

Congenital Umbilical Hernia, with Notes of Case Successfully Treated by Operation.

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THE rarity of this abnormality, and particularly of reported instances of its surgical treatment, render the publication of the following case advisable. Apart from the infrequency of this ailment, as judged by the recorded examples, the existence of a covering, which, from the moment of birth, commences to decay, and ultimately sloughs, is a factor which complicates and modifies the ordinary surgical treatment of umbilical hernia.

On the evening of the 9th of April, 1908, at about 6-30 p.m., a female infant was brought to the Glasgow Royal Infirmary accompanied by its father, who presented a note from the doctor present at the confinement. Dr. W. J. H. Sinclair's message was to the effect that on delivery he noticed the protrusion of bowel, and sent off the baby forthwith for surgical treatment.

When the baby arrived, I had just concluded an abdominal section for intestinal obstruction, and no time was lost in examining the patient. The need for immediate operative interference was evident on inspection of the abdomen, for the bowel lay exposed without any protection, and the cord, about 8 inches in length, was very thick, and was split longitudinally, on the upper surface, from the skin margin outwards about 3 inches. The proximal end of the cord was hollow to a like extent, and seemed to be lined with a definite membrane. The amount of bowel lying on the abdomen included the cæcum, appendix, about 4 inches of ascending colon, and the greater part of the small intestine. The bowel was of a brownish-red colour, partly inflated, and slightly adherent to the umbilical ring.

Replacement of the extruded bowel was attempted after the baby was anæsthetised with chloroform but without success. The obvious course was to enlarge the opening, and this was done by an incision of the abdominal wall in an upward direction. It was then possible to separate the adhesions fixing the bowel to the umbilical opening and to return the extruded viscera to the abdomen. The removal of the cord and closure of the opening was the next step in the procedure. It was rather a difficult point to determine what should be excised and what left. I excised all the gelatinous material, ligatured the vessels at the inner margin of the abdominal wall, and thereafter sutured the opening in two layers. The first included peritoneum and fascia, the second being confined to the skin. The

material was chromicised catgut, and the method in both layers was by continuous suture.

The after progress was uneventful until the third day, when an icterus neonatorum appeared, accompanied by a slight rise of temperature. The latter subsided in the course of a couple of days, and the child was dismissed on the 1st May, three weeks after the operation, having made an excellent recovery. As the lower part of the scar was rather prominent, pressure was applied by means of the binder.

The infant was seen on June 18th when examination of the abdomen showed the scar to be firm throughout with no trace of protrusion or weakness.

The family history of the patient, as supplied by Dr. Sinclair, is to the effect that "the mother was aged 42 years, big, well nourished though slightly anæmic, and has always had very fair health. She has had 9 children including the patient, all living, the first pregnancy being twins, and 3 miscarriages corresponding to the 3rd, 6th, and 11th pregnancies. The 11th pregnancy, that immediately preceding the present, resulted in abortion at the 4th month, and as there was some difficulty with the placenta, curetting of the uterus became necessary. There was nothing noteworthy in the present pregnancy or labour, except that the last five pains were severe, the strongest, she says, she has ever experienced. The presentation was normal. The child was born with 10—12 inches of bowel extruded through the umbilicus. The cord for the first 4 inches was considerably thickened, and contained a good deal of gelatinous matter. The thickening appeared to widen the aperture of the umbilicus. The extruded bowel which had a pale liver colour at birth, rapidly took on a dull brick red colour. An effort was made to return the bowel by manipulation, but unsuccessfully. The child was rapidly cleaned, carefully wrapped up, and dispatched to the Royal Infirmary."

"None of the patient's brothers or sisters show any developmental defect; the family of a nephew of the baby's father are also free from abnormalities. There is no history of any defective development on either parental side."

Though this variety of congenital malformation is exceedingly uncommon, it is difficult to estimate its frequency from the recorded cases. Macdonald¹ records 19 cases in which operative procedures were undertaken, with but 2 deaths, and refers to 12 cases collected from various sources, treated by pad and compress, of which 9 died and only 3 recovered. That collection of 31 cases includes those in which the cord had ruptured as well as those in which the bowel was not exposed.

Since then, however, a considerable number of cases have been published, some of them in journals difficult of access, and inasmuch

as these may include cases of funicular hernia, present at birth, and cases of hernia into a stretched and distended umbilical cicatrix, it is hardly possible to differentiate them in tabular form.

The presence of a covering, which, in the natural course must decay, or the rupture of that covering with exposure of the bowel, are factors which are absent from all other varieties of umbilical hernia and which complicate the treatment so materially that congenital herniæ should be classed by themselves.

The deciduous matter must be removed; should delay occur, it becomes adherent to the intestine which it covers, and its removal is rendered difficult, the danger of peritoneal infection will be enormously increased and the prognosis correspondingly grave. Immediate operation is therefore imperative in order to avoid adhesion and infection.

The cases in which the cord ruptures during birth, exposing the bowel, are still more serious, for the peritoneal cavity and the intestines are already exposed to direct infection from the outside, and here too, prompt operative procedure affords the only chance of recovery.

