

SPINA BIFIDA OR HYDRORRHACHITIS.*

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Spina bifida or hydrorrhachitis is a congenital malformation consisting of a cleft in the vertebral column with protrusion of the lining membranes of the spinal cord.

This deformity is caused by an arrest of ossification of the vertebral arches, and is situated in any region of the vertebral column. It is more frequently found in the lumbar region, which constitutes about 50 per cent. of all cases; there are probably about 12 per cent. in the lumbo-sacral region, and about 25 per cent. in the sacral region. It is frequently associated with other congenital deformities, such as hydrocephalus, talipes, harelip, etc.

It consists of a tumor, varying in size from a marble to an adult's head, and occupies the central portion of the canal over the posterior aspect of the vertebral column, and is intimately connected with the canal in which a gap is felt in the bones of the vertebra upon raising the tumor. The tumor is elastic, smooth and fluctuating, and in some instances wholly translucent; in other cases it is covered by integument, which may be normal in character, but more often the skin is thin, covering the base and sides of the tumor, or finally emerging into the transparent membranes, which forms the apex of the growth. In some cases the tumor is peduncular, in others sessile.

In this malformation there may be entire division of the vertebrae, involving even the bodies, with partial or complete absence of the lateral arches; or there may be perfect development of the lateral arches with the want of union at the median line. This protrusion generally takes place during the latter months of the fetal life; it may, however, be unobserved until some weeks or months after birth.

At present there are recognized three distinct varieties of this affection: 1, meningocele, the protrusion consisting only of fluid held in the membranes of the spinal cord; 2, meningo-myelocele, where we have the addition of a portion of the cord in the sac; and 3, syringo-myelocele, the central canal of the spinal cord being dilated, thus forming the cavity of the sac.

This is, as we are all aware, a very fatal affection, few children surviving longer than five or six months after birth, many dying before that time. Death usually occurs from convulsions, or ulceration and rupture of the sac. If the sac is ruptured during parturition, the infant is nearly always stillborn; and if it becomes open after birth, death usually follows in a few hours, the immediate cause of death being convulsions from the pressure being taken off the brain in consequence of the loss of the cerebrospinal fluid.

In the diagnosis of this affection there are some very important facts which should be borne in mind. The tumor is congenital and occupies the central portion of the posterior aspect of the spine. By pressure it is diminished in size, tension being easily seen at the fontanelle. By raising the tumor we are often enabled to discover the loss of the spinal arches and map out the bony margins of the spinal bodies; and when the child cries or coughs the tumor becomes more tense.

On account of the very fatal termination in the majority of these cases it can be readily recognized that

the surgeon is warranted in pursuing any treatment which promises a prolongation of life or a radical cure. This treatment we can readily divide into palliative and radical. In the palliative treatment, when the tumor is small, or of moderate size, considerable pressure should be exerted upon it, either by the application of collodion, or a cup-shaped truss either made of surgeon's wool or some soft material, this pressure being maintained by a common roller bandage or adhesive strips. This treatment is suggested by a few accidental cures which have resulted by pressure being exerted by binders, which have been inadvertently placed tightly around the child's body, and in this way compressing the tumor. Some surgeons supplement this treatment by acupuncture, their method being by repeatedly pricking the thin portion of the cyst wall with a fine needle, allowing the fluid to ooze away upon an aseptic dressing; another method, following a similar course, is by tapping the cyst with a fine trocar and cannula, one or two drams of the fluid being drawn off at each tapping, gentle pressure being maintained either by pads of wool or cotton or the application of collodion.

In 1848, Dr. Brainard reported a number of successful cures by the injection of iodine into the cyst. The rules laid down by him are: 1. to make a puncture subcutaneously in the sound skin by the side of the tumor; 2, to draw off no more fluid than the quantity of fluid to be injected; 3, to evacuate the contents of the sac and, if symptoms of irritation supervene, to replace this fluid immediately with distilled water. The solution he generally used was iodine and iodide of potassium in the proportion of one-quarter grain of the former and three times the quantity of the latter to one ounce of distilled water. Morton's fluid has been lately employed more or less with success, and consists of 10 gr. of iodine, 30 gr. iodide of potassium to 1 oz. of glycerin. Two drams of the fluid are generally drawn from the cyst walls and replaced by the same quantity of this injection. These injections are repeated at intervals of from one to three weeks, so long as inflammation continues.

The radical operation consists in the excision of the sac. Dr. Bayer has reviewed the whole subject of spina bifida, and has discarded the treatment by acupuncture, seton, or trocar, and he condemns the injection of iodine or other irritants into the sac, and considers this condition to be one analogous to hernia, and suggests that the treatment of this affection should be maintained upon the same lines. He points out the danger of meningitis following this plan of treatment is no greater than that of peritonitis following the treatment of hernia, and as compared with the operation for hernia is both safer and more certain of success.

It does seem to me, from the statistics gathered from the treatment by tapping followed by the injection plan, the results of which have been most unfortunate, we are warranted, especially in this aseptic age of surgery, to treat this affection after the suggestion of Bayer; especially when the tumor is small and peduncular. Some very brilliant results have followed this plan of treatment. The outlines of the operation are as follows: An incision is made through the skin on each side of the tumor about an inch from its base and two flaps are carefully dissected off the tumor. The sac is then punctured, withdrawing the fluid, and the sac so cut and separated as to leave two flaps, one longer than the other. Should the nerves or portions of the cord be found adherent to the sac, they are carefully separated from the wall of the cyst and returned to the spinal canal. These flaps are now sutured, the approximation

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being so close that leakage will be impossible; the skin flaps are now brought together by silk or silkworm gut sutures, and should there be a deficiency of skin for covering, sufficient amount can be obtained by dissecting the skin from the loin and transplanting it.

