Remarks on the modes of proceeding in regard to the hernial sac in the operation for strangulated hernia / by William Pirrie.

DR PIRRIE ON HERNIOTOMY.

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MODES OF PROCEEDING

IN REGARD TO

THE HERNIAL SAC

IN THE

OPERATION FOR STRANGULATED HERNIA.

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FROM THE EDINBURGH MONTHLY JOURNAL OF MEDICAL SCIENCE, MAY 1848.

EDINBURGH:
SUTHERLAND & KNOX, 58, PRINCES STREET.

MDCCCXLVIII.

ON HERNIOTOMY.

It is a question of great importance, in reference to the operation for strangulated hernia, which of the two following modes of proceeding in regard to the hernial sac is the more advisable; namely, that of opening the sac, and dividing the stricture from within; or that of dividing the stricture, and replacing the parts without opening the sac. Of these two, technically called the *intra-peritoneal* and *extra-peritoneal* modes of division, the former is that, which, except in a limited number of cases, has received the sanction and adoption of most surgical authorities in these islands. It appears certain that, in the great majority of cases, it is by that mode alone, that it is possible to accomplish the two grand indications which it is desirable to fulfil by the operation; namely, the removal of the pressure by division of the stricture, and the return of the hernia. The fulfilment of the former, namely, the removal of the pressure by division of the stricture, is essential to the safety of the patient; and the latter, the return of the hernia, exceedingly desirable when practicable and proper.

With regard to the FIRST indication, when the stricture is external to the sac, as is not unusual, it is possible to divide it by adopting either mode; but if formed by the sac, or within it, it is clear, that by intra-peritoneal division alone can the more important indication be fulfilled, or any good effected. Cases belonging to the latter class are by no means of unfrequent occurrence. That the neck of the hernial sac occasionally constitutes the stricture, is a point regarding which surgeons are agreed, instances having been recorded by the great surgical authorities of this and other countries, and examples occurring frequently in the practice of many surgeons. The sac, necessarily narrower at its neck than in other parts, is liable to be still further diminished by effusion and organization of lymph, either on its outer or inner surface, as well as by a thickened and

indurated state of its own substance, conditions which, separately, or in various degrees of combination, diminish the canal of the sac. For eighteen years I have availed myself of every opportunity of examining the condition of hernial sacs, and from my dissections I am led to conclude, that, in herniæ of considerable standing, thickening of the neck is of frequent occurrence. Although constriction, when sufficient to render a hernia irreducible, is usually at the neck of the sac, yet it is not invariably so. This fact is of little practical moment if a hernia be merely irreducible; but it becomes of the greatest importance if it be strangulated, and require an operation, as the paramount object of the operation is to divide the constriction, in order to relieve the symptoms of strangulation.

The stricture is occasionally found within the sac. In a very few instances it has been found to be occasioned by a loop of intestine; in some by a band of omentum; and in others by a band of lymph effused from the serous coat of the intestine, and surrounding and constricting it as by a ligature.

This last-mentioned condition has been described and delineated by Sir Astley Cooper. It has also been met with by other surgeons; and not fewer than four cases of it have come under my own observation.

The *first* case was that of a female about sixty years of age, of a full habit of body, and the subject of a strangulated umbilical rupture. Her medical attendant, a surgeon of long standing in Aberdeen, found it necessary to have recourse to an operation, and of that I was a witness. The hernia returned very suddenly as soon as the margin of the umbilicus was slightly divided; but the symptoms of strangulation continued, and the patient died in ten hours after the operation. I was requested to conduct the post-mortem examination; and, on opening the abdomen, found behind the umbilicus a swelling about the size of a small orange, formed of intestine, with a neck surrounded by a band of lymph, which embraced and constricted the part, as by a cord. The lymph had been effused from the serous coat of the intestine in consequence of the inflammation excited by the pressure of the margin of the umbilicus. In this case the hernia returned, but without the stricture having been divided.

The *second* case was that of a female, a patient of my own, about the middle period of life, on whom I had occasion, with the assistance of Mr Paterson, surgeon in Aberdeen, to perform the operation for strangulated femoral hernia. On carrying up the point of my finger between the hernia and hernial sac to feel for the stricture, I was struck with the circumstance, that the tightness of what I supposed to be the stricture, bore no ratio to the extreme urgency of the symptoms of strangulation, and that, after dividing some of Poupart's ligament, by cutting from within the hernial sac, the intestine on being gently pressed still remained as tense as formerly, and its contents did not seem to be moved by the pressure. I therefore examined the neck of the hernia with my finger, and perceived a band of lymph keeping the part tightly constricted, and, in short, constituting the stricture. I gently drew down the intestine, and cut the band in several different parts, when the contents of the intestine could be easily made to move upwards. On being satisfied that all constriction was removed by dividing the band of lymph in various parts, the intestine was returned into the abdomen, and the patient recovered without an unfavourable symptom. If the hernia had been returned without this band of lymph having been discovered and divided, the object of the operation would have been unaccomplished.

