

plying it, and making a ureteral fistula above the loop of isolated bowel. The bowel may now be embedded beneath the skin with adequate drainage. The secondary operation some time afterward will aim to direct the flow of urine into the now shrunken and far less septic intestine and thence into the bladder. The bladder must be temporarily drained.

This method by the use of intestinal loops can never be of practical consequence, except possibly in those very rare cases in which the ureteral fistula opens upon the abdomen at a point remote from the bladder, requiring on that account a large amount of tissue to fill in the space.

Where the ureteral injury occurs low down, near the bladder, the loss of substance must be considerable, indeed, if the ureter can not be implanted directly into the bladder. This can be accomplished, if the ureter can be drawn down and the bladder drawn up sufficiently, with great ease, as has been described under the head of complete transverse injuries without loss of substance.

(To be continued.)

THE ETIOLOGY, MORBID ANATOMY, DIAGNOSIS AND TREATMENT OF INFANTILE HERNIA; OF THE INGUINAL TYPE IN THE MALE.

Read in the Section on Diseases of Children at the Forty-fourth Annual Meeting of the American Medical Association.

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A fully developed hernia is rarely met with at birth; though the conditions favorable to the evolution of it always exist at this time in the male.

When infantile-hernia is met with, it may appear in divers situations; in the simple or complicated forms, single or double; with or without pain.

Inguinal hernia in the male child is commonly associated with ectopia of the testis.

Dr. Wm. T. Bull has said that when a male child is sent to him with hernia, one of the first things he does is to look for the testicle.

When hernia appears under the first year, a common impression prevails that it comes from excessive crying, and when, later one takes his feet, the evolution of the infirmity is charged to injury.

As soon as a hernia is discovered the parent, filled with alarm and knowing that a mass is outside the abdominal-cavity, which belongs within, at once hurries off for a truss and applies it.

The vast majority of such herniæ are recovered from for the time, but in later years generally return. There is a considerable number of cases in which the hernia is never fully developed. The patient may go through life, never conscious of the infirmity. He has a greater fullness in one groin than another perhaps; but as it never occasions any annoyance, he gives it no thought. This is the type in which, when strangulation occurs, the patient will deny with emphasis, that he ever had a hernia; though, on close questioning, will often admit of always having had a fullness high up in the groin.

It has been said that with our advances in civilization and the widespread growth of democracy, that hernia has become much more common than when the social lines were more clearly drawn; when it was a condition peculiarly common among the aristocratic classes. There can be no question, but it is an infirmity of much greater prevalence among the easier classes than among those who toil with their hands for a living. For it has been long noticed that it is commonly seen in the families of those in America in whom the transition from poverty to

affluence has been sudden; and in which neither parent or ancestry was afflicted. There can be no doubt either, but all cases of so-called "rupture" are of infantile origin; or rather are attributable to defects of development which antedate birth.

Of late years, radical operations have been recommended for this infirmity early in life. Hernial operations have been revived on an enormous scale, for every type of hernia in the infant and adult. But it does not appear from the ancient literature of hernia, that the *infantile* type was ever treated by direct surgical intervention in past ages.

It would be a great gain, if we could cure all the cases of this malady as soon as we discovered them after birth. But this has proved a disappointment, for but few and uncommon phases of it can be radically treated and permanently cured by surgical methods.

With a view of determining what the chief factors are in the causation of infantile hernia; its morbid anatomy, pathology and treatment, rather than for the purpose of attempting to present anything original, this short essay is offered. It may be added that inasmuch as the technique of surgical operations for it was considered by me in a brochure, presented at the Nashville meeting three years ago, this will not be considered in detail at the present time.

ETIOLOGY OF INFANTILE HERNIA.

The chief predominating elements in infantile-hernia are anatomical; though it is well to remember that this, in common with all other physical imperfections is commonly hereditary. The maldescent of the testis is responsible for more herniæ than all other known causes combined. As this organ leaves its abode from just below the kidney, at about the sixth month of intra-uterine life, it may become arrested in any part of its journey by adhesions and not engage in the abdominal walls at all. This may occur on one side or both. The testis may be wholly absent at birth, and make its descent safely later. As it advances and presses before it the process-vaginalis, it may besides, carry with it a coil of intestine, a fringe of the omentum, or the wall of the bladder. Many times in dissections and operations on the herniæ of infants, I have found the sac of a recent hernia very thick, dense and adherent to the spermatic cord through its whole length, which pathologic condition clearly indicated that the parts were favorable to the advent of a hernial-protrusion, which had no doubt existed not only since birth, but before it, and that it only required the application of a certain force to make the hernia complete.

