REFRESHER COURSE FOR GENERAL PRACTITIONERS

ABDOMINAL HERNIA IN CHILDHOOD

BY

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This article deals with the principal herniae of the abdominal contents in children—umbilical, epigastric, inguinal, femoral, and diaphragmatic—as well as with those conditions associated with these herniae or which may cause difficulty in diagnosis.

True Umbilical Hernia

In true umbilical hernia the protrusion comes right through the centre of the umbilical scar. It is possible to feel round the neck of the hernia a collar of fibrous tissue continuous with the linea alba, running distally and finally thinning out over the end of the sac. Herniae of this kind have an invariable tendency to spontaneous cure, owing to the contraction of the fibrous tissue round the neck of the sac, which should normally have occurred at birth but in these cases is merely delayed. Cure can be hindered by a not uncommon vicious circle in which the child forces out the hernia by crying, and so causes pain which makes it cry all the more. On the other hand, it can be accelerated by preventing the protrusion by means of a 3-in. (7.6-cm.) wide strip of zinc oxide adhesive strapping applied transversely in such a way as to bring over the hernial orifice a vertical fold of skin. The plaster will remain in place for about a fortnight if it is kept dry, and the less often it is changed the better. Variations of this simple and effective method, all less efficient, are: (1) the use of pads, coins, etc., under the plaster; (2) the use of extensible plaster instead of the ordinary inextensible type—this is very common, in spite of its obvious unsuitability; and (3), least effective and most expensive of all, the use of rubber belts and various types of corset.

I do not think that operation is ever necessary for this form of hernia, though it is often performed. There is no need for anxiety if a small bulge persists for several years; I have been unable to find any record of a case in which strangulation of bowel occurred. This is curious in view of the notorious tendency to strangulation of umbilical herniae in the elderly. There is one type of operation against which I would offer a particular warning, that of subcutaneous ligation. It is effective only in cases with a strong fibrous collar round the neck of the sac, and these, as has been stated, cure themselves spontaneously; with the "semi-umbilical" types, considered below, it is most disappointing. Apart from this I know of two cases of death from peritonitis as a result of this technique, although I have been unable to ascertain the exact mechanism of the disaster.

Semi-umbilical Hernia

This is the term I use for a hernia in which the sac does not emerge through the centre of the umbilical scar, but through its upper border, in such a way that half of the resultant bulge is covered by the umbilicus and half by the abdominal skin above it. There is no collar of fibrous tissue to be felt around the neck, and the margins of the opening in the abdominal wall are thin. This hernia resembles the true umbilical type in its harmlessness to life, but does not share its tendency to spontaneous cure. Unless closed by operation, the opening persists indefinitely. The bulge can be controlled by the same strapping as is used for the true

umbilical type, but later on must be closed surgically. A suitable time for this is about 3 years of age. A short transverse incision is made immediately above the bulge, and through it the neck of the sac is isolated while intact. Then the neck of the sac is severed, and while the skin and distal portion of it are lifted away by means of a self-retaining retractor the resulting gap in the linea alba is closed by two layers of non-absorbable sutures. I have never found any need for more elaborate measures of closure. It may be noted that operations on the umbilicus in children may cause a surprising amount of shock for what is apparently a trivial proceeding; often far more than is produced by opening the chest. Presumably this is because this area is a centre for referred pain impulses.

Exomphalos

The treatment of the severer degrees of exomphalos is outside the scope of this article. There is, however, a minor degree of this alarming deformity the treatment of which is relatively easy; it is that in which the abdominal contents protrude into the umbilical cord but can be milked back into the abdomen without difficulty. Here it is necessary only to twist the cord so as to force the bowel back and narrow the opening in the abdominal wall, and then to maintain this position by firmly applied strapping. This is left on for a fortnight, in spite of any protests that may be made that the dressing needs changing because there is a discharge under it. When it is removed it will be seen that the natural processes of obliteration of the umbilical opening have taken place in a surprising way, and that the abdominal wall looks normal.

Other Umbilical Abnormalities

Umbilical Polyp.—This is a small island of intestinal mucosa shut off on the outside of the abdomen by the closure of the umbilical orifice. It causes a persistent mucous discharge, and shows as a moist red protuberance in the centre of the umbilicus. Repeated applications of silver nitrate, or a single application of diathermy or cautery, will destroy the mucosa and end the nuisance.

Meckel's diverticulum may present as a fistula at the umbilicus through which a probe can be passed into the bowel. Laparotomy is the only treatment.

Patent urachus is an excessively rare condition in which the bladder has an opening at the umbilicus. Treatment is obvious and not particularly difficult.

Pubic Umbilicus.—Occasionally the umbilicus is situated just above the pubic symphysis, so that the bladder lies directly under it. This is merely an oddity for which no treatment is necessary.