A classification of umbilical hernia which serves the purpose, though the congenital variety should be first, is that given by Hicks.²

1. Due to weakening of the umbilical cicatrix in children.

2. Due to protrusion through apertures about the umbilicus in adults.

3. Congenital or exomphalos.

This last is, he says, an exceedingly rare condition due to the imperfect closure of the abdominal walls so that the whole of the intestine is not accommodated at birth, but some of it is found in a cavity in the umbilical cord, which is bulbous and enlarged. He records a case in which he operated. The cord had been tied by a midwife, clear of the hernia, and sloughed off at the twelfth day, leaving the knuckle of bowel unprotected. The hernia increased in size, and adhesions formed between the bowel and the umbilical ring. Resection of 6 inches of ileum was necessary and the child recovered. Hicks calls attention to the danger of tying the bowel in the ligature of the cord if the condition is not observed, in addition to the liability to sepsis.

Another peculiarity of these herniæ is mentioned by D'Arcy Power,³ in that no parietal peritoneal covering is present to protect the bowel from the infection of a gangrenous cord. He reports that he operated two days after birth on a case in which the bowel was adherent, and the patient died in 24 hours; and notes that he had previously seen two similar cases. Judging from the case presently reported it is very difficult to tell when operating, the point where parietal peritoneum merges into the lining membrane of the cavity of the cord.

M. de Larabrie⁴ reported a case, similar to the present one, to the Surgical Society of Paris, and mentioned another in which the doctor simply returned the bowel, and the patient lived but had an intestinal fistula. In the course of the discussion M. Berger remarked that the second case had the further deformity that the umbilical vesical was persistent. (See also references 14 and 19.)

It is a common experience to find more than one error of development in the same infant, but the observation of M. Berger and the two cases of ruptured congenital umbilical herniæ recorded by Morshead,⁵ in each of which a Meckel's diverticulum was the seat of intussusception, are rather examples of different degrees of incomplete development of the same part, as are also the cases of Bilhaut,⁶ in which part of the liver was included in the hernia, and Veron,⁷ where there were many malformations of the intestines. Other cases are reported in which different developmental deformities were present. (See 8 and 9.)

Two systems of classification are permissible in these congenital cases, one taking note of the stage of incompleteness of the development,

1. Hernia into a cavity in the funis.
2. Hernia with patency of the umbilical vesicle.
3. Hernia with patency of the urachus.
4. Hernia with other intestinal deformities.
5. Hernia with marked incompleteness of the abdominal wall.

or the more practical one of differentiating between the complications of the first and most common variety.

1. Funicular hernia with its covering intact,
2. Ruptured funicular hernia,
3. Irreducible funicular hernia, and
4. Strangulated funicular hernia.

Of this latter table the first two varieties are apparent on inspection. The reducibility becomes obvious on attempted replacement but, since it is not possible to determine in an unruptured case whether the bowel is merely anchored by adhesions, prevented from returning by the constriction of the umbilical opening, or really strangulated, and as the remedial measures also include the removal of the cord, it is evident that the wise plan is to open the unruptured sac and inspect the bowel, rather than to attempt any but the most gentle taxis.

The obstructions to the return of the extruded bowel are adhesions and undue contraction of the umbilical ring. In recent cases, *i.e.*, at birth or within a few hours after birth, the adhesions are found between the umbilical ring and the bowel, and they are probably due to the encroachment of the contracting ring on the pre-existing space. In the strangulated complication the chief factor seems to be the same.

When a longer period has elapsed between the birth of the infant

and its treatment a new set of adhesions form between the devitalized cord and the bowel, and it is this variety of adhesion which constitutes the greatest menace to the child's ultimate recovery, for the adhesions are of so intimate a nature that their removal is difficult and in some cases impossible, so that resection of bowel is preferable to the return of bowel with adherent decaying matter.

The operative measures, then, consist in opening the sac, if it has not ruptured during birth, and inspecting the contents. If the bowel shows no sign of strangulation it may be gently pulled outwards in order that adhesions may be freed and the part of the bowel situated at the ring examined. It should then be returned through the original opening if that is possible. In cases where the opening is too small, where the adhesions are not readily separable, or where there are signs of strangulation, it is well to enlarge the opening, upwards, in the middle line. An incision of two or three inches enables the surgeon to return the bowel in the simpler case and to inspect the adhesions in the other cases by everting the edges of the wound and the umbilical opening. The involved bowel may be freed and brought out of the wound for careful examination. It is treated according to its condition, restored to the abdomen if considered viable, or excised if necessary.

The closure of the abdomen must be preceded by removal of all the deciduous matter of the cord. In the case reported the amount of thickened cord was considerable and was removed flush with the parietal peritoneum. The vessels were ligatured as a precaution, but on consideration this is hardly necessary, for the closure of the opening by sutures will control any hæmorrhage. The abdominal opening was sutured in two layers just like a median laparotomy, and in this connexion it is interesting to note that Macdonald¹ inserted a deep purse-string suture in the umbilical ring and remarked that he would not again employ that method. It seems unnecessary to resort to the more complicated methods used in the radical cure of other forms of umbilical hernia, since the simpler treatment suffices; and there can be little doubt that a minimum period of operative interference and of anæsthesia makes for success in the surgical treatment of infants whose unstable nervous equilibrium renders them susceptible to shock and excessive reaction.