In looking over the literature on the subject of operation by extirpation, I found among some of the rules laid down the following: Extirpation is unjustifiable in very young infants; in cases complicated by extreme hydrocephalus, paraplegia, or serious nerve lesion; and again, where also the disease is very extensive and the want of a normal amount of integument is inadequate for covering the outside of the cleft. The indications advised for such an operation are as follows: Where the child is over 7 or 8 years old, and where the tumor is rapid in its growth, rupture threatened, and where normal skin is abundant for covering.

In consulting the authors on this subject, I am also impressed with the fact that the great majority of them are united in condemning the ligation of the sac. I therefore desire in this connection to report the following very interesting case:

On March 5 I received a communication from a local physician, stating that he had under his observation a baby of tender days, who had a fatty tumor upon the back, and which had a nevus developed upon its most salient point. The tumor, he also stated, had been growing quite rapidly in the past three weeks, and he was exceedingly anxious to know what course to pursue. I advised him to bring the child to Nashville for an examination, which he accordingly did on the evening of March 18. On the next morning, in conjunction with Dr. W. A. Bryan, I called upon the family and made a very careful examination of the baby. I found a tumor between the scapulæ, situated in the median line of the spine, about the size of an orange, translucent for about three-fourths of its diameter, globular in shape and pedunculated.

The base of the tumor was covered by normal integument. My examination also disclosed a cleft in the spine corresponding to the fifth dorsal vertebra, and I was enabled to discern the absence of the lamina and the connection of the tumor with the central spinal canal. The head of the child was drawn backward, and was apparently too large for the size of his body; there was, however, no bulging of the fontanelles, their closure being about normal for this period of life.

The following history was obtained from the mother: The family history on both sides was excellent, with not a single trace of deformity in any other member of the family, both lines having arrived at an advanced age of life. The child was born on Dec. 27, 1900, and weighed 5 pounds at his birth. Shortly after birth the mother noticed a tumor about the size of a partridge egg, with a nevus over the most salient point, and which, she informed me, grew rapidly from the date of the child's birth, increasing when the child cried, and producing a slight bulging of the fontanelle, which was also noticed when I made gentle pressure upon the base of the tumor.

I gave it, as my opinion, that we had a spina bifida to deal with, which was concurred in by my consultants, and that on account of the rapid growth of the tumor and the attenuated condition of the sac, together with the small size of its pedicle—which in diameter was only about 1 to 2 inches—that the best procedure would be total extirpation and advised an operation. The consent of the parents and consultants being obtained, the pa-

tient was prepared for an operation, which was performed on April 20.

I was assisted in the operation by Dr. W. A. Bryan. Chloroform was the anesthetic chosen, but as the patient did not do well under this anesthetic, it was changed to ether, which proved very satisfactory, the patient standing it excellently during the whole of the operative procedure. An irregular incision was made at the base of the tumor, the object being to obtain as large a skin flap as possible. The skin was dissected from the sac, which required a very delicate dissection for separation, and the pedicle disclosed, which upon examination proved to be about the size of a quarter dollar. The pedicle was seized between two fingers for the purpose of seeing if there were any spinal nerves in the contents of the tumor, but none being discovered by this examination, a clamp was carefully adjusted to the pedicle and symptoms watched. Nothing of an alarming character developing, the sac was opened at its side and drained. This incision was now enlarged and a very careful examination made of the contents of the interior of the sac, which proved to contain nothing but cerebrospinal fluid. The pedicle was now transfixed beneath the clamp by a needle loaded by a double silk ligature; this was interlocked and the pedicle ligated. The stump of the pedicle was stitched by a double row of catgut sutures and made perfectly water-tight; the skin flap—which proved abundant—approximated by silk sutures and the wound dressed.

From March 20 to March 25 the temperature was below 100 F., with corresponding pulse rate and respiration; the first dressing was made at this date and no leakage discerned. On the evening of March 25 the temperature rose to 103 degrees, which proved to be due to a stitch-wound abscess in the skin flap; this stitch was removed and the wound thoroughly cleansed and dressed.

The temperature from this date immediately decreased, the wound being dressed each day, and on March 27 it struck the normal line. The remaining silk sutures were removed on the seventh day, the wound found almost healed, and from this date the child made an uneventful recovery, and was dismissed entirely well on April 8.

In conclusion, I desire to call attention to the following points:

The child I operated on was less than three months old; the tumor was rapid in its development, and threatened rupture was imminent; the pedicle was small, and consequently easily dealt with.

With authors to the contrary, I claim the only conservative plan that could be adopted is the one carried out in this instance; which leads me to say that, in the vast majority of cases, each individual surgical case is a law unto itself, and we have to exercise that good common sense, without which surgery would be at a standstill.

Cacodylate of Soda.—A correspondent calls attention to the editorial in THE JOURNAL for August 17, p. 455, on "Cacodylic Acid." He says: "There is an error in calling this cacodylic acid, for cacodylic acid as such is not used medicinally to any extent, but the sodium salt, known as 'cacodylate of soda,' is extensively used in some parts of the country, and I have had a broad experience in observing its effects. The cacodylic acid has been known for many years as possessing the virtues of arsenic, but it could never be used satisfactorily until it was combined with a sodium base. It is now used both hypodermically and internally, and I consider it one of the best remedies we have for many conditions."