Epigastric Hernia

These herniae are small protrusions of the fatty extra-peritoneal tissue through minute openings in the linea alba above the umbilicus. Apparently they never occur below. They are usually so small as to be difficult to see through the skin, unless there is a good side-light. They do not contain peritoneal sacs and are in no way dangerous, but they may become painful, apparently because of partial strangula-

tion of the neck of the protrusion. If this occurs they should be exposed through a small transverse incision and removed after ligating the neck. The small orifice in the linea alba can be closed by a single non-absorbable stitch.

Inguinal Hernia

With a more rational system than we have at present of collecting and arranging medical knowledge it would be possible to discard such absurdities as the description of one particular variety of the failure of obliteration of the processus vaginalis as "infantile hernia." The work of Hamilton Russell showed that all inguinal herniae in children are congenital deformities, and they might be divided into the "complete," in which the entire processus vaginalis persists so that the bowel in its descent actually impinges on the testis, and the "incomplete," in which the tunica vaginalis is shut off from the hernial sac. There is no great importance in this division, as in symptoms, prognosis, and treatment the two kinds are exactly the same.

Unless bowel is actually present in the sac it may be impossible to decide by examination whether a hernia is present or not. However, the characteristic history of a lump that comes and goes in the inguinal region, appearing particularly after straining or at the end of an active day, is enough to establish the diagnosis, as no other condition gives such signs.

In certain cases a truss is very useful, either as a method of cure or to tide an infant over a period when operation is inadvisable. If a small hernia appears soon after birth and an efficient truss is applied without delay there is no doubt that permanent cure can be obtained in many cases. In most cases, however, the main use of a truss is to avoid, as everyone of experience prefers to do, operations upon infants during the milk-feeding period.

I think there is only one form of truss which is satisfactory—the horseshoe-shaped solid rubber one. Skeins of wool, one-sided trusses, and pneumatic pads are all inefficient compared with this. The truss should never be removed, but simply lifted to allow cleaning the skin below it, and with the necessary renewals should be kept on throughout the first year. It can then be taken off and events observed. If the hernia appears there is now no chance of cure by this means, and operation should be advised. If it does not, a guarded prognosis should be given, as it is never possible to be sure whether the sac is obliterated or merely empty.

Once the child is over the first year, operation without undue delay is the only treatment, since the more the bowel descends the more the orifice is stretched, and there is always the risk of the protrusion becoming jammed.

The incision should be made transversely, curved slightly in the lines of the folds of the skin, just above the pubic symphysis, and should be long enough to expose both external rings. If a double hernia is present it is much the quickest to treat both sacs through a single incision; in the case of a single hernia exploration of the other side will reveal a sac that hitherto has given no signs in about 20% of cases. A last and not entirely negligible advantage of this incision is that no one who uses it can possibly operate upon the wrong side. This incision heals extremely well and, unlike the classical one in the line of the inguinal canal, is in adult life entirely hidden by the pubic hair.

The trick of easy dissection of the hernial sac turns upon grasping the testicle in a tough but unimportant part by an artery forceps, and holding it out of the wound so as to put the cord upon the stretch. This can be done without disturbing in the slightest its relations in the scrotum. Then with blunt dissecting forceps the sac is delicately extracted from the spermatic cord and ligated under strong tension by a transfixing suture of unabsorbable material. If this is done properly the closed neck, when released by cutting off the sac below, should shoot upwards to well above the internal ring. If the external ring is much stretched it

should be narrowed by a couple of sutures; otherwise the testicle should be returned to the scrotum and the incision sutured, care being taken that the testicle is not caught up by an incautious stitch and anchored in the wound.

Hernia with Undescended Testicle

In this case the inguinal canal must be opened and the internal ring freely exposed. For this purpose a frame retractor of the type I use, which will pull any structure in any direction and in any plane, will be found a great help. As in the simple herniae, the keeping of all the structures upon the stretch is the secret of any easy dissection, and for this purpose the testicle should be extracted from the sac and grasped discreetly by artery forceps as a first step in disentangling the structures of the cord. The sac is the tightest of all the structures which oppose the descent of the testicle, and once it is divided the only other permissible freeing consists in the isolation and division of its suspensory fibres. These, undescribed by anatomists but easily demonstrated, run from the back wall of the abdomen in a fan-shaped layer into the outer edge of the cord.