The *third* case was that of a female, about sixty years of age, of a remarkably full habit, and who, about two days before I saw her, had been seized with symptoms of strangulation. When I first saw her, the abdomen was tympanitic to a great degree; the vomiting was most distressing; the bowels had not been moved for five days, and she had every symptom of sinking very rapidly. She stated that she had often on previous occasions had attacks of what she believed to be colic, and imagined at first that the illness from which she was suffering was only a return of that disorder, and, consequently, anticipated a speedy recovery. I was also informed that, for a considerable time, she had had a disagreeable feeling of tenseness in her left groin, though without swelling, so far as she could perceive; and that, some hours before I was called, while drawing up her limbs in a fit of retching, she felt, to use her own expression, as if something had given way in her groin, and from that moment was relieved from all feeling of tenseness. The symptoms of strangulation, however, continued. I made a most minute examination of all the usual seats of hernia, but could detect no symptom of such a lesion. I requested my colleague, Professor Macrobin, to attend the patient along with me, which he did, and he was also present at the post-mortem examination. On opening the abdomen, there was at its under part a small tumour of intestine seen, before any parts had been disturbed beyond merely turning down the abdominal parietes. It was of a livid colour, about the size of a walnut, and with a narrow neck, tightly embraced by a band of lymph, by which it was so constricted as to make it difficult to pass a probe from that part of the intestine which led to the swelling, into that which constituted the tumour. The intestine was also twisted over itself in form of a loop. On examining the femoral canal of the left side, a hernial sac was found in it; and the tumour of intestine had, no doubt, formed a hernia, but returned of itself. The stricture, however, formed by a band of lymph, still remained. Sir Astley Cooper records a case in which Mr Weston returned a hernia by the taxis without an operation; but the symptoms of strangulation continued, and it was found that the stricture was caused by a band of lymph which embraced the intestine. In the instance of my patient the hernia returned without any assistance.

The *fourth* case was that of a female, whom I had never seen during life, but at the post-mortem examination of whose body I was present, in consequence of the request of a medical man who had seen her a short time before death, and who had also often attended her on previous occasions, when in a state of great suffering from disease of the womb. The symptoms, I was informed, were those usually induced by a strangulated hernia; but the medical man could not detect any swelling in any of the usual seats of hernia. On examining the left groin before opening the abdomen, I thought I felt a very small swelling, which I suspected to be a hernia, and I therefore made a careful dissection of the parts in presence of the surgeon, who requested me to do so, and of one of my pupils. On cutting through Poupart's ligament from before backwards, the contents of a small hernial sac returned into the abdomen without being touched, and were found to consist of intestine strangulated by a band of lymph, embracing the neck of a small hernia. The hernia was not much larger than a walnut. If it had been discovered during life, and been made the subject of operation, there would have been great risk of its returning into the abdomen without the real stricture being discovered or divided.

From what is stated above, it appears very clear, that the extra-peritoneal mode of herniotomy is quite unsuitable when the stricture is formed by the sac or within it, whatever be the nature of the stricture itself; and the above-mentioned examples of strictures formed by membranous bands, suggest very strongly the propriety of great caution in arriving at the determination of adopting the extra-peritoneal division; as well as in those cases in which the sac

is opened, of examining very carefully, before the hernia be returned, whether membranous bands do or do not exist.

The *second* indication which it is desirable to fulfil by an operation, is the return of the hernia. With a view to facilitate the inquiry, as to which of the two modes of procedure is the more suitable, cases may be arranged into the three following classes:—

First, Those in which the stricture is external to the sac, in which it is neither impracticable nor improper to return the hernia, and in which no obstacle exists to that return after the stricture has been divided. *Secondly*, Those in which an obstacle does exist after division of the stricture; and, *Thirdly*, Those in which the return of the included intestine would be practicable, but improper.

First, In cases belonging to the first class, either mode is applicable; but extra-peritoneal division being attended with much less danger, is decidedly preferable.

