Practical observations on the radical cure of inguinal hernia / by C. Holthouse.

PRACTICAL OBSERVATIONS

ON THE

RADICAL CURE

OF

INGUINAL HERNIA.

BY

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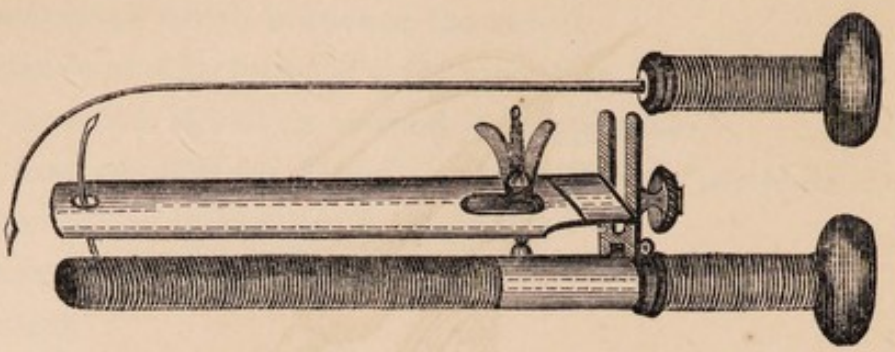

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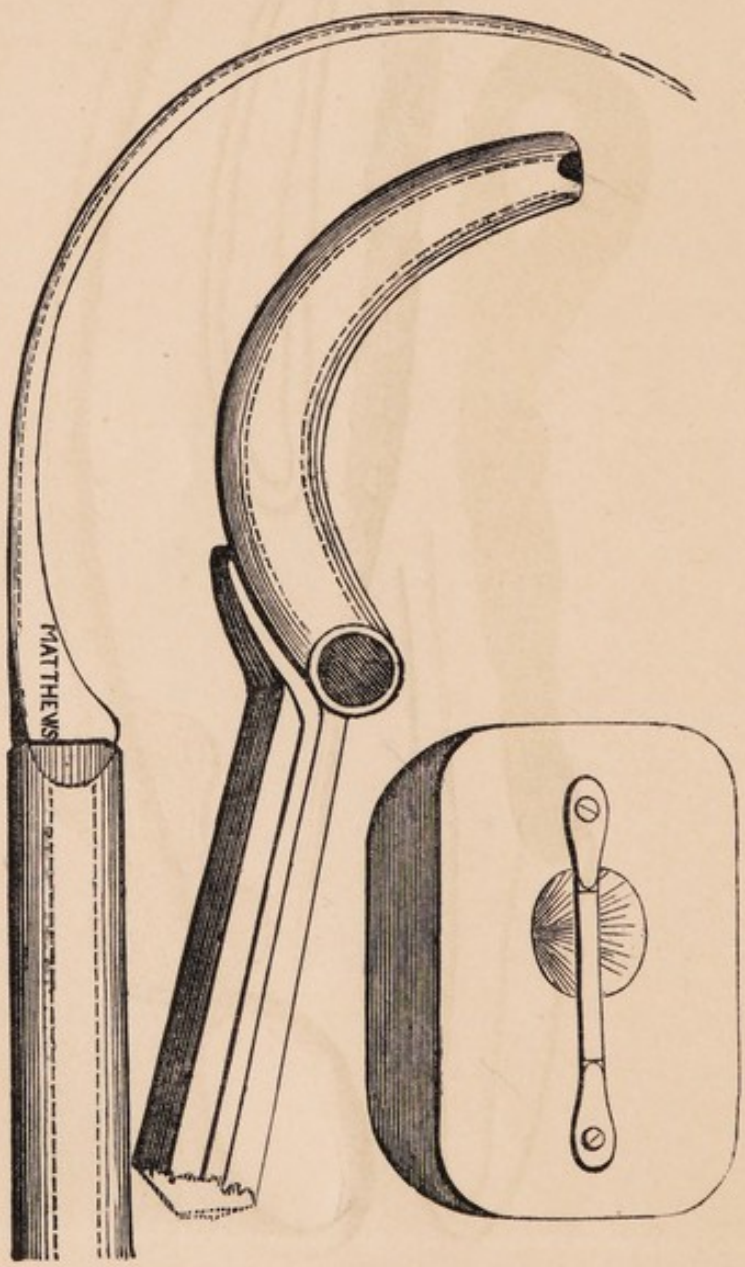

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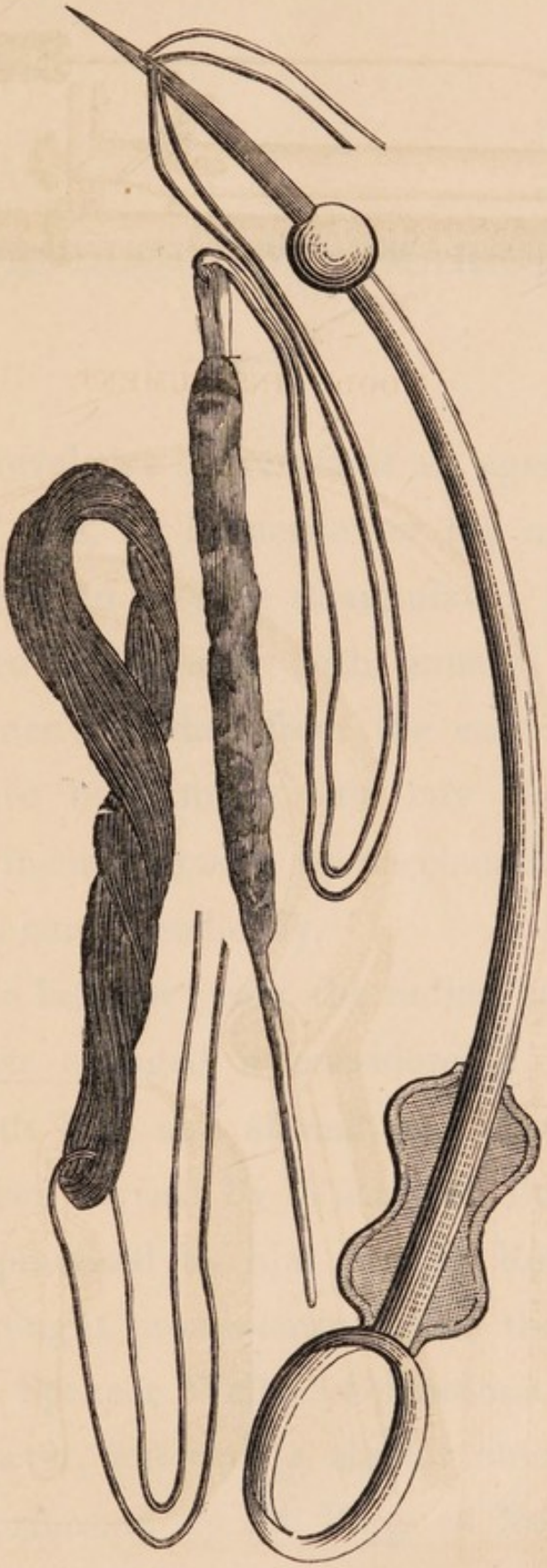

