

## A DISCUSSION ON THE TREATMENT OF HERNIA IN CHILDREN.

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THE pathology and treatment of hernia in the adult have for many years occupied a first place in surgery, and more so since the operation for its radical cure has completely revolutionised its treatment.

In infants and children, however, this lesion has not received the same attention, and it is owing to this that our President asked me some months ago to introduce this discussion. It has been proposed, and I think wisely, that its consideration should be limited to the age of 10 years and under.

### Frequency.

The discussion of hernia in infants is practically confined to the inguinal variety, as the femoral form is comparatively rare under the age of 10, amounting as it does to only 0.3 per cent. of all cases of hernia. I have only seen one case of femoral hernia in a child under 1 year, although several instances have come under our observation at the Truss Society whose parents stated that the patients had suffered from this form since birth. These statements must be received with caution, but it is interesting to note that this form of hernia occurs more often in boys than in girls under 10.

### The Percentages in each Lustrum of Inguinal Hernia in Male and Female Children at the Time of First Discovery.

Ages.	Males.	Females.
0	15.22	8.55
1-5	4.32	7.08
6-10	2.86	6.91

Inguinal hernia in both sexes up to 10 years of age amounts in males to 23.4 per cent., and in females to 22.54 per cent. of all cases of hernia at the time of its first discovery. It will be noted that though the percentage in both sexes is in the total nearly identical up to this 10 year age limit, there is no corresponding equality at the same ages, for while in males under 1 year the percentage is 15.22, in females it is only 8.55 from 1 to 5 years of age the percentage is 4.32 and 7.08 respectively, and from 6 to 10 years 2.86 and 6.91 respectively. This inequality is easily accounted for by difference of sex and developmental causes.

There are, so far as I know, no statistics which afford any accurate data of the proportion of ruptured infants to the total number of living children, nor of the predisposition in different races to hernia. I have, however, no doubt that Jewish children, and especially boys, are more liable to hernia than are the mixed races.

Boys are more liable to hernia than girls, for out of 12,896 cases which I have collected of inguinal hernia in both sexes, no fewer than 11,833 occurred in boys, of whom 7,801 were situated on the right side, 2,851 on the left side; while in 1,171 both sides were affected. Of the 1,063 girls, in 593 the hernia was situated on the right side, in 360 on the left, and in 110 on both sides.

The greater frequency of right inguinal hernia as compared with the left in boys is due to the fact, recorded by Camper, that the vaginal process of the peritoneum in the right side is nearly always patent at birth on the right side, while on the left side it is nearly always closed. In girls, Féré and Sachs, who conjointly have examined the bodies of 259 girls, have demonstrated that in 15.8 per cent. the canal of Nuck was pervious at birth.

### Diagnosis.

It is difficult to determine definitely whether the hernia in boys is in the cavity of the tunica vaginalis testis, while in the adult no such difficulty exists. In infants the mesentery is so short and the omentum is so ill-developed that neither descends so low into the scrotum as to surround the testes, by which alone the diagnosis can be accurately set at rest.

It does not necessarily follow that the hernia is in the cavity of the tunica vaginalis testis because the patient is born with a hernia. The two are not of necessity associated, although the literature of the subject almost infers it. The term "congenital," as I always teach, has reference to the time of the occurrence of the lesion, while the second has reference

to the developmental and anatomical relations of the protrusion.

Before the proper treatment for a hernia can be recommended we must be assured of its existence, and this diagnosis is not always easy, for it may be that only from time to time a swelling occurs which simulates a hernia. In infants the diagnosis presents far fewer difficulties than in older children. Here complications arise of which malposition of the testis or disease of that organ or of the cord are the most important. Malposition of one or both testes does not often in early life lead to much trouble, so that their displacement or absence is only recognised late on in life, and it is only when the child approaches puberty that interstitial hernia and other complications of retained testes become evident. Out of 1,417 cases of ruptured boys under 5 years of age I find that 15 cases presented evidences of misplaced testes; of these 7 were at the mouth of the external ring, 5 were within the canal, one of which was associated with an interstitial hernia, whilst in 3 the testis was completely retained. In this number of 1,417 cases of rupture there were 5 instances of irreducible omentum, 4 being on the right side, and 1 only on the left; there were also 6 cases of congenital hydrocele in this total number.