Secondly, In regard to cases in which, independent of the stricture, an obstacle to reduction exists, it will be proper to consider what are the principal obstacles most frequently met with. These are adhesions of the protruded parts to the hernial sac, the natural means of connexion, in some rare cases; adhesions of the protruded parts to each other; and the large size of the hernia.

Adhesions of the protruded parts to the hernial sac often constitute an impediment to reduction. Of these adhesions there are three varieties.

1*st*, The protruded parts sometimes adhere to the sac through the medium of a layer of coagulable lymph. This form was described by Scarpa as the *gelatinous* or *glutinous* adhesion; and as it is a condition of parts which very quickly takes place, the surgeon should endeavour to return the hernia as soon as possible, in order to prevent the slight inflammation which gives rise to the effusion.

2*d*, Adhesions sometimes assume a membranous or filamentous appearance, varying greatly as to the number and length of the filaments. As a general rule, adhesions of this form are only found connecting moveable parts with each other, as the intestine with the hernial sac, or with the omentum. They are precisely similar to the bands we often find between serous surfaces in other parts of the body, and are produced by the effusion of coagulable lymph, which ultimately becomes organized. In this respect they differ from the last-mentioned form. The lymph thus effused is drawn out into bands or filaments by the movement of the intestine, which accounts for the circumstance of their being found chiefly connecting moveable parts to each other, and for their being more frequent at the body and fundus of the sac than at its neck or mouth, where the parts are in a more confined space and have less motion.

3*d*, The third form of adhesion, which usually receives the name of the *close organized*, or the *fleshy*, is, like the gelatinous and membranous—a result of inflammation; but differs from them, inasmuch as the union is close and firm, so that the protruded parts and the

sac cannot be separated from each other, but form a solid mass, the vessels of which are continuous. In a case of strangulated hernia, the subject of operation, this form of adhesion requires a very different method of procedure from the gelatinous or membranous, as will afterwards be stated. This species of adhesion is very frequently met with between the omentum and hernial sac; and then is generally at the body and fundus of the sac. When it is found between the intestine and sac, which is a rare occurrence, it is usually at the neck. Scarpa has described this form under the name of the *unnatural fleshy*, to distinguish it from what he calls the *natural fleshy*, which is of an entirely different character, as will presently be shown. These three forms of adhesion agree with each other in being caused by inflammation, and in being attended with effusion of lymph; but they differ, inasmuch as the lymph in the first form is not organized; while, in the second, it is organized and elongated into bands or filaments; and, in the third, although organized, it is not elongated, but effused between the sac and protruded parts, so as to convert them into a solid inseparable mass, the vessels of which are continuous.

The obstacle to reduction is sometimes furnished by the natural means of connexion between the intestine before its descent, and the peritoneum lining the surrounding part of the abdomen. It is of the greatest importance that the surgeon should have distinct ideas of this condition of a hernia; for, if it be not understood, and an operation be necessary, the most fatal errors may be committed. Scarpa has given an exceedingly clear and full explanation of this condition of a hernia. It has also been described by Pelletan, Cloquet, and Hesselbock, and with great distinctness by Mr Lawrence. The natural means of connexion of the hernia with the surrounding parts, may form the obstacle on the right side if the hernia be formed by the cœcum or head of the colon, or on the left if it be formed of the sigmoid flexure of the colon. These divisions of the alimentary canal are covered by peritoneum laterally and anteriorly, but are in a measure destitute of peritoneal covering behind; and the peritoneum is reflected from their lateral aspects to the parietes of the abdomen in the ileo-lumbar regions, with which parietes it is connected by loose cellular tissue capable of great elongation. The natural means of connexion of these divisions of the alimentary canal with the parietes are short, and formed of the peritoneum extending between that portion of the membrane which furnishes a serous coat to the intestines, and that which lines the walls of the abdomen. If these portions of the alimentary canal descend to form a hernia, they will drag along with them the part of the peritoneum which naturally lines the parietes of the ileo-lumbar region to form the hernial sac; and if the hernial sac descend into the scrotum, and there form adhesions to the surrounding parts, the portions of peritoneum which, within the abdomen, preserved the intestine in its natural relations to the walls of

the abdomen, will now retain it in the sac; and as, through the medium of these portions, the hernial sac and serous coat of the intestine, which forms the hernia, are continuous with each other, it is evident that reduction must be impracticable. It is as impracticable under these circumstances to return the intestine, as it would be to return the testicle into the abdomen; the intestine draws the peritoneum along with it to form hernial sac, and the testicle draws peritoneum to form tunica vaginalis; and the serous coat of the intestine has the same relation to the hernial sac as the tunica vaginalis propria has to the tunica vaginalis reflexa. Such a hernia, when it becomes strangulated, and the subject of operation, requires a particular method of treatment, which will afterwards be explained.