INTRODUCTORY REMARKS.

THE great prevalence of hernia at all ages and in all ranks of life, its influence on the mortality, and its liability to become strangulated, have always invested this disease with unusual interest and importance; so that from the earliest times attempts have been made, not only to palliate some of its inconveniences by mechanical appliances, but to cure it radically.

Within the last few years, the radical treatment of hernia has engaged a considerable share of attention both here and abroad, and an operation which has been devised by Wützer of Bonn, and extensively practised by him and by Rothmund, has been brought prominently before the profession by Mr. Spencer Wells. Operations of a different character, but with a similar object, have also been performed by Dr. Riggs of New York,

Mr. Wood of King's College, London, and by myself. A brief description of these several operations, an examination into their relative merits, the mode in which they effect a cure, and their adaptability to the several varieties of hernia, are the chief objects of the following pages.

OBJECTS AND CHARACTER OF THE OPERATIONS WHICH HAVE BEEN PROPOSED FOR THE RADICAL TREATMENT OF HERNIA.

The operations that have been devised with this object all aim at the same result, viz., the permanent closure or contraction of the passages through which the hernia escapes. This has been attempted in a great variety of ways, some of which are both barbarous and dangerous; others, though not open to the charge of barbarity, are not free from danger; and others, lastly, are so little dangerous, and have been attended with so much success, as fully to justify their performance. They may be classed under the following heads.

Classification of the Operations.

1st. Operations for removing or obliterating the hernial sac by means of the knife.

2dly. Operations for obliterating the hernial sac by exciting inflammation and adhesion of its contiguous surfaces.

3dly. Operations for closing the hernial passages by a plug of integument.

4thly. Operations for blocking up and closing the external abdominal ring.

Some of the principal operations of the first class are the following.

A. Removal of the sac, cord, and testicle by excision.

B. Exposing the sac by dissection, removing a portion of it longitudinally, and sewing up the remainder. (*The Royal Stitch.*)

C. Laying open the sac by a free incision through the integuments, and allowing the cavity to heal by granulation.

D. Laying open the sac by the preceding method, and then destroying it by the actual or potential cautery.

E. Separating the sac by dissection from the spermatic vessels and surrounding structures, passing a ligature round its neck, and then cutting it off below the ligature. (*Schmucher's operation.*)

F. Exposing the neck of the sac by dissection, passing a ligature round it, and allowing the remainder to inflame or slough. (*Langenbeck's operation.*)

The chief operations of the second class are the following.

A. Injecting the sac with dilute tincture of iodine. (*Velpeau's.*)

B. Scarification of the neck of the sac by subcutaneous incisions. (*Richter's.*)

C. Introducing pins through the sac, and fixing them there till adhesive inflammation has been fully established. (*Bonnet's.*)

D. Introducing gold-beater's skin into the inguinal canal with the same object. (*Belmas's.*)

E. Introducing a small skein of silk, or compressed sponge, into the inguinal canal. (*Riggs's.*)

The operations of the third class consist in:

A. Dissecting a flap of skin from the upper part of the thigh, pushing it into the femoral ring, and drawing together the edges of the wound by suture. (*Jameson's operation.*)

B. Pushing a portion of the scrotum into the inguinal canal, and retaining it there:
By ligatures. (*Gerdy's operation.*)
By hare-lip pins. (*Signorini's.*)
By wooden plug (*Wützer's.*)

The fourth and last mentioned class of operations are but modifications of the preceding, and consist in:

A. Laying open the sac, pushing up the testicle through the external abdominal ring, and retaining it there by the punctum aureum.

B. Pushing up a portion of the fascia covering the spermatic cord through the ring, and bringing together the pillars of the ring by suture. (*Wood's operation.*)

Of these numerous operations the majority have been long and justly condemned. Those which seem

most worthy of note are Langenbeck's, Gerdy's, Wützer's, Rigg's, and Wood's, to each of which I shall now devote a few words.

Langenbeck's Operation. Langenbeck performed his operation in the following manner. The neck of the hernial sac having been cut down upon, it was exposed with as little disturbance of the surrounding parts as possible, a ligature was then passed round it as close to the ring as possible and tightened, an operation which, we are informed, gives no pain; the part of the sac below the ligature, if previously detached, sloughs; if not, inflammation is set up, and subsequent consolidation or adhesion is thereby effected. Langenbeck performed this operation in the three principal varieties of hernia, and with entire success. "I have already performed this operation twelve times with the most successful results, and all the patients are capable of the heaviest labour without wearing a truss.

"The ligature causes adhesive inflammation of the serous surface, and the neck of the sac becomes closed up to the abdomen, like the portion of an artery that has been tied."

It has been objected to this operation, on theoretical grounds, that it cannot obliterate the sac higher than the external abdominal ring, and therefore the portion of the sac within the canal is left open for the descent of the viscera. If this be true, it would be a reason for not practising it in oblique hernia, but none at all for its adoption in direct; and Langenbeck's own testimony is directly opposed to this opinion.

The same end as that attained by Langenbeck has been sought by means even more simple, and without the employment of the knife; these consist in passing ligatures, pins, or gold wire, through the integuments and beneath the neck of the sac, and tightening the former over a piece of wood, or twisting the latter till a sufficient amount of pressure has been made to cut off the communication between the hernial sac and the peritoneal cavity, care being always taken not to injure the cord.

