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OF

The Paralysis of New-Born Children.

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presented by the author

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THE SURGICAL ASPECT OF THE PARALYSIS OF NEW-BORN CHILDREN.[1]

BY ROBERT W. LOVETT, M.D.

IT is desired to call your attention to a class of cases of surgical injury occasionally received by children during birth. I allude to those cases of paralysis of the arm, which appear from time to time in surgical clinics, and about which there is surprisingly little information in the books.

This paralysis of the arm is not, of course, the only one which children receive during difficult labors. Cerebral injury resulting in hemiplegia or spastic paralysis (often spoken of as Little's disease) is in some cases the outcome of injury received during birth. But more often it is the outcome of a cerebral or meningeal inflammation occurring in early life, while in other instances the disability is the result of fœtal changes.

A second form of paralysis which may be mentioned as sometimes occurring during birth is paralysis of the legs, due to an injury to the spinal cord from excessive traction upon the legs. Such cases as these are not likely to find their way into literature; but there are at least three well-authenticated cases on record. In all of them paralysis of both legs was found to exist after birth. In one, the case of Nadaud,[2] the presentation was a head, but the labor was excessively

[1] Read by invitation before the Obstetrical Society of Boston, April 9, 1892.

[2] Nadaud: Thèse de Paris, 1872, No. 282.

difficult and the child was only delivered after strong and long-continued traction made by the forceps.

In the case of Parrot [3] the presentation was a breech. Very strong traction was made on the legs and complete paralysis of the lower extremeties was present immediately after birth. The child died in a few days; and autopsy showed a rupture of the spinal cord at the level of the seventh cervical vertebra.

A third case was reported by Gueniot [4] (but not in detail), where severe traction caused a rupture of the spinal cord at the third cervical vertebra, with fracture of the spine.

These are the only cases that I have been able to find on record; and I mention them now more to call your attention to the discussion of such cases than for their practical value.

The commonest forms of paralysis directly attributable to injury during birth are facial paraylsis and paralysis of the arm.

Of facial paralysis there is very little to be said. I have had no personal experience in the matter, but it is described as being generally transient, and in the great majority of cases passing off in a week or two after birth. It is produced by direct injury to the nerve by the application of the forceps, although it occurs in occasional cases where instruments have not been used, especially in face presentations. Parrot and Troisier have demonstrated the paralysis to be due to injury of the nerve, most often at its exit from the stylo-mastoid foramen. This may go to the extent of a fatty degeneration, but in general the pathological changes to be noted are slight in the few cases where an autopsy has been made.

Although in general the paralysis disappears in a

[3] Parrot: L'Union médicale, 1870, No. 11.
[4] Gueniot: Ibid.

few days, or at most a few weeks, there are cases on record where facial paralysis has been permanent, as in a case reported by Duchenne.[5]

Paralysis of the arm, which I wish to make the especial subject of my paper, is fortunately not a very common accident. In 5,600 cases of surgical disease in children coming to the surgical out-patient department of the Children's Hospital since 1884, there have only been two cases of obstetrical paralysis of the arm, and this would point to a decided infrequency of the affection, as many kinds of paralysis find their way to this clinic. Last year, for instance, there were some 60 new cases of various sorts of paralysis brought to the department.

I am able to present you an analysis of nine cases of this affection, especially with regard to the end results to be expected; and, so far as possible, I have made prominent the practical features of them. Of these nine cases, two occurred in my own experience, one occurred in the practice of Dr. C. W. Townsend (who has kindly allowed me the use of his notes), for one case I am indebted to Dr. J. G. Dearborn, of Charlestown, and the other five are from the records of the nervous out-patient department of the Boston City Hospital, occurring in the services of Drs. Prince and Bullard, to whom I am indebted for permission to use the cases. Dr. Stickney, the house physician at the Children's Hospital, has rendered me much assistance by finding and investigating the present condition of these cases, in some of which several years have elapsed.

The condition is made manifest immediately after birth by an inability to use one arm, it hangs powerless at the side, with the palm turned backward, and often the fingers are flexed tightly. If the arm is

[5] Quoted by Nadaud.

lifted from the side it falls lifelessly back into place, and although movement of the fingers is generally present, it is impossible to use the arm to any extent on account of the paralysis of the shoulder muscles.