### Complications.

It is not my object to discuss the many varying conditions complicating hernia in infants, but to enumerate those only which have a distinct bearing on its treatment. The treatment for all practical purposes may be included under the heads of prevention, instrumental, and operative measures. This must be varied if associated with an umbilical hernia, which is met with in no less than 21 per cent. of all cases of inguinal hernia. In this number I include only definite umbilical protrusions, and not the pouting umbilicus so frequently met with in early infancy.

### Prevention.

The preventive plan of treatment includes the proper dieting of infants, and on this subject there is much to be enforced. In many infants there exists chronic intestinal irritation leading to distension of the intestines and consequent increased pressure on the abdominal walls. The size of the abdomen is frequently increased to such an extent that in infants of 6 months it is not unusual to find that the umbilical girth of the abdomen is 3 or 4 inches in excess of its iliac girth. This error of diet is more frequently met with in the lower than in the upper classes.

Circumcision is much advocated, not only as a preventive measure but also as a curative one, when a hernia is present. The value of circumcision I recognise most fully, but I do not think that phimosis plays any active part in the causation of a hernia; and I would go further still in asserting that it has little or no indirect action. The Jewish race, as I have before stated, are very prone to hernia, and logically they should be markedly exempt if phimosis is so productive of this lesion. Good as the exercise of this religious rite is from many points, we must not ascribe to its performance greater virtue than it possesses.

The operation is in itself attended by considerable pain to the little patient, and every time the wound is dressed the infant gives expression to its trouble by explosive fits of crying and straining, in themselves a cause, in many surgeons' minds, of the very lesion the operation is supposed to cure. In practice it is known that phimosis and hernia are not necessarily associated, and many infants come for relief who have already been subjected to circumcision and are still ruptured.

I have for many years urged that micturition is not as a rule the result of the sole action of the abdominal muscles, even though a phimosis does exist, and which act is, even under extraordinary conditions, performed by the intrinsic action of the muscular walls of the bladder alone.

Muscular exercises play an important part in preventing hernia by strengthening the abdominal muscles, and specially those forming the walls of the inguinal canal. These exercises can be enforced only in children from 3 years and upwards, and I always employ them not only as a preventive measure in those who have a strong family tendency to hernia, but in those also in whom a protrusion has already manifested itself.

Every measure which conduces to the maintenance of good general health serves to lessen the tendency to hernia.

*Treatment by Trusses.*

The curative treatment of hernia is effected by the application of some form of mechanical support either by means of a spring truss or by the use of skein wool truss or bandage. Whichever method is recommended it is of the first moment that the treatment should be commenced directly the existence of a hernia is recognised. If a hernia is treated by effective instrumental support operative measures will probably not only not be needed, but will not even be discussed.

The skein wool truss is a method now adopted not only in many hospitals but also in private practice. This plan is comparatively modern and was warmly advocated by the late Mr. William Coates, of Salisbury. In his Hunterian lectures in 1884 Mr. Lund alluded to its use. On referring to my notes I ascertained that Mr. Fred. Wood at St. Bartholomew's Hospital was in the habit of treating infants by this method. Some years ago he forwarded at my request some skein wool specially made for him at Lichfield, in Staffordshire, and which he used in exactly the same way as now practised. One of the acutest observers of disease and its treatment I know, he was not satisfied with the results. I have had now a large experience of its use, and observation and practice have convinced me of its unsatisfactory results, and at some children's hospitals many patients are brought to us by their mothers who bear strong record of its absolute inutility in the majority of cases. The failure of its use may safely be predicted, owing to the almost habitual malposition of the knot, its dirtiness, its loss of elasticity and resiliency, upon which so much of its vaunted benefits depend. As the result of almost invariable disappointment I have practically discarded its use. I am glad to note that my friend Mr. Bull, in the *Annals of Surgery* for 1893, p. 531, states that, "In children under the age of 1 year the worsted or so-called 'hank truss' has been extensively tried. This truss has been very highly praised by some, and as strongly condemned by others. During the past year an attempt has been made to give it an impartial trial, and alternate cases up to the age of 1 year were treated by the 'hank' and the light spring truss. The results in 240 cases carefully followed up led us to discard the hank truss as a routine method of treatment, although there are still a few cases—for example, very young and ill-nourished infants, where it fills a useful but temporary place."