Gerdy's operation is supposed to have been suggested by two cases of inguinal hernia recorded by Arnaud, in which, during reduction, a fold of skin was drawn up through the external abdominal ring, became adherent in that position, and prevented the future descent of the rupture.

The operation may be described in a few words. 1. A portion of the scrotum is pushed up before the finger into the inguinal canal, and secured in that position by three or four sutures. 2. The skin of the invaginated scrotum is made to inflame by means of ammonia, and the union of its sides thus attempted. And, lastly, the opening into this *cul-de-sac* is closed by means of sutures. This operation of Gerdy has formed the basis of most of the subsequent attempts for the radical cure of hernia; and his principle, that of invaginating a portion of the scrotum, and fixing it in the inguinal canal, has been adopted by nearly all.

Wütżer's Operation. This operation has been so well described by Mr. Spencer Wells in the *Medical Times and Gazette* of last January, as well as in

the *Dublin Quarterly Journal* of last March, that I cannot do better than refer my readers, for full details, to those journals. The chief difference between Wützer's operation and Gerdy's consists in the mode of doing it; the former surgeon employing a cylinder of hard wood, which is made to act like the finger of the surgeon, and to carry before it a portion of the scrotum into the inguinal canal: instead of being withdrawn, however, it is fixed there by means which will be better understood after reading the following description of the instrument and its mode of application, as given by Mr. Wells in the journal above referred to.

"The instrument consists first of a cylinder of very hard wood. This is made of different lengths and diameters, according to the breadth of the canal. It is destined to take the place of the index finger, after the latter has pushed a part of the scrotum through the abdominal ring into the inguinal canal. Towards its anterior blunt extremity it becomes gradually thinner. It contains a canal, lined with metal, which conducts an elastic steel needle, flattened on the point, and furnished with a moveable handle. A round opening near the point of the cylinder allows the needle to pass through, so that, when the cylinder has been properly introduced, pressure upon the handle of the needle sends its point along the interior of the cylinder, the skin of the scrotum, the serous coat and coverings of the hernial sac, projecting at last through the integuments. In order to increase the pressure which the wooden body remaining in the

canal itself exercises, a moveable case of hard wood is made concave, corresponding to the outer convex side of the cylinder. It is made rather wider than the cylinder, projecting two or three lines on either side, in order to distribute the pressure more equally, and near the end is an opening to receive the projecting point of the needle, which thus fixes one end of the cover over the cylinder. The other end is supported upon a moveable metallic staff; near this is a screw, by means of which cover and cylinder can be pressed together to any degree of strength, so that, in a moment, the anterior wall of the hernial sac, of the inguinal canal, and the tissues between the cylinder and the cover, can be compressed to the precise degree each case may require.

"The cylinders are made of various calibres, to adapt them to the different diameters of the inguinal canal, as a great deal depends on the proper filling of the canal by the cylinder, the pressure of which should operate as equally as possible upon all parts of the inner surface of the sac. On the other hand, the diameter of the cylinder must not be too great, or it would be impossible to pass this blunt end to the internal ring, and our object would be defeated; a diameter of five to seven lines suits most cases. The invaginated scrotum fills the rest of the canal."

This instrument has been considerably improved by Rothmund, of Munich, and still more by Mr. Wells, who employs a cylinder flatter than Wützer's, but rounder than Rothmund's, which is too

flat. In order to admit of the same cylinder serving for the occlusion of canals of various dimensions, it is so made that side-pieces of different sizes can be fitted on to the central portion of the cylinder. The needle also has been much improved; it used to get rusty, and sometimes broke or became unfit for use a second time; it is therefore now made of silver instead of steel, the point only being of the latter metal, and at the handle there is a spring, which prevents its slipping from its place. The mode of performing the operation is thus described by Mr. Wells.

"The hair is removed from the side affected, the bladder emptied, and the hernia carefully reduced. This being done, the patient is placed on his back with the shoulders raised, the thighs semiflexed, and the knees separated, just as in reducing a hernia by the taxis. The surgeon stands on the side to be operated on. Perhaps I may be here allowed to quote from my lecture the following account of the operation, as the familiar mode adopted in lecturing may be clearer than a more formal description:—

"'If you can use the right and left hand equally well, you may use the left forefinger for invaginating on the left side, and the right to hold the instrument—the reverse for the right side. But the left finger will do for invaginating on either side very well. You see I operate on the left side—so I stand on the left side of the patient. I place my left forefinger here on the scrotum, about an inch below the external ring, and then push a fold of

the scrotum before my finger with a little rotatory movement slowly and steadily into the canal, keeping the palmar surface of the finger turned forwards and a little outwards, until it is well under the tendon of the external oblique, and the plug of scrotum is well pressed up to, or through, the internal ring. If you place one forefinger on the abdomen, just over the internal ring, while the other is in the canal beneath the tendon of the external oblique, you will feel the tendon very distinctly. As you move the finger backwards and forwards, it rolls over the tendon. You should accustom yourselves to feel this, because it is the test by which you know and can be certain that you are well in the canal, and, when you have introduced the cylinder, that it is in the canal, and has not slipped anterior to it. When you are quite sure that your finger is in the canal, the next thing is to get the cylinder into the place of the finger, and then to fix it there by the needle. To do this you take the cylinder with the needle passed within it as far as you can without permitting the point to project, and hold it as I do now in the right hand with the thumb before the screw, the forefinger and the second finger on either side of the prong which supports the cover, and the ring and little finger on the under side of the cylinder. Then bend the left forefinger a little, draw it forwards, and slip the cylinder along its dorsal aspect at the same time as the finger itself is being withdrawn. This is the most important step of the whole operation, and the only step which is at all difficult.

Without care the plug may follow the finger. Without care the cylinder, instead of slipping beneath the tendon of the external oblique, may slip between it and the integument. You must be very careful that this does not occur, by feeling, as you felt when your finger was in the canal, that the tendon rolls over the cylinder. If you do not feel this, and if the cylinder moves freely beneath the integument, you may be quite sure it is not in the canal, and you must begin again. I wish particularly to guard against this mistake, because I *know* it has been made once, and I *suspect* oftener. If you feel the tendon rolling over the cylinder, you may be quite sure it is in the canal, and the end well up to the internal ring. To fix it there I have only to push on the needle till its point appears through the abdominal parietes, then to put on the cover, and use the horizontal and perpendicular screws until the cover and cylinder are evenly pressed together. Then the point of the needle is unscrewed, the knob put on, the handle of the needle removed, and all is done.'"