The funicular-process at birth is very often patent, or imperfectly closed. Later, it becomes completely obliterated when nothing interposes with physiologic processes. But it may remain widely open; and hence permit the intestine to descend into the tunica-vaginalis and lie in immediate contact with the testicle or firmly adherent to it. What is the most common, it remains enclosed in different segments of the cord, from the internal ring out to the gubernaculum testis. Among the lesser elements in causation and aggravation are hygienic conditions, as was some years ago, pointed out by Dr. Frank Parsons of Massachusetts, in the wearing of the tight abdominal binder; besides excessive feeding, and forcing the child to walk too early.

Some authors have cited an excess of the intestine or omentum and an elongation of the mesentery, as important factors. It seems to me that a pre-natural diminution of abdominal capacity might constitute an important causation.

From the foregoing, it is evident that as causation differs in this disease, so must treatment be varied; and that while some causes will remedy themselves, others may be obviated; while with a considerable number, the infirmity depends on such conditions as are beyond art to remove they must remain incurable, though not being beyond effective measures of relief.

MORBID ANATOMY.

The underlying ground-work of all infantile herniæ is defective development. In but a comparative few, will we find distinct evidence of recent pathologic changes. How or why remains a mystery, but it is evident that through some occult cause the testis in its march often acquires adhesions to adjacent parts, and thus, while pushing a duplicature of the peritoneum before it, may carry one, or possibly two, fringes of the peritoneum along with it; if not into the scrotum into the inguinal canal. These adventitious sacs or omental masses, in time, if no unusual strain is put on the abdomen, are not occupied by viscera; but contract, become obliterated and practically disappear.

The same may be said of the enclosed funicular process, which state is practically physiological at birth; the infant lying on its back the greater part of its time asleep, at this time of life, with loose, semi-liquid fecal discharges, seldom puts any severe strain on the abdominal walls, and no visible hernia follows. But, let there be atresia of the rectum or urethra; a tightly adherent prepuce, indigestion from improper food or too much of it, with flatulency; then the confined viscera, in obedience to a well-known physical law, will make their way in the direction of the least resistance, and we will have a matured hernia. Whooping-cough or a measly cough in the young infant will have the same effect.

Simple hernial extrusions in the young child will tend to recede and disappear of themselves, if the recumbent position is continued long enough, in a considerable number. The sac contracts, the rings narrow and the canal attains an obliquity. Along with this, there is a shortening of the mesenteric ligament, with an alteration in the seat of intestinal contact with the abdominal wall.

This process of hernial retrogression is not peculiar to small, diminutive protrusions, but applies also as well to those of considerable volume.

In the greater number of cases of ectopia of the testis, hernia is present. In certain cases, it appears that the testis passes down through, making a portal of escape for itself, and then recedes, or is suddenly drawn up inside the abdominal rings by a powerful contraction of the cremaster muscle. For we will sometimes witness a hernial formation in the scrotum, when the testis is not in sight on that side. And in the event of strangulation, as I once said, the testis is in the canal, between the rings, while the extrusion is in the scrotum. We will, too, sometimes find a case in which on one day we will discover the testis in the perineum, another time in the scrotum, again between the rings; and finally, we look for it when it has vanished, to reappear again in the scro-

tum perhaps the next day. In many cases in which there is a hernia at birth, but the testis has not yet descended, we will observe before the infant has taken its feet, that it has lodged and the extrusion has disappeared or is greatly reduced in volume.

It is only when the testis carries with it into the scrotum either the intestine or omentum, and the congenital type continues, that we will have such a state as will fail of spontaneous relief, or not respond to a tentative therapy. The rings being constantly widened by a substance or structure which acts like a wedge on them, become wider and wider, so that the obliquity of the canal is lost. If omentum is extruded it will hypertrophy in time and acquire an immense volume. It follows, accordingly, that when the testis contracts adhesions with the escaped viscera, the reduction of the hernia will be quite impossible.