Adhesions of the protruded parts to each other, often form the impediment to reduction. The parts which form a hernia often glide down separately and to a great extent into the sac; and afterwards, by pressure and various accidental causes, adhere to each other, and cannot in mass be returned through the opening by which they separately left the abdomen.

A frequent impediment to reduction is the bulk of the protruded parts in relation to the opening through which they would have to be returned. The bulk is sometimes owing to the quantity of parts which have come out from the abdomen, especially in neglected cases, where means have not been used to give a degree of support. Another more frequent cause is the enlargement or growth of some parts constituting the hernia. The omentum and mesentery are the parts which, when protruded, present the impediment to reduction from growth, and their increase is occasioned mostly by deposition of fat in the portions of these tissues external to the opening through which they came out from the abdomen. Where they are embraced by the opening, the pressure prevents enlargement in that situation; but from the yielding nature of textures external to the opening, the increase of volume is often very considerable. In old herniæ, which have been long irreducible, this condition is sometimes met with to a great extent. Such are the principal conditions which, independent of the stricture, offer an obstacle to the reduction of a hernia.

If any of these conditions exist, and if the sac be not opened, reduction is in general impracticable. If the sac be opened, two of them may easily be overcome; namely, the soft recent adhesions formed by coagulable lymph and the filamentous,—the former can be broken down with the finger, the latter divided by the knife. Two of them present an insuperable impediment to reduction; namely, the natural means of connexion, and the close organized adhesions, if they be to a great extent, and the hernia large. With regard to the two remaining conditions, the possibility of overcoming them, and the propriety of attempting to do so, must depend entirely on the particular circumstances of the case; but in many cases it is more judicious not to interfere with them, unless they exist only to

a limited extent, and in herniæ of moderate size. Most of these conditions, however, are principally met with in cases of large and old herniæ; and, on account of the risk of injuring the intestine in attempts at reduction, as well as that of inducing dangerous inflammation by much handling of the intestine, and the difficulty of maintaining the parts reduced, even should reduction be possible, the majority of surgeons seem now disposed to follow the advice of Sir Astley Cooper regarding such cases. His practice was to divide the stricture, which fortunately in such cases is, for the most part, external to the sac, and to leave the latter unopened, and the hernia unreduced. The stricture being divided, the principal cause of danger is removed. The coverings of the hernia should be replaced, and proper means taken for promoting the healing of the wound.

Thirdly, There are certain states in which it would be extremely improper to attempt reduction; namely, when the hernia is gangrenous, or when the intestine has given way from inflammation having gone on to gangrene, or when it has been torn, or accidentally wounded in the operation. The two last-mentioned conditions can only result from unskilfulness in the mode of procedure; but, should they exist, the hernia ought not to be returned. When the intestine presents such an appearance as to render it doubtful whether its return may be followed by fœcal extravasation, the surgeon should content himself with carefully dividing the stricture. In all cases in which the intestine is gangrenous, or not entire from whatever cause, it ought to be allowed to remain, so that the fæces passing off by the wound may form an abnormal anus, and extravasation into the abdomen be thereby prevented. When omentum forms the hernia, and it is gangrenous, the gangrenous portion may be removed, and the remaining part returned to the abdominal aspect of the mouth of the hernial sac. The practice of removing a portion of omentum, when from growth it renders a hernia irreducible after division of the stricture, is a proceeding which, in some cases, may be adopted with advantage. For cases belonging to this class, extra-peritoneal division is of course quite unsuitable. These remarks, it is to be hoped, will be sufficient to point out the proper mode of procedure when the hernia is sound, and reducible after division of the stricture; when it is irreducible after such division—and when it is in any of the various conditions in which reduction would be dangerous and improper; and also to show, that to follow one method indiscriminately in all cases would be unwise; that intra or extra peritoneal division should be adopted according to the particular circumstances of the case; that in the majority of cases intra-peritoneal division is not only the more suitable mode, but the only one which is safe, or by which any good can be effected; and that the cases in which extra-peritoneal division is suitable are those of very short standing, where there is no reason to apprehend the existence of adhesions, or of an unsound condition of the hernia; and in cases

of large and old herniæ, where the more judicious proceeding is to divide the stricture, and not to attempt reduction.