With this verdict I must cordially agree, and if we consider the reasons for its use we shall be inevitably drawn to the conclusion that in theory and in practice it fails to attain the first object of its use—that of efficiency in retaining a hernia in position.

*Trusses.*

In this form of mechanical support we possess in my experience all the essentials of cure by a pressure sufficient to procure obliteration of the processus vaginalis, together with comfort.

It is not my purpose to discuss the details of the manufacture nor of the mechanical requirements of the spring truss, only so far as to say that experience counts for much in the proper measurement and adjustment of the truss, without which it must be ineffective. It needs a long apprenticeship to properly measure and to scientifically apply a truss on a patient.

Our President, in his Lettsomian lectures for 1890, has a passage which appears to me to touch this whole point of mechanical treatment. He says: "As a rule, the truss which the trussmaker chooses—mark the word—for the child is needlessly strong in the spring," and it is in this statement that the condemnation lies of the manner in which these helpless patients are relegated to the care of the trussmaker. The choice and adjustment of trusses should not be left to the judgment of the mechanic, and if so can we wonder at the thrice-told pain and disappointment due to ill-fitting trusses.

In the course of over thirty-five years' experience in private practice and at the largest special hospital in the world for this disease, I have never seen the glibly-told tortures of children so graphically described as resulting from the use of trusses in infants. The number of cases in which trusses

failed to efficiently retain difficult herniæ could be counted on one's fingers.

It goes for the saying that for adequate treatment the truss must be of good make and of the proper size, and in infants covered with soft indiarubber, while proper attention must be given by its mother or its nurse to cleanliness and to dryness. If these precautions are carried out excoriation and other troubles are of the rarest occurrence. To obtain a cure the instrument must be worn day and night, and only removed for the purpose of cleanliness. No grease should be allowed to come into contact with the rubber truss nor with the patient's skin.

This treatment should be commenced immediately the hernia is discovered. As might be expected the results of treatment are more satisfactory in private than in hospital practice, and the causes are not far to seek. This is instructive, since cases in private are usually more complicated than in hospital experience. In home practice the cure of the hernia may be confidently forecast.

In private we are able to trace our patients for years either by personal knowledge or by his history, and my experience has been most favourable as to the permanent cure of most of these infant patients. Almost the first question an anxious mother puts to the surgeon is the length of time needed the child to wear a truss if he is to secure a permanent cure.

The question is more easily asked than answered, and indeed it is often difficult to be certain when the child is cured. My answer to this question is that when protrusion takes place before the age of 1, the use of the truss should not be discarded under any circumstances till the age of 4 years; if a truss has not been worn till the age of 3 or 4 it must be worn till the age of 10; and if not worn till the age of 7 then the truss should be worn till puberty.

That these patients in large numbers become permanently cured there is no doubt, for statistics show that as years roll on the number of ruptured children gradually diminish. This diminution is not the result of death, for there is no evidence to show that the mortality of ruptured children is greater than in non-ruptured ones. We have thus every reason to believe that the lessening is the outcome of a cure. To substantiate this I have examined our statistics, and they show that during the first decade of life this decrease is very marked. In a total of 4,910 patients under 10 years of age, the numbers in successive years are 2,322 in the first year of life, 520 in the second, 480 in the third, 440 in the fourth, and in the succeeding years 260, 230, 200, 240, 120, and 120 respectively.

The prospect of a permanent cure is thus most encouraging, but the longer the treatment is delayed the greater the progress of the disease, and the less probability of success. In my experience the outlook of cure is more favourable in girls than in boys.