But there is a considerable number in which, after the rupture descends, adhesions form, when the type is not essentially what is anatomically known as congenital and which, too, in consequence are quite irreducible.

In babies, we will at times meet with those in which but one element of the abdominal contents is present, viz, a serous fluid. This is commonly called a hydrocele or hematocele, but is in reality, in its elements, clinically and pathologically unlike what is so designated in the adult. Not infrequently it is a genuine cystic formation, of a homogeneous composition; while again it is a pure serous fluid or what is known, physiologically, as lymph.

DIAGNOSIS.

Diagnosis of the inguinal type of infantile hernia is not difficult in the most of cases. But nevertheless, in many forms of cystic diseases of the cord, it is impossible to diagnose with accuracy the contents of a fullness which occupies the scrotum or the upper inguinal region. Manipulation will not do it, nor is transmitted light a reliable test in all. Hypodermic puncture is an important aid, but unless special care is exercised it may do harm, and hence in only exceptional cases is its employment to be recommended. But in mixed complicated cases in which there are both cystic disease and hernial protrusion, its use may lead us into the error of assuming that a mere tapping will effect a cure of the case; while as a matter of fact, it will fail in this; besides perhaps lead to puncturing the bowel or peritonitis.

Unless a hernia seems to be a source of pain and is increasing in volume, there is no pressing necessity for determining what the mass is; besides, nothing is lost by waiting.

In reducible hernia it is not difficult to recognize an epiplocele from an enterocele; but in mixed cases, those which predominate in infants, this will be quite impossible.

TREATMENT.

The treatment of infantile hernia of the inguinal type, in the absence of complications, should be on tentative lines. It is only in exceptional and unusual cases that the question of operation will arise.

It will be borne in mind that those cases here described only embrace that class which are seen in the suckling infant before walking begins.

The treatment will have reference to a few things mainly:

- 1, diet; 2, clothing; 3, rest; 4, support or pressure;

5, removal of such causes as occasion straining; 6, radical operation.

Diet.—When the infant is a suckling, nothing need be done in the way of dieting it, only, if the mother is constipated, she should be given sufficient of an aperient to act moderately on the bowels of the infant, through the mother's milk. But in modern times, when so many mothers are over-fed and under-exercised, or are the partners of ardent husbands, they either have no milk, it dries up, or is unfit for the infant; when resort must be had to artificial diet. The infant commonly over-eats, overloads the intestine, or in consequence, accumulates an undue amount of fat in the omentum. If digestion is disordered, he has gaseous distension from alimentary fermentation, when the abdominal walls are put on a severe strain.

Caution should be exercised, then, when the natural aliment is cut off from the herniated infant, not to over-feed, nor give food of improper quality. Harm is apt to rather follow too much than under-feeding.

Clothing.—Little need be said as to the quality of clothing. The infant must be comfortably clad. The only question is with regard to how the garments are adjusted. The tight encircling band which has been so long applied over the lower thorax and entire abdomen, when adjusted, under the old orthodox rules is quite certain to render the spontaneous cure of a hernia impossible. Hence, in every case, this should be cast aside. The abdominal muscles should be allowed the freest possible play, and the peristaltic movements of the intestine be in no manner hampered by an artificial pressure of any description whatever.

To overcome this deleterious action of the binder, Dr. Frank S. Parsons has advised that the garments covering the trunk and extremities should be adjusted to, and suspended from the shoulders. (*The Hygiene of Infant's Clothing*, JOURNAL OF AMERICAN MEDICAL ASSOCIATION August, 1890. By Frank S. Parsons.) Those of us who have given this subject a special study must indorse Parson's views, and commend his special hygienically-made infant wearing apparel.

