on. From the general history of the case and from the appearance of the girl it had occurred to him that there might have been some mental deficiency before the onset of her present symptoms, and that we had to deal here with a hysteria developing in a person of inferior mental caliber—an imbecile of a high grade.

Dr. Putnam said that in trying to make a distinction between hysteria and dementia præcox, we were perhaps attempting to draw a line where no line could distinctly be drawn. In both of these conditions we had both the severe and the milder forms to deal with, and in a case of this kind one would rather hesitate to say positively whether it belonged to one category or the other. It should also be kept in mind that many cases of hysteria were really of a serious type, and as Dr. Hoch had said, some of them never recovered. Personally, he would be inclined to regard this case as one of hysteria in a person constitutionally unfit.

Dr. A. A. Brill said that he first saw this patient at the Mt. Sinai Hospital in 1910. At that time she was suffering from hysteria showing typical hysterical major attacks. He saw her again a few months later and found her in the same condition. Her mother stated that she was a terrible burden at home so that he suggested that the girl be transferred to the Manhattan State Hospital where she has remained ever since. His opinion of the case at that time was that it was one of hysteria occurring in a high grade imbecile.

Dr. Brill said that it was not surprising if this patient would not get well, because psychoanalysis was only effective in persons of normal mental condition. The patient must not only coöperate in the treatment but must have a perfect understanding of the psychological mechanisms at play.

As regards the diagnosis between dementia præcox and hysteria it is of course at times very difficult to form a distinct line of demarcation between these maladies. He recalled a case, which was also seen by Dr. Putnam, which for a long time was regarded as one of hysteria but which finally proved to be dementia præcox. The patient showed, however, the characteristic shut-in personality. In the case shown by Dr. Garvin there had been apparently no mental deterioration since the speaker first saw her two years ago, and he was therefore inclined to regard it as a case of hysteria in a defective individual of the imbecilic type.

Dr. M. J. Karpas, who had also previously seen the patient, said he regarded the case as one of constitutional deterioration with hysterical manifestations. He was inclined to doubt that much could be learned by psychoanalysis, as the patient was inferior intellectually, and could not be made to appreciate the significance of the method. He did not regard the case as one of dementia præcox: it lacked the earmarks of that disease.