This apparatus is allowed to remain thus for about a week and is then removed, a compress and bandage being substituted, and so applied as to make pretty firm pressure over the inguinal canal. At the end of a fortnight this also may be removed, and its place supplied by a truss, which, as a matter of precaution, had better be worn for a month or two longer.

The advantages which are claimed for Wütz er's method are, that it ensures a more uniform pres-

sure on the whole circumference of the inguinal canal than does Gerdy's, and it is assumed that this pressure is sufficient to ensure complete union of the invaginated scrotal plug with the walls of the canal; while it is objected to Gerdy's, that it only provides for the adhesion of the anterior surface of the plug with the corresponding surface of the canal, and thus an opening is left behind through which another protrusion may descend.

Riggs's operation. Dr. Riggs of New York has lately recommended an operation for the radical cure of hernia, identical in principle with one I have been in the habit of performing, and which I shall have occasion to refer to by and by. Dr. Riggs makes use of an instrument which he calls the hernial trocar, and describes his operation in the following words. "The patient placed upon his back with the hips somewhat raised, the surgeon standing or sitting at the right side of the patient, after reducing the hernia, places the index finger of the left hand upon the integuments of the scrotum, anteriorly and at a point *not higher* than the junction of the lower with the middle third of the pouch. Sufficient pressure being now made with the finger to catch and hold, upon its end, the tegumentary tissues of the scrotum; these are now to be carried, upon the end of the finger, upward over the testis and arch of the pubes, until, immediately above the bone, the abdominal ring is easily found, and into which the end of the finger readily becomes fixed; where, as a guide to the instrument, it is to remain sta-

tionary, until the bulbous extremity of the canula is made to take its place *fairly* and *securely within the external ring.*

"The instrument, in the right hand of the operator, and held at the serrated portion of its handle, between the thumb and fingers, something after the manner of holding a pen, is passed into the pouch of the invaginated scrotum, and made to glide along and upon the back of the finger to its destination within the ring. The finger may then be withdrawn, and the left hand being now liberated, the thumb of this hand may be placed at a point opposite the internal ring; where, by pressure, all danger from any tendency there may be to partial protrusion of the intestine through the internal ring can be effectually obviated, while, at the same time, the pressure thus exerted at this point tends materially to facilitate the passage of the instrument through the tissues. The instrument is now carried forward until the bulb approaches as nearly as practicable to the internal ring, when the handle is depressed upon the pubes, which serves to elevate its bulbous extremity, causing a prominence upon the surface, and indicating both to the touch and to the eye the exact point of its exit through the integuments. The operator now places the index finger of the right hand through the ring of the stylet, and with a single movement of the fingers thus placed, pierces all the tissues involved in the operation, and brings the point and eye of the instrument into view upon the surface opposite the internal abdominal ring.

"The surgeon, or his assistant, now arms the stylet, by passing through its eye, for an inch or more, the free ends of a slender cord or tractor, previously passed through a small skein of silk or compressed sponge; when, by a single reversed or backward movement of the finger, which is still in the ring of the stylet, the instrument is entirely disengaged and freed from the tissues, being still, however, concealed from view within the pouch of the invaginated integuments. The entire removal now of the instrument, leaves the free ends of the tractor passing through the puncture in the scrotum, and hanging loose below. These are now seized, and by the necessary traction, the foreign body is drawn from above into the passage, to the distance of some two inches or more, and leaving its upper extremity protruding from the puncture above; when, dropping from his grasp one of the ends of the cord, the surgeon, by means of the other end, draws it entirely out, and thus completes this bloodless and comparatively painless procedure."

Wood's operation. The last operation to which I shall direct attention in connexion with the radical cure of hernia, is one of great merit and originality, devised by Mr. Wood, of King's College, and which seems particularly well adapted for cases of direct inguinal hernia. It consists in a kind of subcutaneous separation of the superficial fascia from the cord, pushing the former into the inguinal canal, drawing together by ligature the two pillars of the external abdominal ring, and applying pressure over the opening. The instruments used in the

operation consist of: 1st, a tube two inches and a half long, mounted on a strong handle about three inches and a half in length, curved in a circle of an inch and a half radius, and flattened into an oval at one end, and forming a linear aperture a quarter of an inch wide at the point; 2nd, a strong needle, having a corresponding curve, with a perforated point, projecting a full inch beyond the end of the tube when passed through it, and mounted on a strong handle; 3rd, a boxwood pad or compress, two inches by one and a quarter, perforated by a hole at half an inch from one end, and crossed longitudinally by a bar of iron wire screwed on to the upper surface; 4th, a subcutaneous section knife, with a sharp point, a narrow blade, and an inch of cutting edge.

The operation is thus described. The patient being laid on his back, with the legs a little drawn up, and the hernia returned, an incision about three-eighths of an inch long is made through the skin only, over the cord, about an inch and a half below the external ring, with the subcutaneous knife, which is then carried close under the skin, so as to separate a circle of the superficial fascia around the opening of two inches in diameter. The detached fascia is pushed up into the inguinal canal by means of the curved tube, the end being placed through the opening in the skin. The extremity of the tube is then carried behind and close to Poupart's ligament, or the external pillar, to the extent of an inch and a half from the pubic spine. It is then felt, by depressing the handle,

to raise the external pillar upon the extremity. The needle, carrying the thickest silk ligature, is then protruded through the tube, and pushed through the external pillar and the skin, the latter being previously drawn considerably downwards and outwards. The needle is then withdrawn, leaving one end of the ligature on the surface. The end of the tube is next shifted upwards and inwards, and made to protrude behind the internal pillar, as far as possible from its margin. Through this the needle is then passed, and the skin moved upwards and inwards till the point appears at the opening previously made. The ligature is then freed, and the needle withdrawn, the tube being still held firmly in its position. The ends of the ligature are next passed through the hole in the boxwood compress, one on each side of the wire bar, over which they are then drawn close and tied firmly, so as to retain the pad close down to the end of the tube in the canal, which is then withdrawn. It will thus be seen that the first passing of the needle pierces not only through the external pillar of the external ring, but through the origin of the internal oblique and cremaster muscles, from Poupart's ligament behind it; and at the second passing it goes through, not only the internal pillar, but also the conjoined tendon of the internal oblique and transversalis muscles, which is placed behind it, so that the sides of the inguinal canal are drawn together from end to end by the ligature. The wound in the skin of the scrotum is drawn firmly together by plaster, a fold

of linen placed upon it, and the whole secured by a spica bandage, the patient being ordered to remain in bed, and to use no exertion whatever.