Rest.—Physiologic-rest, of all known agencies is one of the most potent, as an aid in the therapy of every species of hernia, and at every stage of life. This element of rest is what so powerfully contributes towards the recovery of infantile hernia. The baby lies in a quiet state in the horizontal position a large share of his time, and when he comes to sit up, yet the parts in the region of the infirmity by this attitude, are in a favorable state for restoration to the normal condition. The depression of the inguino-femoral fold, the pressure downward of the abdominal parietes and upwards of the convexity of the thighs exert a forcible influence in relaxing the fibers in proximity to the ring, and the recession of the visceral displacement. Therefore, in the herniated infant particularly when the mass is of considerable volume, the lying and sitting positions should be encouraged, as long as possible. Creeping or walking "on all fours," on the hands and knees, thus carrying the spine in a horizontal direction, and equally distributing the weight over the anterior abdominal walls, no doubt, is a necessary and salutary exercise, when the infant has reached the first year or before it. But the practice of forcing an infant into *early* walking, carrying the

spine erect and putting a severe strain on a weakened part is a vicious one considered in any light, to the herniated, as it not only interferes with the reparative efforts of nature, but it likewise greatly aggravates the preëxisting condition, rendering subsequent treatment more difficult and unsatisfactory.

Support or Pressure.—My own experience has been that a small painless hernia which shows no tendency to enlarge, will do better by entire non-interference, than by too much, or the misdirected application of pressure. Parents are naturally apprehensive when a hernia is discovered, that it will become worse with time, and expect something more than an encouraging promise; besides perhaps, with many of these simple cases, a simple bandage support will probably do no harm. But before we apply anything, let us be assured that the testis is well down and that the supposed hernia is not a simple cyst. With these cases the hank-truss so-called, made of a couple of skeins of worsted, or the simple pad and spica bandage, amply suffice. The general use of the spring truss in infantile hernia is a bad practice. Its adoption is to be prohibited, except in those cases, in which the medical attendant is permitted to keep the case under constant observation. Those trusses with a strong spring, do incalculable harm. By their pressure they often not only prevent the testis from fully descending, but they likewise induce adhesions of it with other parts. Simple reducible hernia they render irreducible, in many cases; and in many too, by their constant pressure, they induce atrophy over the rings which they are supposed to strengthen. When the child takes his feet is the time when the truss plays an important rôle; until then its employment must be guarded by an intelligent supervision.

The removal of such causes as occasion severe straining.—It goes without saying, that in every case, before any thought of treatment is entertained, we should first institute a searching inquiry as to the etiologic factors. If the hernia be an inheritance, when once reduced, it should be remembered that, as a tendency to relapse remains throughout life, it may be a wise precaution, as a prophylactic measure, to recommend the wearing of some sort of support over the inguinal rings.

In all cases, we should be assured that there is no impediment in any part of the urethral or rectal passage.

Operation for radical cure.—As the operation for radical cure of hernia is rendered devoid of pain and is attended with little or no danger to life, the temptation to perform it is very great; when we can practically promise success in every case. But when we bear in mind that the greater part of infantile cases will spontaneously disappear; and as we know, now, that very few operations for radical-cure produce permanent effects, we should hesitate to ever recommend surgical intervention in any, except certain complicated cases, presenting unusual characters.

The cases of infantile inguinal hernia which require operation are; 1, those in which there is a marked tendency to increase in volume; 2, those which are attended with severe pain and 3, those in which there are extensive adhesions between the testis and viscera, and there are no possible prospects of reduction or cure without radical methods. With these exceptions none should be treated by any other than ordinary, safe and tentative means.

The technique of operation is practically the same for the young as the adult. Although it is quite impossible to preserve the dressings from the urine; on being displaced, the wound heals well.

It is well in this latter class to require the wearing of some sort of support for a year after operation.

As the scope of this paper will not permit it, I have purposely refrained from including the various complex types of inguinal hernia; besides those which present in the umbilical, femoral and other regions; which overlie or are continuous with the abdominal cavity.

THE TREATMENT OF CHOREA BY LARGE DOSES OF QUININ.

Read in the Section on Diseases of Children, at the Forty-fourth Annual Meeting of the American Medical Association.