The best way of fastening down the testicle is to make a special tunnel for it underneath the narrow passage which connects the upper and lower scrotal cavities. Tough fixed fibrous tissue lies in front of the pubis at this point, and once the testicle is dragged through this by means of an artery forceps thrust up through a small incision in the scrotum it lies firmly fixed but free from stimulus in the upper part of the scrotum. Atrophy of the testicle after operation to correct its position is far more frequent than would be gathered from reading works upon the subject, and I think the main cause of this atrophy is venous engorgement due to spasm of the veins. At any rate pronounced swelling of the testicle after operation is a most sinister sign and usually foretells the disappearance of the gland. It can be guarded against by leaving the veins unstimulated by any drag upon them after operation, and by incising the tunica albuginea of the testicle to allow free escape of oedema before pulling it down.

I dislike all forms of fixation, such as Bevan's and more particularly Torek's, that put a strain on the long leash of testicular vessels which no one would dare to inflict upon the very similar blood supply of a caterpillar skin flap.

Jammed, Irreducible, or Strangulated Hernia

I have never seen a hernia in a child which was irreducible, provided that the following trick of reduction was employed. It consists in using the fingers of one hand to form a kind of funnel leading into the external ring, while those of the other hand grasp the lower end of the sac. Then by alternate squeezing and releasing of the grip of each hand a pulsating to-and-fro movement of the contents, which are mainly fluid, is set up and maintained until they can be felt to escape back into the abdomen; at first drop by drop of contents, and then actual loops of bowel. After reduction operation should be performed without delay.

There are certain contraindications to trying this method of reduction when it might result in returning to the abdomen either gangrenous bowel or a necrotic testicle. I have seen it stated that strangulation and gangrene of the bowel do not occur in the inguinal herniae of children. This is incorrect and a most dangerous teaching. I have known several deaths from this cause, one occurring from a small Richter hernia in an infant under the charge of a very experienced surgeon; and on two occasions I have had to resect gangrenous bowel extracted through an internal ring enlarged by an outward cut through the surrounding muscles.

The danger signs which indicate immediate exploration of the area rather than taxis are: (a) if a child with symptoms of intestinal obstruction shows any tenderness or

thickening in the region of the external ring; (b) if vomiting of the obstructive type is present; and (c) if there is any redness or oedema of the skin over a hernial bulge.

In operation upon such cases the surgeon must be prepared for all kinds of curious conditions, including not uncommonly the death of the testicle. This is due to obstruction of the latter's very vulnerable blood supply, either by torsion of the mesentery of the testicle or by compression of the artery at the external ring. In one curious case the testicle was gangrenous because a piece of omentum strangulated in a minute hernial sac had secreted enough fluid to expand the neck of the sac and compress the testicular artery. In the female a not uncommon content of the sac of an inguinal hernia is the ovary, apparently trying to follow the path of the male gonad, and feeling to the examining finger extremely like an inguinal ectopic testicle. In such cases operation should not be delayed, as partial strangulation is quite common, and is followed by dense adhesions which make reposition of the organ very difficult.

Torsion of the Testicle

I consider there are two different conditions, with different prognoses and for which different treatment is necessary, which are usually lumped together under this heading.

Torsion of the Cord of the Testicle.—In this condition the gland, complete with its covering of tunica vaginalis, is rotated as a whole inside the scrotum. The onset is often not very acute, and the twist may spontaneously undo itself, to recur with greater or less severity. The treatment is a gentle rotation of the testicle, finding the correct direction in which to do this by noting whether the first way in which it is twisted increases or diminishes the symptoms. As a prophylactic measure I have sewn the tunica vaginalis of both testicles together through a small incision in the scrotum.

Torsion of the Mesentery of the Testicle.—In this condition the onset is usually abrupt and extremely painful. If operation were performed without any delay at all most of the organs could probably be saved, but I have never known this to be prompt enough. It is particularly apt to occur in maldescended testicles in hernial sacs, and I have known one death occur through an error of judgment which led to the preserving of a necrotic testicle and the consequent infection of the peritoneal cavity.

Types of Hydrocele

Fluid Inguinal Hernia or Communicating Hydrocele.—This is really a "complete inguinal hernia" in which the part of the sac formed from the processus vaginalis has so nearly approached its normal obliteration that it remains merely as a tube of peritoneum so narrow that it will permit only the passage of fluid from the abdomen into the serous space round the testis. The distinguishing point from a true hydrocele is that the collection of fluid into the tunica vaginalis varies in size according to whether the patient has been lying in bed or running about. The treatment is operation, as otherwise the condition will persist indefinitely, unlike an ordinary hydrocele.

Hydrocele of the Tunica Vaginalis.—For some unknown reason fluid is apt to accumulate round the testicle in some children, particularly during the first two years of life. This collection is in no way dangerous, and will almost invariably disappear in the course of a year or two as mysteriously as it came. In a few cases the tunica may become so tense as to cause discomfort, and then it may be exposed through the incision recommended for hernia, opened, and everted. Simple tapping of the fluid is quite futile and seems, if anything, to delay its disappearance; I have no experience of the injection of irritants that is sometimes recommended, but the disadvantages of this for such a harmless condition seem obvious.