It is desirable, if possible, to know the cause and the natural history of this condition, especially with regard to the prognosis.

Cases of paralysis of both arms are on record, as in Observation X of the series reported by Nadaud.

This paralysis is not always the result of difficult labor. In most cases, however, it is to be attributed to some abnormality in the birth of the child.

Of my nine cases, I was able to learn of the character of the labor in all but one. One labor was described as a cross-birth, but beyond that no information could be obtained. The second was a footling presentation, with a long, hard labor, and forceps were applied to the after-coming head. The remaining six labors were with the head presenting. All were multiparæ, and in four of the six the labor was described as hard and forceps were used. The two remaining cases are particularly worthy of attention. In one the child was the eighth, and the labor was described by the mother as being unusually easy. The other is of such interest that it is presented in detail, as it demonstrates very clearly how paralysis may result from what appears to have been an easy labor. In this instance the woman was delivered at the Boston Lying-in Hospital, and six weeks afterwards came to the surgical clinic at the Children's Hospital.

Case I. Mrs. M., twenty-six years old, was delivered of her second child at the Lying-in Hospital on January 6, 1892. She entered the hospital at 6.40 A. M., the pains having begun at 1 A. M. The membranes ruptured at 8.15 A. M., and an hour later the child was born. The presentation was a head, with the position of occiput left anterior.

The labor was an easy multiparous one, and instruments were not used. The first stage occupied seven hours and thirty-five minutes; the second, twenty-five minutes; the third, five minutes. After the head was born there was no advance, and strong traction on the head combined with pressure on the fundus was necessary to deliver the body. The child weighed ten pounds.

It was noticed immediately after birth that the right arm was not used; and February 13, 1892, six months after birth, the child was taken to the Children's Hospital. No bony lesion was found, but the paralysis seemed to be complete so far as the arm was concerned, although the fingers could be moved a little. The child had some electrical treatment from Dr. Bullard, but on March 29, 1892, the following note was made:

"No improvement has occurred: the arm hangs powerless at the side; the fingers are doubled in the palm, which is turned backward; and there is slight limitation in the movements of the shoulder."

This demonstrates how little is required in a given instance to produce so serious a lesion as this.

In certain cases a disability of one arm simulating paralysis is due to a fracture or dislocation of the upper end of the humerus. In the case of a fracture the nerves may be involved in the callus, and impairment in their functions (a true paralysis), may result from their involvement, or the disability may be only a transient one due to the fracture itself. I saw last winter, in consultation with Dr. Greenleaf, a woman, thirty years old, who had a wasted and shortened arm with a deformity of the upper end of the humerus, the result of a fracture received at birth; but the disability was so slight that her husband had never noticed the impairment of the usefulness of the arm, which was quite marked in careful examination.

The disability of the arm noticed at birth is, however, in most cases a paralysis due to an injury of the brachial plexus, which lies at the root of the neck,

embedded among the muscles and directly in front of the trapezius muscle. It is therefore liable to severe pressure in the descent of the child. This sets up an irritation which may eventuate in a neuritis resulting perhaps in fatty degeneration of the nerves, and upon the extent of the original injury depends the amount of disability. Theoretically, it seems curious that the accident is not more common if it can be produced by such trifling causes as in the labor described last.

There has been a general consensus of authority as to the cause of the affection, although Jacquemeyer attributes it more often to prolonged pressure of the humerus against the nerves of the plexus in the axilla.

In a case reported by Danyau [6] it was clearly demonstrated at autopsy that the nerves had been locally injured and were surrounded by ecchymoses produced by the blades of the forceps. A long contusion running down the border of the trapezius muscle was seen externally.

It is asserted by some writers that the injury to the plexus is produced by too deep an insertion of the forceps into the pelvis; but the fact that two of these nine cases occurred without the use of forceps at all shows that such a supposition cannot explain by any means all of the cases.