The bandage is removed on the third day, when the subcutaneous puncture will be found completely healed by the first intention. The compressed ligatures are retained till the fifth day; some œdema and suppuration will by this time appear around them, with considerable soreness and pain in the groin. The opening for the ligature will look red, healthy, and suppurating. It should be dressed with wet lint and oil silk, a large compress, and spica bandage. In a fortnight it will be completely healed. No irritation nor swelling ought to occur in the course of the treatment, nor any symptoms of peritonitis.

MODE IN WHICH THE FOREGOING OPERATIONS EFFECT A CURE.

The object of Gerdy, Wützer, Rothmund, and of all who adopt their methods of operating, is to procure intimate union of the integumental plug with the walls of the inguinal canal; while Dr. Riggs, and those who practise his method, endeavour to produce adhesion of the opposed surfaces of the inguinal canal. Now, the first question which would probably suggest itself to a surgeon in connection with these operations is, whether the hernial sac is pierced; and secondly, whether such perforation, supposing it to take place, is essential to the cure, or, on the contrary, unessential and dangerous, and, therefore, to be avoided. In

Gerdy's operation, according to the evidence of that surgeon, the sac is not wounded, but occupies a position either behind the invaginated portion of skin, or is pushed up before it, and Thierry affirms that he has several times verified this by dissection. Mr. Spencer Wells, on the contrary, in discussing this point in reference to Wütz̈er's operation, states that the sac is folded upon itself before the invaginated portion of scrotum, and if this portion be fixed by the passage of a needle, or needle and thread, that needle and thread transfix the sac. Dr. Riggs makes no mention of the hernial sac in speaking of his operation; but in describing one, essentially the same as his own, which has been done by Professor Armsby of Albany, we are informed that the sac is pierced and a thread left in it for about two weeks. Mr. Wood carefully avoids puncturing the sac, though he thinks it desirable to procure its obliteration, and supposes that the pressure he employs may operate after awhile in producing adhesions of the opposed surfaces of the doubled up sac. As to whether the sac is or is not pierced in these several operations, will depend partly on the kind of hernia, and partly on the operation selected for its cure; in a bubonocele, for example, the sac may be pushed up before the invaginated skin and so escape perforation; in an oscheocele, except in Wood's operation, I imagine it must always be perforated. But the more important question to decide is, whether such perforation is dangerous, or whether it exercises any influence either for bad or for good upon the

success of the operation or the safety of the patient. Theoretically speaking, one would say that the chances of cure are better but the danger greater when the sac is pierced than otherwise, yet practically this is not found to be the case, and from all the evidence I have been able to collect on this subject, I have arrived at the conclusion that it is of little consequence either way.

In a child affected with congenital hernia on whom I operated, the peritoneum must necessarily have been pierced, yet no untoward symptom took place, and he suffered so little from the operation that he was with difficulty kept in his bed. The principal danger which is apprehended from piercing the sac is peritonitis; yet it curiously happens that in all the recorded cases of death from this operation not one resulted from peritoneal inflammation. I think, therefore, we are justified in dismissing from further consideration this question of wounding the sac.

To return to the subject—the mode in which these several operations effect a cure. There can be no doubt that in Wützer's operation, it is sometimes effected by the union of the invaginated plug with the walls of the inguinal canal, as proved by the following dissection related by Mr. Spencer Wells in the *Dublin Quarterly Journal* of May 1858. The subject was a young man twenty years of age, who had been operated on by Rothmund a short time previous to his death, which took place from some cause altogether independent of the operation.

"The invaginated scrotal plug was found to be so firmly united by adhesive inflammation to all parts of the canal, that it could not be separated without dissection. The external ring, and the whole canal to within six lines of the internal ring, were completely filled and closed up by the adhesion of the plug." It seems that some five or six years after the operation, the plug can scarcely be felt, and nothing abnormal be detected on the most careful examination.

"Rothmund convinced himself that this could not be explained by the sinking of the invaginated scrotal plug to its former position, by tatooing round the opening of the cavity, and observing that the marks did not change their position as they would have done had the plug descended." In other examples of the radical cure of hernia by Wützer's method the *modus curandi* is, however, different, as proved by the following case. In February of the present year I operated on a gentleman, twenty-seven years of age, affected with oblique inguinal hernia which had descended into the scrotum, after Wützer's method. The apparatus was kept applied for seven days and then removed, the patient being confined to his bed, and pressure applied for another two weeks. At the end of this time he was permitted to get up and go about as before the operation, wearing only his truss. Before the expiration of a week the hernia had again descended. Disappointed, but not disheartened, and as anxious as before to get rid of his infirmity, this patient once more submitted to

the same operation. He was, I ought to have mentioned, a very stout, fat young man, his scrotum thick and well pursed up, and his inguinal canal very short. I this time made use of the smallest of the three cylinders employed by Rothmund, and having pushed it as far into the canal as possible, it required considerable force to retain it there, even after the needle had been pushed through the abdominal wall.

Having succeeded by means of a bandage in retaining it in the desired position, it was this time kept in for ten days, the patient experiencing a good deal more tenderness in the canal than he did on the former occasion. On removing the apparatus, I observed that the scrotum was larger than it was immediately after the operation, giving one the impression that the invaginated portion had partly descended, and on carrying my finger to the bottom of the *cul-de-sac* it passed through a constricted opening, which I at first took to be the external abdominal ring; but which was, in fact, a hole through that part of the invaginated scrotum which had formed the bottom of the *cul-de-sac*, and against which the extremity of the cylinder had pressed with so much force as to cause its absorption. By this accident the scrotal plug had escaped from the inguinal canal and slipped down by the side of the cylinder, which alone had maintained its proper position within the canal. A compress and bandage having been applied for another ten days, my patient was allowed to get up and go about, the ulcerated opening in the scrotum healed

rapidly, and the hernia has not since descended—the patient, in fact, is cured. This is by no means a solitary instance of a cure resulting from Wützer's operation, notwithstanding the plug of integument had escaped from the canal: three such cases are reported in the *Lancet*, of April 17th of the present year, and many more have come to my knowledge, though not published.