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Of the various theories that have been advanced from time to time, in the effort to elucidate the etiology of chorea and to localize the affection; that is, to ascribe to the choreic movements either a cerebral, or a spinal, or a conjoined origin, that of a diminution or loss of spinal inhibition recently proposed by Prof. H. C. Wood in a contribution read before the Philadelphia Neurological Society and published in the *Journal of Nervous and Mental Diseases* for the month of April, may be accepted as pre-eminently a rational one; a theory that is based upon sound scientific investigation and deliberate ratiocination. We would invite a perusal of this very interesting paper, as giving in a more concise and intelligent manner than any resumé we could offer, the various steps that led up to the enunciation of the theory suggested. In the meanwhile, permit us to review briefly some of the principles involved in this line of study of the motor function of the cord, with its physiologic and pathologic manifestations.

It appears to be a fundamental law that certain highly specialized cells of the nervous organism have relegated to them powers that are dominant; whose function it is to dominate and regulate other cell-groups not so highly specialized in the assignment of the complex workings of the body. Especially is this law exemplified in the familiar manifestations of the well-known cardio-inhibitory center of the vagal nucleus, and in the intensely interesting and intricate phenomena of thermotaxis. That group of cells to which has been allotted the power of inhibiting the motor function of the spinal cord is designated as Setschenow's center, which, in the frog is placed in the optic lobes, and in man and the higher vertebrates is believed to be situated somewhere in the corpora quadrigemina or medulla oblongata. Whatever may be its precise location, it is undoubtedly true that stimulation of this portion of the brain-substance will be followed by a marked diminution in the reflex activity of the cord, thus demonstrating at once the dominating influence of the center over the motor tracts of the cord beneath.

Spitzka, in the *Reference Handbook of the Medical*

Sciences, has aptly said: "The spinal cord is essentially a segmental organ;" in the typical vertebrate it may be regarded as made up of a series of nerve centers, fused into a column, "each center corresponding to a somatic segment, with which it is connected symmetrically by a pair of spinal nerves. Each one of these spinal segments corresponds in its topographical situation with the somatic segment which its nerves supply, and these nerves take a direct transverse course, leaving the cord at right angles to traverse the intervertebral foramina and thus reach their somatic destination."

Stimulation confined to any one of these spinal centers,—thus directly or absolutely augmenting its motor power, or its function of motor discharge, or the cutting off from any one such center of the inhibitory action of the dominant center in the brain above—thus, primarily, indirectly or relatively, and secondarily, absolutely, increasing its motor power, will be accompanied by spasmodic muscular contraction in the somatic segment supplied by the implicated center. This is self-evident. Now, generalizing, suppose that the direct stimulation be applied to the spinal centers as a whole, the entire cord, simultaneously, or that the inhibitory action instead of being removed from a single spinal center be very perceptibly diminished, or absolutely cut off from the entire cord, and it will go without saying that all of the somatic segments supplied by the spinal motor nerves will be involved in the exaggerated discharges of motor force, and that the muscular system of the body will, so to speak, run riot. Prof. Wood, from his studies in this direction would ascribe to chorea some such origin as this. He suggests that the direct cause of chorea lies in a disturbance or overbalancing of the equilibrium that normally exists between the motor power of the spinal cells and the inhibitory apparatus of the spinal cord located in the so-called Setschenow's center of the brain, the latter in choreics being involved in a paresis more or less marked. During inhibition the function of an organ is restrained; during paralysis it is abolished. The amount of disturbance will depend entirely upon the degree of loss of inhibition. Thus may be accounted for the varying grades of choreic manifestations, from the slightest case of so-called spinal irritation with the characteristic unrest and ebullition of nerve force and the exaggerated reflexes of the neurotic individual, to the grave cases of chorea major with absolute loss of control of voluntary muscular effort, and finally, diminished or absent reflexes from exhaustion and depression of the entire motor area of the cord.

Nowhere is the perplexing uncertainty that surrounds the true etiology of chorea better demonstrated than in the very recent work of Landon Carter Gray. In it, he gives a varied list of causes of the disease, covering the most remote possibilities and including such unsatisfactory etiologic factors as the seasons, the emotions, malaria, race, eye-strain, as well as the more definite causes; trauma, articular rheumatism, imitation and heredity. After such an array we would naturally expect to hear him say that although certain cerebral changes have been well described in the chronic and fatal cases, as well as of the disease in animals, there has never been any approach to a description of the pathologic alterations that would explain the movements of the