The paralysis is most marked in the deltoid and biceps muscles, the supinator longus, and the supra- and infra-spinatus. Gowers states, that the paralysis is most often due to an injury of the branch from the sixth cervical nerve to the brachial plexus. It seems difficult to understand how traction upon the head can be severe enough to stretch the nerve roots of the plexus without producing other injuries; and pressure directly upon the nerves of the plexus by some of the bones of the pelvis is a more satisfactory explanation in those cases where it can be assumed.

[6] Bull. de la Soc. de Chir., 1851, ii, p. 148.

In short, so far as we can judge, the cause of the paralysis would seem generally to lie in strong traction made oftenest by the forceps, but that in certain cases the paralysis is probably produced by direct pressure upon the plexus either by the instruments or by the bony prominences of the pelvis.

Once more, it may be said that it is hard to understand how traction upon the head, or even upon the arm itself is sufficient to stretch so seriously the brachial nerves without tearing apart the shoulder-joint or inflicting some other injury. And again it is difficult to comprehend why the affection should be so uncommon if it can be produced by strong traction, in view of the fact that strong and even violent traction is so often necessary during delivery.

The cases that I have analyzed have all followed one course. The paralysis has been complete, and the arm has hung lifeless at the side for weeks and months, with little or no improvement in its condition. Atrophy is not marked at first, but gradually comes on in slight degree, and the shoulder appears wasted and droops a little. In the course of years, a certain amount of motion is restored to the arm; and in the oldest cases among those analyzed, there was a fairly useful arm. There is some shortening of the bones and some atrophy of the muscles; but the disability is chiefly to be attributed to the paralysis of the muscles of the shoulder.

I give in detail the present condition of a typical case, now six and a half years old:

Case II. Willie H. The labor was a particular easy one and the paralysis at first was complete in the right arm. The child has had but little treatment. He is now well developed, and stands with the right arm hanging at the side. The elbow is slightly flexed and the palm turns backward. The humerus is half an inch shorter than the

left one, and the arm is half an inch less in circumference. The grasp of the hand is good, but motions which involve the deltoid and spinatus muscles are imperfect. He can raise the hand to the opposite shoulder, and with some difficulty to the mouth, but not to the top of the head. He is just learning to write with that hand, but feeds himself very imperfectly.

This case serves as an example of what may be expected at the end of some years.

Case III. By the kindness of Dr. J. G. Dearborn, of Charlestown, I was enabled to examine a young lady, nineteen years old, whose right arm had been paralyzed from an injury received at birth, and the case was of such interest that it is given in detail. This patient was born by a difficult labor, in which forceps were used. The paralysis was noted soon after birth, and the child had the benefit of early and continued treatment. Her present health is excellent, and her condition at the end of nineteen years has much bearing upon the prognosis of this affection. She stands with the right shoulder drooping, and the clavicle on the right side is an inch shorter than on the left. The right arm is four inches shorter than the left, and two and one-half inches of this shortening is in the humerus, the rest in the bones of the forearm. The hand is slightly smaller than on the other side. The forearm and arm of the affected side both measure one inch less in circumference than on the opposite arm. The grasp of the hand is fairly good. But it is in the movements of the shoulder that one chiefly notices the disability. The arm cannot be fully extended at the elbow, but can be flexed beyond a right angle. The arm cannot be lifted at all from the side by voluntary effort. The patient can touch her chin with the hand of the affected side, but cannot raise it to the mouth or to the opposite shoulder. The arm, as it hangs at the side can be used, and the movements are perfectly co-ordinated. Practically, she can do very little that is useful with the hand, but she notices an improvement in its usefulness each year.

It seems hardly worth while to do more than sum-

marize the remaining cases, to show the data from which the conclusions of this paper have been obtained.

CASE IV. Harry H., one year old. Fifth in family. Long, tedious labor, and forceps delivery. Paralysis at first was complete, but now the child can move the arm slightly, and there is considerable power in the hand. As yet, the left arm is practically useless.

CASE V. Joseph D., five years and nine months. "Cross-birth," and complete paralysis of the left arm. Last winter the child was operated upon for a muscular contraction of the arm which had come on and rendered it useless. This case is open to doubt, and may possibly have been one of cerebral paralysis.