If an umbilical hernia coexists with an inguinal hernia, the treatment of the inguinal hernia should be the first consideration, as pressure by an umbilical truss, especially in boys, tends to increase the inguinal protrusion. In boys the umbilical hernia nearly always becomes cured; in girls the cure is more tardy and less satisfactory.

*Operative Treatment.*

It is the experience of most surgeons who have had a large experience of ruptured children that the indications for operative treatment are not often present. The anatomical conditions of the structures concerned in inguinal hernia are not favourable for effective suturing in early life, for there is practically no canal, the aperture of the primary exit of the hernia being almost opposite the external ring. The muscles and other structures also are so soft and ill-developed as to afford very insufficient support to suturing the boundaries of the canal.

The details of the operation are so varied and depend so much on the experience of different operators that it would be waste of time to discuss the operation in all its minuteness. In my opinion no operation should be advised except under unusual or pressing conditions prior to 5 or 6 years of age, and I have previously stated that if the hernia is properly treated by truss pressure, the majority of ruptured children are cured long before this age.

The form of ligature I am inclined to recommend is kan

garoo tendon, which resists destruction for at least three or four months. Silk sutures are advocated by many, but it is the experience of some surgeons that they cause suppuration even as long as three or four weeks after the operation.

The operative cure should be undertaken :

1. In cases of irreducible omentum.
2. In cases of irreducible omentum with fluid in the sac.
3. In congenital hydrocele.
4. In operations for the relief of strangulated hernia.
5. In all cases of fluid in the sac of a hernia.
6. In all cases where it is impossible to efficiently return the hernia by mechanical appliances.
7. Where proper treatment is impossible owing to incompetence or ignorance of the mother.
8. In cases in which a truss has been worn for three or four years with no benefit.

In early infancy the result of the operative cure for inguinal often results in one of the most intractable forms of hernia—a traumatic vertical extrusion.

The conclusions, therefore, which I beg to suggest are :

1. That hernia in infancy, if properly and promptly treated, is a curable lesion.
2. That in children in whom there is a marked family history of hernia the preventive measures should be employed at as early an age as possible.
3. There is no evidence to prove that circumcision either prevents or cures hernia in infants.
4. The cases requiring operation are comparatively rare, and should not be recommended in infancy.
5. Experience proves that hernia occurs at an age ill suited for operation, and that if properly treated it is usually cured long before any question of operation arises.

#### II.—FREDERIC EVE, F.R.C.S.,

Surgeon to the Evelina Hospital for Sick Children.

MR. EVE said he proposed to consider the question under four headings: (1) On what cases should we operate? (2) Was the operation dangerous? (3) Was it satisfactory? (4) What operation should be performed, and at what age? With some additions he accepted Mr. Langton's indications for operation. He would also operate, after the age of 1 year, in all cases of inguinal hernia in early life complicated with undescended testis, and for the following reasons: The testis, if in the canal, prevented cure; it might become twisted, inflamed, and was liable to injury, and, to some extent, to tumour formation. There were grounds for believing that so long as it remained in the abnormal situation it underwent a process of progressive fibrosis. The speaker was glad to find that Mr. Langton included in his list of conditions justifying operation, "cases in which owing to the carelessness and ignorance of the parents the treatment by truss was unsatisfactory." In Mr. Eve's opinion this included a large proportion of hospital cases. Personally, he would operate on any case of scrotal hernia if the parents—after having matters explained—preferred operation to treatment by truss. Except in slight cases, he was prepared—on general grounds of greater convenience—to advise operation, although not to urge it, unless some special indication existed. It must be remembered that a rupture apparently cured in infancy by a truss, might descend later in life and become tightly strangulated. Such cases had come under his observation. In regard to the other questions, he would give briefly an analysis of his own cases. The numbers were small in comparison with adults; of the latter he operated upon between 150 and 200 cases for radical cure. During the ten years, 1889 to 1898 inclusive, he had operated on 29 cases of inguinal hernia in males of 10 years or under; 17 were under 2; and 5 under 1 year of age. In four instances the hernia was strangulated. No patient died, except one child who took diphtheria. The wound was then healed. Two cases suppurred superficially. Of the 29 cases he had recently seen 19, and heard from 1 case; and of these 20 cases only one had recurred slightly, making 5 per cent. of recurrences; 18 cases were treated by ligature of the neck of the sac, after slitting up the aponeurosis of the external oblique, and 2 by Bassini's method. He invariably used Bassini's operation in adults, but in children only when the rings were wide or the parts ill-developed. Contrary to what was said, this operation was quite feasible