The same thing appears to have happened in several of Gerdy's cases; for a long time this surgeon believed that his plug of integument cured the hernia, by acting as a stopper and so blocking up the canal; but a larger experience convinced him that this explanation was not tenable, as in many of the cases the skin gradually descended, while in others it became less and less, and finally disappeared by absorption; he therefore came to the conclusion that the obliteration of the canal took place by plastic exudation in its interior.

Mr. Teale, alluding to these cases of Gerdy, supposes that the plug "constitutes a barrier, aided, probably, by plastic effusion, for a sufficient length of time to allow the hernial aperture, in some cases, to contract so completely as to prevent the future descent of the hernia; and in others, to such a degree that the hernia can be readily retained by a truss:" but this explanation will not hold good in the case I have just related, nor, indeed, in any of the cases in which the plug came down very shortly after the operation. The true explanation would appear to be, that such an amount of inflammation is set up in the inguinal canal, by means of

the threads in the one operation and the needle in the other, as, aided by pressure, cause the adhesion of its walls and the consequent obliteration of the canal. If this is really the way in which a cure is effected in many of Gerdy's and Wütz er's operations, and of which, I think, there can be no doubt, their mode of proceeding seems somewhat roundabout, and a more simple method of exciting the necessary amount of inflammation within the canal would in some cases seem preferable.

Accordingly, on the 22nd of February, 1858, I passed a double silk ligature into the inguinal canal of a man sixty-five years of age who had been afflicted for many years with a double oblique inguinal hernia, and on whom I had previously performed Wütz er's operation on the opposite side. The first steps of the operation were the same as Wütz er's—a fold of scrotum was carried up on the left forefinger as high into the canal as possible, a curved needle armed with a double silk ligature was then passed along the palmar aspect of the finger, thrust through the anterior wall of the canal and brought out on the surface, about half an inch or more above the centre of Poupart's ligament, carrying one end of the double ligature with it. The finger being withdrawn from the inguinal canal, the invaginated portion of the scrotum with the other end of the ligature followed it. The upper and lower ends of the ligature were then tied together, and pressure made over the outside of the canal with a compress and bandage. In one respect it is to be regretted that I operated on this

old man, inasmuch as his state of health was such as to contra-indicate any operation; for, besides being the subject of hip disease, he was also labouring under chronic bronchitis, and the effect of these diseases was to counteract the processes necessary for the radical cure of the hernia, so that neither operation succeeded. The case, however, deserves record, not only because it is the first in this country in which such an operation has been done, but because it proves the little danger, if not absolute harmlessness, of the proceeding, the patient experiencing no exacerbation of his previous symptoms, and suffering no more pain within the inguinal canal than he did when Wützer's operation was performed on him. Two months after this, I performed a similar operation on a child five years of age, affected with congenital hernia of the left side. The threads were left in the canal from Tuesday afternoon till the Saturday morning following, and excited a pretty considerable amount of inflammation in the scrotum; on their removal the redness and swelling gradually disappeared, no symptoms of peritonitis, or any other untoward accident occurred, and the operation only failed to be completely successful from the unruly conduct of the child, and the folly of its mother who had spoilt it;—indeed, considering these circumstances, the success was greater than I had reason to anticipate, for in spite of the child's tearing off the bandages, refusing to keep in bed, romping about the ward, and throwing himself into a violent passion whenever any restraint was put on him,

the hernia did not come down till some three weeks afterwards, though previous to the operation, the mere act of rising from the horizontal posture, invariably caused it to descend.

It was subsequent to these two operations that I became acquainted, through the medium of the *New York Journal of Medicine*, with Dr. Riggs's successful treatment of hernia by a similar operation. In this class of operations, then, the cure would appear to be effected in precisely a similar manner as it is in Gerdy's, and in many of Wützer's, and the operation is certainly more simple and not less safe.

I will now subjoin a dissection of the parts which have been operated on and cured by Dr. Riggs's method, and by comparing this with the dissection of Rothmund, already related, my readers may judge for themselves which of the two modes of cure appears to offer the best chance against a relapse. A German, forty-seven years of age, affected with a scrotal hernia of the right side, was operated on by Professor Carnochan, after Riggs' method, on the 2nd of May, 1857; the operation was completely successful; towards the latter end of July, pulmonic symptoms made their appearance, and on the 9th of September, he died of tuberculosis of the lungs.

"*Post mortem.* 10th September. Upon opening the cavity of the peritoneum, the orifice to the hernial sac could not be traced, the internal ring being firmly closed around the cord. On the outer side of the peritoneum, and just below the situa-

tion of the internal ring, was found a small rounded body of a yellowish colour, supposed to have been the remains of the hernial sac. The *upper portion* of the inguinal canal, for nearly an inch, was closed by plastic exudation, which had become organized and somewhat fibrinous in its appearance; while the canal at its lower part, and the external ring, were, to appearance, in their normal condition, though the cord, throughout the entire length of the canal, seemed to be imbedded in plastic formation.

"The skein of silk used in this case being too large for the puncture made by the instrument, it was not introduced more than one inch, which will explain the facts mentioned, of the lower portion of the canal and external ring being in their normal condition; while, at its upper portion, both the canal and internal ring were firmly closed."

STATISTICAL RESULTS OF THESE OPERATIONS.

Let us turn now to the statistics and results of these modern operations for the radical cure of hernia.

Of *Gerdy's* operation, sixty-two cases are recorded.

Of *Wützer's*, we are informed by Mr. Spencer Wells, that Wützer himself has repeatedly practised it since the autumn of 1838,—let us say, two hundred times. Professor Sigmund of Vienna, according to the same authority, had done it nineteen times; Rothmund of Munich, one thousand times; and it has been done by British surgeons at least fifty times.