CASE VI. Katie D. Died at the age of one year and six months. An account of the labor could not be obtained. The paralysis remained complete to the time of death.

CASE VII. Minnie F., three years old. This child was born by a footling presentation, and forceps were applied to the aftercoming head. The paralysis of the left arm was complete, but at the age of two years the child was able to feed herself and to raise the hand to the mouth. The arm, however, was shorter than the right, and not very useful.

CASE VIII. Thomas F., nine months. The labor was not a very hard one, but forceps were used. The paralysis of the right arm was at first complete. With treatment by Faradism for two or three months the arm improved, and the hand can now be raised to the chin but not to the head. It seems to be steadily gaining, and the case was the most favorable one among those seen.

CASE IX. Charles M., six years old. Child was the tenth in a family of eleven. The head presented, and forceps were used. The left arm was completely paralyzed from birth; but improvement began early, and has been continuous. The humerus on the affected side is half an inch shorter than the other, and all the motions at the shoulder are much restricted. The arm is only fairly useful, although the atrophy is slight. This case corresponds most closely to Case II, a child of the same age.

In view of these cases and their uniform slowness of improvement and incompleteness of recovery, it is hard to see on what ground nearly all of the books speak of the affection as transient and of little account in most cases. For example, I quote from the best as well as the most recent article on the subject: "*The paralysis usually passes off in a few days*, but if the damage be severe and irreparable, will be permanent." [7] It is a matter of the greatest importance that the question of prognosis should be carefully formulated; and in the discussion it is to be hoped that some gentlemen will have a more favorable experience to relate.

But from the cases given here, which are certainly representative and qualified to give a view of the end results, the prognosis must be set down as bad, and the paralysis of the arm occurring at birth must be regarded as a very serious affection which will improve with discouraging slowness and leave the arm, after all, in a very unsatisfactory condition, and in the most favorable cases only partly useful.

The diagnosis rarely presents any difficulty. The paralysis is present at birth, and involves only the arm. It may be simulated (*a*) by fracture or dislocation of the shoulder; (*b*) by a hemiplegia occurring before, during, or after labor; (*c*) by infantile paralysis, which should be mentioned as a possibility in very early life, although the greatest of rarities in the first months. A case, however, stands on record from Duchenne where anterior poliomyelitis occurred on the twelfth day after birth. As a matter of fact the paralysis of the arm received during labor rarely is noted until some days after birth.

In the treatment of this affection, electricity is universally advocated as the best and most available measure at our command; and the faradic current is

[7] Keating's Encyclopedia, vol. iv, p. 807.

used in preference to the galvanic. But few parents will persist in a treatment which is likely to stretch over months, with little or no sign of improvement; and practically most of the cases analyzed here have been untreated so far as any continuous application of electricity is concerned. In the lighter cases electricity might be of much practical benefit; in the severer, it would certainly aid in preserving the nutrition of the muscles and hastening the improvement so far as possible.

One measure which seems reasonable has been used in the cases coming under my own observation, namely, a supporting bandage to the arm and shoulder, generally applied in the form of a Velpeau. In any paralysis of the deltoid and shoulder muscles the weight of the arm drags heavily downward and stretches the ligaments and the disabled muscles. In a case of slight paralysis it might be a very important matter to support temporarily the arm and save the muscles from further stretching and irritation. In a severe case, of course, it would do little or no good. Indeed, it is easy to see that, where an injury to the nerves lies at the root of the trouble, measures addressed only to the muscles supplied by those nerves are not likely to produce any radical improvement.

In conclusion, I would call your attention once more to some of the more important practical conclusions to be drawn from the analysis of these cases. The paralysis most often occurs in very difficult and in instru mental labors, but it is not necessarily limited to these, and may result from labors apparently normal. It is probably due to some injury of the brachial plexus, and is generally associated with strong traction made upon the head. Last, and most important of all, is the fact that the affection is not in most cases a transient one, but that the outlook is doubtful at best, and a

disabled arm is most likely to result after years of slow and unsatisfactory improvement.

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