in infants. He would not operate on infants under 1 year, except for strangulation or other special reason. He thought that division of the aponeurosis of the external oblique was necessary in order to tie the neck of the sac sufficiently high up. The result of his cases showed that it did not weaken the canal, provided there was no suppuration of the deeper structures.

#### III.—ROBERT CAMPBELL, M.B., B.Ch.,

Belfast.

MR. ROBERT CAMPBELL said that he did not agree with Mr. Langton's statement that phimosis played no part in the production of hernia, for it appeared to him only reasonable that any marked obstruction of the urinary outlet must lead to increased intra-abdominal pressure, and so promote the formation of a hernia. In this connection he would like to ask Mr. Langton if a case of hernia in a child with phimosis were presented to him, would he not perform circumcision? As regarded the wool truss, while he agreed that a properly fitting spring truss was the more useful appliance of the two, he considered Mr. Langton's wholesale condemnation of the former not altogether justifiable. A great amount of dissatisfaction with its use was due to its improper application. If a truss had failed to cure a hernia after constant use for two years at the outside, operative treatment was, in the vast majority of cases, necessary. In children under 3 Mitchell Banks's operation was all that was required, but for children over 5 a more extensive operation might be necessary, and the method of Bassini was the one that gave the best results. The buried sutures should be catgut, hardened in formalin, and so capable of being boiled.

#### IV.—RICHARD H. ANGLIN WHITELOCKE, M.B., C.M.,

Surgeon to the Surgical Aid Society, Oxford.

MR. WHITELOCKE said that there was a natural tendency in these cases to cure. A properly applied spring truss, worn day and night and under all circumstances for three years, would in most cases be successful. He had abandoned the use of the wool truss as unreliable, owing to the carelessness of most nurses. Nurses should always be taught to apply the truss with the child recumbent. Cases in which he would recommend operation were those of irreducible or strangulated hernia, and those in which there was an undescended testis. He operated by opening the canal, carefully separating the sac and ligaturing it with silk, closing the canal, and dressing with collodion. He allowed the patient to get up on the fifteenth day. He had only operated on a limited number of cases, which had all been so far successful with no return. He had never applied a truss after operation, but had only been doing the operation during the last five years. He had met with 3 cases of irreducible hernia, one sac contained cæcum and another the urinary bladder. He had given up catgut, and always used silk for ligatures and sutures. The dietary was most important where a truss was used, especially among the poorer classes, for the over-distension of intestine not only increased the intra-abdominal pressure, but produced a peevish, unhappy, crying child. He did not consider circumcision was indicated in all cases, as herniæ often occurred in Jewish and in female children.

#### V.—GEORGE HEATON, M.B., B.Ch.,

Surgeon to the Birmingham and Midland Counties' Hospital for Sick Children.

MR. HEATON uttered a plea for the old-fashioned worsted truss. It had the great advantage of being cheap, and if carefully applied was efficient in a large majority of cases. The use of a spring truss in hospital patients was in many cases precluded by its expense. With regard to the question of radical cure, each case must be judged on its own merits. Personally he never did an operation for radical cure in a child under 4 years of age unless there was a good reason for not attempting cure by truss, or for abandoning it as useless. Some herniæ were so large and had so strong an impulse that any such attempt at cure would be useless. In other cases the hernia might be partially irreducible or complicated with an undescended testicle, rendering the application of a truss difficult or impossible. With regard to the particular form of operation, each surgeon would doubtless perform that in which experience had