Hydrocele of the Cord.—This is an accumulation of fluid in an unobliterated but isolated portion of the processus

vaginalis. It has very little tendency to spontaneous absorption, and usually an operation is necessary to remove the sac it lies in.

Femoral Hernia

Though rare, this condition does occur in children. Its pathology is puzzling, as there is a narrow sac surrounded invariably by a kind of lipoma continuous with the extra-peritoneal fat. This fatty collection can usually be felt quite plainly, even when the sac is empty. I have found Lothiesen's approach to the neck of the sac through the inguinal canal very satisfactory, though it is often necessary to dissect away the fat in order to withdraw the sac through the femoral canal. The incision is the same as for an inguinal hernia, and the femoral canal is closed with an unabsorbable stitch.

Diaphragmatic Hernia

The possibility of this condition should always occur to anyone faced with a baby or older child suffering from attacks of interference with the proper working of the bowels or lungs, or both together. Once it is diagnosed, even if in the first few days of life, immediate operation is far safer than delay. The jamming of the contents of a diaphragmatic hernia is always a danger, and when it occurs is of a peculiar deadliness, both on account of the large amount of bowel usually involved and because of the pressure on the heart exerted by the gaseous distension of its obstructed loops. An approach through the chest is far safer and easier than that through the abdomen. Also—and this is very important—it requires much less anaesthetic.

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SUPPLEMENTARY LIST OF APPROVED NAMES

The Pharmacopoeia Commission has issued the following Supplementary List of Approved Names:

AZAMETHONIUM BROMIDE (3-methyl-3-azapentane-1:5-bis(ethyl-dimethylammonium) dibromide, "pendiomide"); BENZYLALCONIUM CHLORIDE (alkylbenzyltrimethylammonium chloride, "zephiran chloride"); CARAMIPHEN (2-diethylaminoethyl 1-phenylcyclopentane-1-carboxylic acid, "parpanit" is the hydrochloride); CHLOROPYRILENE (N-5-chloro-2-thienylmethyl-N,N'-dimethyl-N-2-pyridylethylenediamine); CHLOROQUINE (7-chloro-4-(4-diethylamino-1-methylbutylamino)quinoline, "aralen"); CO-CARBOXYLASE (pyrophosphoric ester of aneurine); DEXTRAN; DICHLOROPHENARSINE (3-amino-4-hydroxyphenyldichloroarsine); DISULFIRAM (tetraethylthiuram disulphide, "antabuse"); DOXYLAMINE (2-(α -2-dimethylaminoethoxy- α -methylbenzyl)pyridine, "decapryn"); EUCATROPINE (4-mandeloyloxy-1:2:2:6-tetramethylpiperidine, "eupthalmine"); GENTISIC ACID (2:5-dihydroxybenzoic acid); GLUTAMIC ACID (1-aminopropane-1:3-dicarboxylic acid); HYDRA-LAZINE (1-hydrazinophthalazine, "apresoline" is the hydrochloride); HYDROXAMETHOCALINE (2-dimethylaminoethyl 4-n-butylaminosalicylate); MERALLURIDE (mixture of N-(3-hydroxymercuri-2-methoxypropylcarbonyl)succinamic acid and theophylline, "mercuhydrin"); MERCAPTOMERIN SODIUM (disodium salt of N-(3-carboxymethylthiomercuri-2-methoxypropyl)camphoramic acid, "thiomerein sodium"); MERCUPHYLLINE SODIUM (mixture of the sodium salt of N-(3-hydroxymercuri-2-methoxypropyl)camphoramic acid and theophylline, "mercuzanthin"); METHANTHE-LINIUM BROMIDE (2-diethylaminoethyl xanthen-9-carboxylate methobromide, "banthine bromide"); METHAPHENILENE (N,N'-dimethyl-N-phenyl-N-(2-thienylmethyl)-ethylenediamine, "diatrin" is the hydrochloride); METHIODAL SODIUM (sodium iodomethanesulphonate, "skiodan sodium"); METHOESTROL (α 8-diethyl-4:4'-dihydroxy-3:3'-dimethylstilbene); METHYLERGOMETRINE ((+)-1-hydroxy-2-butylamide of (+)-lysergic acid, "methergin" is the tartrate); NEOCINCHOPHEN (ethyl 6-methyl-2-phenylquinoline-4-carboxylate); OXYPHENONIUM BROMIDE (2-diethylaminoethyl α -cyclohexyl- α -phenylglycollate methobromide, "antrenyl"); PENT-