The plan of not opening the sac, although practised in certain cases by Franco and Paré, was first strongly recommended by Petit, and consequently has been designated the *method of Petit*, to distinguish it from the mode in common use. Petit practised this method as early as 1718. It was subsequently advocated by Garengeot; and, at a still later period, adopted and strongly recommended by Bonnet of Lyons.

In this country it was introduced by the second Monro, who advocated its adoption in cases of small and recent hernia, and mentioned four cases in which he resorted to that mode of proceeding. In one of them, however, adhesions prevented the return of the hernia, and in two of them he was obliged to cut the neck of the sac. In later times, the same proceeding was adopted by Sir Astley Cooper in cases of large and old herniæ, and strongly recommended by him as the decidedly preferable mode in cases of that class. Mr Lawrence, in his valuable *Treatise on Ruptures*, remarks, "The plan of removing the stricture, and returning the prolapsed parts without opening the sac at all, ought, I think, to be more frequently adopted than it has hitherto been, although it appears objectionable as a measure of general use, in the operation for strangulated hernia." To Mr Key, however, the merit undoubtedly belongs of having recommended a more general adoption of Petit's mode than had previously prevailed in this country. In his admirable *Memoir on the Advantages and Practicability of dividing the Stricture in Strangulated Hernia on the Outside of the Sac*, published in 1833, will be found much valuable information on this interesting subject. Mr Luke of the London hospital strongly recommends this mode, and his success is a decided testimony in its favour. Out of nearly forty patients he has not lost more than two. In October 1845, when I had occasion to be in London, Mr Liston showed me a patient in the North London hospital, in whose case he had adopted this mode; and, in a communication I afterwards received from him, he informed me that he had practised it in a few other instances, and felt convinced of its being the preferable mode when the hernia is small and recent, and when there is no reason to apprehend an unsound state of the intestine. And, judging from the recorded statements of some other distinguished surgeons, this mode seems to be meeting with deservedly increased favour; and I have no doubt will continue to do so, if practised under the limitations already mentioned.

There can be no doubt that intestinal inflammation is the most frequent cause of death after the operation for strangulated hernia. Some of the advocates of Petit's method have assigned as the causes of that inflammation, when the ordinary proceeding is adopted, the exposure of the intestine to light and air, change of temperature, and handling. I agree with Mr Lawrence in ascribing it not to

these agents, but chiefly to the long-continued pressure of the stricture, owing to the operation being *too long delayed*, and to an injudicious and *too frequent use of the taxis* previous to the operation. I remember being very much struck with an observation of Desault's; I have not his works beside me at present, but it is to this effect—"Think well of that hernia which has been little handled and soon operated on." The operation is justifiable and necessary when the taxis has been first tried alone, and has then, in combination with such auxiliary means as seem advisable, been again fairly and skilfully tried without producing the desired effect. The conviction being thus produced, that by no other means than an operation is there hope of saving the life of the patient, it ought to be resorted to as quickly as possible. Much handling must not only give unnecessary pain, but also increase the risk of hurrying on the inflammation to results, which, even though the operation should be performed, would render it unsafe to return the hernia. When therefore the taxis, and also along with it the proper auxiliaries, have been fairly and skilfully tried, no advantage can, but considerable injury may, result from the repetition of treatment already found to be unavailing. Many considerations show that the operation should be performed as soon as possible, after its inevitable necessity has been found to exist. Delay, like undue handling, increases the risk of inducing such a state of the hernia, in consequence of inflammation, as would render its return unsafe. From the short time in which a hernia may prove fatal, and from the depressed state which comes on in consequence of delay, rendering the patient less able to stand the shock of an operation, will be seen the importance of being as prompt as possible; but there is another, and a very urgent reason—namely, that, if the operation be delayed until intestinal inflammation has been induced within the abdomen, it is far from certain that this inflammation will subside on the removal of the hernia which caused it. I have performed the operation for strangulated hernia, according to the usual mode, a very considerable number of times, and in every instance with success; which I attribute to two things—namely, avoiding all undue and useless handling, and performing the operation early. My decided impression is, that the reason why the operation is so frequently followed by death, instead of being one of the most successful of the great operations of surgery, is, too great delay in resorting to an operation, and the undue and injurious use of the taxis, even after its adoption alone, and in conjunction with the proper auxiliaries, has proved unavailing.

MURRAY AND GIBB, PRINTERS, EDINBURGH.