In the cases where there is a persistence of the vitelline duct the treatment of this complication will depend upon the amount of patency, whether limited to the bowel end as a Meckel's diverticulum, shut off from the bowel end but open to the umbilicus, or closed at both ends forming a cyst. A comprehensive study of this condition is given in Ballantyne's *Antenatal Pathology*,⁹ and there is an interesting article by Gallant¹⁰ dealing with umbilical fistula, under the divisions (1) fecal, (2) gastric, (3) biliary, (4) hæmorrhagic, and (5) urinary, with many useful references.

The nomenclature of this affection has already been mentioned in connection with classification of umbilical herniæ given by Hicks,² and preference was given to a term which would differentiate between a hernia present before, or at birth, and the herniæ occurring later. The term employed by Ballantyne (*loc. cit.*, p. 523), *hernia funiculi umbilicalis*, implies that the condition is congenital, and is quite satisfactory from a surgical point of view. The fourth edition of the *Nomenclature of Diseases*,¹¹ the British standard nomenclature, recognizes only the word "umbilical," though, on the same page, it differentiates between congenital, infantile, and other forms of inguinal hernia. So, too, in the medical indices and in text-books, there is an absence of differentiation which causes confusion and renders research difficult.

Congenital umbilical hernia differs in many respects from the other forms of umbilical herniæ, and if there were no other reason than the presence of the decaying cord and the danger of delay, it should be put in a class by itself.

The ætiology of congenital umbilical hernia forms a very interesting subject of discussion in Ballantyne's treatise (p. 527). He mentions the theories of (1) pressure or mechanical action, (2) the doctrine of disease, such as peritonitis with adhesions, and (3) the embryological theory of arrested development; and after reviewing our knowledge of the development of the abdominal organs and the means by which the intestine is withdrawn from the cord into the abdominal cavity states his belief "that the causes operating in hernia of the cord and in gastroschisis differ not so much in nature as in the time in embryonic life when they come into play." The presence of adhesions existing at birth in the present case, and in many reported cases, might be taken in support of the second view were it not that the adhesions were limited to the umbilical ring and were possibly due to the narrowing of that orifice causing friction and perhaps some obstruction to the circulation in the gut.

The practical aspects of this disease, as observed in the present case and in the experiences of other observers, may be shortly stated in the following lines:—

Congenital umbilical hernia differs from other umbilical herniæ in that it has no covering of parietal peritoneum, but is contained in the hollowed cord; that this cord, instead of being a protection, becomes a danger to the bowel by adhesion and infection; that this danger increases with the hours that elapse after birth; that the cord may rupture during birth and so expose the bowel to outside infection; and that the whole cord must be excised. In addition to these there may co-exist other errors of development such as persistence of the vitelline duct in a number of forms and similar urachal deformities.

It is noteworthy that immediate operation offers a great measure

of success, and the favouring factors are the absence of microbic invasion in the newly born, the removal of the cord before adhesions and infection set in, the short duration of the operation in the absence of adhesions to the cord and the consequent minimal shock.

Delay in commencing operative treatment allows of infection of the infant's skin, of adhesions forming between the cord and the bowel and thereby of direct infection, necessitating a prolonged operation and in some cases more formidable surgical procedures such as enterectomy, with a corresponding amount of surgical shock.

The operation consists in opening the cord, if it has not already ruptured, to inspect the bowel and withdraw it slightly to look for adhesions and to examine the constricted portion of bowel. If there are no adhesions and the bowel is intact, it may be returned to the abdominal cavity, after washing it with sterile water in the ruptured cases. When the bowel cannot be withdrawn on account of adhesions, or if there are signs of strangulation, the umbilical opening should be enlarged upwards in the middle line and the edges everted so that the adhesions can be seen and separated. When the bowel has been returned the attachment of the cord should be removed, and the vessels of the cord may be ligatured at the peritoneal margin or included in the first suture of the opening.

The method of suture will depend on the size of the opening and the practice of the surgeon, preference being given to the simpler methods so as to save time.

The occurrence of other errors of development complicating the hernia requires special treatment depending on the nature of the lesion. The after treatment requires no special mention either in the matters of dressing or alimentation.

It will be obvious from the foregoing that the initiative and a great measure of responsibility lies with the physician, or midwife, who is in charge of the confinement, and in the present case great credit is due to Dr. Sinclair, Barlinnie, for the prompt action in protecting the bowel and in sending the patient for surgical treatment immediately after birth.

In conclusion I may be permitted to append a table of classification based on the order of occurrence of umbilical herniæ.

HERNIA—UMBILICAL.

I. CONGENITAL.

- (1) Congenital, *i.e.*, hernia into a cavity in the cord.
- (2) „ with patency of the omphalo-mesenteric duct.
- (3) „ with patency of the urachus.
- (4) „ with other intestinal deformities.
- (5) „ with marked incompleteness of the anterior abdominal wall.

II. INFANTILE.

III. ACQUIRED.

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