Riggs's operation, or one similar in principle, and which may be termed the seton operation, has been done eight times by Professor Carnochan of New York and by Dr. Riggs; once by Professor Armsby of Albany; four times by Dr. Moesner; twice by myself; and once by my colleague, Mr. Charles Brooke: in all, sixteen times.

Wood's operation, which is the latest plan proposed, has hitherto been done only twice; once by the inventor, and once by myself.

Adding together all these operations, the number of which is certainly rather understated than overstated, we arrive at a total of 1,349 operations undertaken for the radical cure of hernia; a sufficient number to enable us to form some estimate of the merits of these proceedings, reference being had first, to their safety; and secondly, to their efficiency. An estimate of the former may be arrived at by comparing the number of deaths with the number of operations, which, as far as the list just given extends, stands thus. Of sixty-two patients on whom Gerdy's operation was performed, four died; of the remaining 1,287, none died. Of the four fatal cases, I can only ascertain the cause of death in two, and of these, one only I think can in strictness be attributed to the operation, the patient dying with symptoms of pyæmia, and having been much out of health previous to the operation: the other patient died of acute pleurisy, supposed to have been brought on by wet applications over the site of the operation. But, in truth, these sixty-two cases may be altogether excluded,

as Gerdy's operation is now never practised, and is in every respect inferior to Wützer's. This leaves us, then, 1,287 operations without a single death, a result, as Mr. Spencer Wells truly observes, when speaking of a smaller number of cases, "more than almost anyone could say, of the most trifling operation. No one could expect to do 1,000 operations for hare-lip,—to tie 1,000 nævi or piles,—to remove 1,000 small tumours,—in fact, to do the most trivial surgical operation 1,000 times, without some untoward result following accidentally in some one case. So that this evidence is very strong indeed in favour of the almost perfect safety of the proceeding."

With reference to the efficiency of these operations for the radical cure of hernia, we have the evidence of the same able surgeon that, as far as regards Wützer's operation, it has been almost uniformly successful, and the relapses that have followed in some cases, can always be traced to a preventable cause; thus, Wützer observes that in several of his cases a relapse followed, but this was traceable either to the patient leaving off the truss too soon, or undertaking very hard bodily labour soon after the operation; it is also admitted that when the rings are very large and the canal very short, complete success is not to be anticipated, the chief use of the operation in these cases being to make a truss effectual. If we turn now to the sixteen seton operations and the two of Wood's, the success is not less marked; though from the comparatively recent period at which they were

undertaken, and the small number of cases operated on, we cannot speak of them with the same confidence as we can of Wütz er's.

Of the eight cases of Professor Carnochan and Dr. Riggs, five were completely successful, two were still under treatment, and one was a partial failure, attributable, in Dr. Riggs's opinion, to the too great pressure of the pad of a truss placed over the new adhesions, though it seems there was a piece of omentum in the inguinal canal of the same side, which could not be returned, and the patient was sixty-three years of age. Of the remaining eight seton operations, five were successful; one was unsuccessful, and has been already related in a previous part of this work; one, also previously referred to, only failed to be completely successful through the ill conduct of the child; and the remaining one was undertaken on a patient affected with a direct hernia, and to whom therefore it was not adapted, and ought not to have been done. The two remaining cases, in which Wood's operation was performed, were both successful, notwithstanding each of these patients was affected with a violent cough during the progress of the treatment.

But it has been objected to all the modes of curing hernia radically, that although they may be free from danger, and may cure the original disease, yet they do not provide against a fresh protrusion by its side; now without absolutely denying this, I am decidedly of opinion that a patient who has been radically cured of a hernia is less

liable to a second protrusion, than one who has not undergone the operation. In all the cases that have come under my own observation, such a degree of thickening and consolidation of the parts in the neighbourhood of the inguinal canal resulted from the operation, as to be a material guarantee against a fresh protrusion; but independently of this, the objection seems to me, in face of the facts I have brought forward, if not absolutely puerile, certainly not more sensible than if one were to advise a sufferer from toothache not to have the offending tooth removed, because the operation will not prevent other teeth becoming similarly affected.

Having shown then, that the operations for the radical cure of hernia, as now practised, are both safe and efficacious, a few remarks on the best means of avoiding failure may not be out of place; and this subject may be considered under the following heads: the age of the patient—his state of health—the choice of the operation—the duration of the treatment.

The Age of the Patient. The only observations I would offer on this head are, that very young and very old persons are less eligible for the operation than those of an intermediate age. Without a child were very docile, I should not feel disposed to operate on him before six or seven years of age, or till he possessed sufficient intelligence to know what was for his good, and so to aid and not thwart the efforts of the surgeon. Nor should I, without very good reasons, undertake the operation on one

who had completed his threescore years and ten. The feeble reparative power at this age, and the slight causes which suffice to extinguish life at this period, are reasons sufficiently cogent to deter the surgeon from such an undertaking. I am not acquainted with the greatest age at which these operations have been done; Mr. Spencer Wells operated on a patient fifty-nine years of age, Mr. Jones of Jersey on one of sixty-three, Dr. Riggs of New York likewise on one of the same age, and myself on one of sixty-five, though it has been already stated the two last named cases were unsuccessful; in my opinion, however, from causes which were independent of the age. On the latter, must depend to a certain extent the duration of the instrumental treatment, a shorter period being probably necessary in the young than in the old. If we assume, for instance, that the average time the wooden plug, in Wützer's operation, should be allowed to remain in the canal to be seven days, then in an old man ten days would probably be required to produce the necessary amount of inflammation for a cure, though four days might be sufficient for a child. But on this subject I shall have occasion to say more presently.

State of Health. But few remarks are necessary, to prove that the nearer an individual approximates to the true standard of health, the better will he be capable of undergoing an operation, and the less will he be liable to suffer from any collateral risks. A person, therefore, who is already in the enjoyment of his accustomed health and who con-

siders himself well, will not require to undergo any preliminary treatment, beyond the exhibition of an aperient on the morning of, or the night preceding, the operation; this I think advisable, because it diminishes the volume of the intestines, and thus renders the wall of the abdomen more flaccid and the operation more easy of execution; it also anticipates any ill effects that might arise from the constipation which usually follows the operation.

The diseases which would seem more specially to contraindicate operative measures, are those which call into powerful action the expiratory muscles, as bronchitis, asthma, dysentery, stricture of the rectum or of the urethra, and so forth.

The Choice of the Operation. This is a point which has been too much disregarded by operators, yet upon its determination will depend the success or failure of our proceedings. This doctrine has not hitherto been broached in this class of operations; on the contrary, one surgeon practises one kind of operation in all cases, another another, and a third one different from the other two; now I have no hesitation in declaring, that whoever undertakes to cure radically the several varieties of inguinal hernia by any one of these methods exclusively, will fail to reap all the advantage which is attainable; and I fearlessly assert that that surgeon will be rewarded with the greatest amount of success, who does not rely on any one operation, but will make choice of that which seems best adapted to the case under consideration. I must confess that on first reading Mr. Wells's description of Wütz er's

method of operating, I was sanguine enough to believe that at last we had discovered a remedy for every variety of reducible inguinal hernia; but I soon found that its application was by no means so universal as I had been led to suppose, and taking all the inguinal hernias that came casually under my observation in hospital practice, at least one-third of the number were unsuitable for this operation. Among these, I would name, in the first place, all cases of direct inguinal hernia, which, according to the best statistics I can obtain, form about one-fifth of the total number of inguinal hernia cases; then came those cases with very large apertures and short canals, in both of which class of cases Mr. Wells admits we are not to expect complete success, but only so much as shall render a truss available; then, again, cases were met with in which the canal was so narrow and rigid, that the smallest of Rothmund's cylinders could not be inserted far enough to bring the aperture for the needle fairly within the external abdominal ring, without causing more pain than the patient could bear. Lastly, there were cases, in which, though the hernia appeared to be perfectly reducible and no fulness was apparent in the inguinal region, still, on introducing the finger into the canal, a something was felt there besides the cord which did not exist on the opposite side, and whether a small piece of adherent bowel or omentum, or a portion of thickened sac, or whatever else it might be, it did not seem prudent, in the uncertainty we were in regarding its nature, to

attempt any operation. Now assuming, for the present, that Wützer's is the best operation for two-thirds of all the inguinal ruptures that come under treatment, what is the proper operation for the remaining and exceptional cases? As far as my present experience extends, I should say that for all direct inguinal hernias, and probably for those oblique forms of the disease which so nearly resemble them by the size and shortness of the inguinal canal—for all those cases, in fact, in which Wützer's operation is confessedly unequal to effect a complete cure, Wood's principle, if not his exact method, should be adopted. Those cases, on the contrary, which are distinguished by the narrowness and rigidity of the canal, previously alluded to, would be best treated by the seton.

The last circumstance to which I shall allude, as influencing the result of our proceedings for the radical cure of hernia, is the *duration of the treatment.*

Mr. Wells names seven days as the time the wooden cylinder should be kept in the canal in Wützer's operation. Wood removed his block on the seventh day; in the operations that I myself have performed, the time of the instrumental treatment varied from the fifth to the tenth day. Riggs never keeps in his seton beyond forty-eight hours, but then it is previously dipped in tincture of iodine; while Armsby allows his thread to remain in for about two weeks. No absolute rule can, I think, be laid down on this point; but I am

disposed to consider a week, the average time the cylinder or thread should be allowed to remain in the canal, provided no chemical irritant is made use of; our object being to obtain such an amount of inflammation as will suffice for the obliteration of the hernial passages, and no more, and of this we must judge by the local and general symptoms present in each case. With regard to the duration of the after-treatment, and the degree of pressure that should be applied over the inguinal canal, a few remarks may here be offered. Wützer and Rothmund make very slight pressure the first day of the operation, in order to allow for a little swelling that is apt to arise, and the cover is examined daily to see that the pressure is moderate and at the same time uniform. After the instrument is removed, a moderate amount is kept up for three months afterwards by means of a very elastic truss, with a weak spring and large well stuffed pad. "If the pressure is too great, or the pad too small," observes Wells, "absorption of the plug may take place, and relapse of the hernia follow. If no truss be worn, the adhesions, which are still soft and yielding, might give way." Riggs likewise cautions us against making too much pressure. "It may be observed, in a large majority, if not in all, the surgical operations which have been practised for the radical cure of hernia, the truss, or its equivalent, acts a conspicuous part in the after-treatment; and though it is a well settled principle, and universally known and admitted by the medical profession, that continued

pressure upon the animal tissues causes absorption of the tissues thus acted on, yet it is a singular fact, that in their attempted explanation of the frequent failure to cure hernia by the different methods used, *pressure* is seldom or never mentioned by writers as a cause, whereas there is just ground for the belief, that *undue pressure* upon the recent formations has contributed its full quota of failures by the various operations practised."

My own impression is, that the pressure should be measured chiefly by the tendency of the rupture to escape from the cavity of the abdomen, and be just sufficient to prevent this and no more. In many persons, a hernia will go back of itself on the patient lying down, and will have no tendency to protrude while this position is maintained; in others, the contrary happens, and pressure is required even when the patient is in bed. In the first case, the pressure should be very slight, and be discontinued as soon as there is reason to believe that the new deposits have attained a sufficient degree of solidity to prevent the separation of the walls of the inguinal canal by the hernia. In the other case, more pressure, and that longer continued, will be necessary; indeed, in all cases where the hernial apertures are very large, and the tendency to protrusion correspondingly great, the treatment, both active and passive, must be more prolonged.

Having, I trust, proved that the modern operations for the radical cure of hernia are both safe and efficacious, and having pointed out what I be-

lieve to be the principal circumstances which either contribute to, or are likely to interfere with their success, it remains only to add, that the great mortality of persons affected with hernia, independent of the deaths arising from strangulation, is such as fully to justify the trial of any rational means which are calculated to reduce it; and my own opinions on this subject so entirely accord with those which have been so eloquently expressed by Mr. Wells, that I cannot do better, in bringing this little treatise to a conclusion, than adopt his own words.

"The relief of a strangulated hernia is justly regarded as one of the noblest triumphs of operative surgery. The surgeon saves the life of the patient without removing or deforming any part of the body. But the surgeon who cures hernia radically with certainty and safety, is a greater public benefactor, as he not only relieves large numbers of his fellow-creatures from suffering, and the inconvenience of wearing a truss, but he averts the danger of strangulation to which they are continually exposed, in a greater or less degree, through every period of life."

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