Original Articles.

THE RADICAL CURE OF HERNIA.¹

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At a period when the leading practitioners of medicine of the present day were just beginning their career, any operation for the radical cure of hernia was regarded with suspicion. Attempts had indeed been made by surgeons in good standing to remedy this affection by an operation, notably Wood, of London, but all methods were crude and based upon incorrect theories, and the dangers of sepsis were correspondingly great. Even as late as the eighties the operation was still in the hands of the pioneers and it was not until the beginning of the present decade that the subject may be said to have been placed upon the basis of a routine surgical procedure.

During this later period it has become an integral part of the hospital surgeon's work, and the laboring classes are beginning to appreciate the fact that the operation for a radical cure is pretty sure to be successful and a blessed relief from the discomforts and uncertainties of the truss. Old traditions, however, still prevail amongst the laity and even amongst a large proportion of medical practitioners. The patient who can afford to pay for it is still very generally advised by his physician to buy a truss. After an irksome apprenticeship he finally becomes broken to harness and accepts the discomforts of his new life as a matter of course. It is true that such advice is often followed by excellent results and in rare instances (the truss makers say in about 2% of the cases) a radical cure is effected. But in a very large number of cases the patient feels he has discharged his duty by buying a truss and putting it on — somehow — and there his responsibility ceases. The contents of the hernia are kept within the abdominal cavity part of the time, but at the end of a day's work are not infrequently found held securely in the sac below by the pad. In this way the hernia continues to grow until some complication brings both patient and doctor face to face with the situation.

It is for the purpose of endeavoring to impress upon the profession that the time has come when even the most conservative practitioner should revise his opinions as to the treatment of this disease, and should recognize the advantages of the operation for a radical cure, that this paper has been written.

The following series of 98 cases comprises both those operated upon in the Massachusetts General Hospital and in private practice between the years 1888 and 1900. It includes 74 cases of inguinal hernia, 7 cases of femoral hernia, 12 cases of umbilical hernia and 5 cases of ventral hernia. This includes all cases operated upon up to February 1, 1900.

Great pains have been taken to obtain the subsequent history of all cases operated upon over one year previous to the above date and answers have been received from 62 cases. In 4 of these reports death is stated to have occurred from other causes, the subsequent history of the hernial cicatrix being unknown. This leaves 58 cases from which to obtain definite information as to the question of recurrence.

A careful analysis of all the 98 cases has also been

made to determine the relative merits of the animal tendon, catgut and silk sutures and their probable bearing upon the permanent healing of the wound.

A separation of the cases into two groups — those in which the operation was performed between the years 1888–1894 and those between the years 1895–1900 — shows in a striking way the marked change which the improvement in aseptic technique has brought about in the prognosis of the healing of the wound.

	1888-1894	1895-1900	Total.
Clean	14	53	67
Septic	16	9	25
Clot evacuated	1	3	4
Drained	1	0	1
Doubtful	1	0	1
Total	33	65	98

It will be seen that prior to 1895 there were 33 cases operated upon, of which 16, or 48%, were septic; whereas, after 1895, of 65 cases operated upon, 9, or 16%, only were septic. The term "septic" includes all cases that did not heal by first intention throughout the wound, with the exceptions mentioned below. The slightest infection of a stitch wound would place it under the above heading. As a matter of fact there were but one or two cases in the whole series in which sepsis became a formidable complication, as is shown by the fact that in none of the 98 cases was there a fatal result.

The term "clot evacuated" includes those cases in which first intention was not obtained, not because of sepsis, but owing to the formation of a blood clot which prevented close approximation of the surfaces of the wound.

The healing of a wound by first intention depends, of course, largely upon the perfection of the aseptic technique, but in hernia especially the sutures become an important factor in the solution of this question. There is more or less tension in the wound at the time of application of the sutures, and this is increased when the patient is in the upright position. The tendinous character of the tissues bounding the lines of suture is not so well adapted to healing as softer and more succulent structures. For this reason surgeons usually have strong preferences for different kinds of suture material.

The following table is therefore submitted with a view to comparing the results obtained in groups of cases in which different kinds of materials were used for this purpose. The sutures were made of silk, catgut, animal tendon (kangaroo) and silkworm gut. In a few cases silk and catgut were used simultaneously and silk was also combined with animal tendon. Wire was also once used with animal tendon.

	Clean.	Septic.	Clot evacuated.	Doubtful.	Drained.	Total.
Silk	49	10	1	0	0	60
Catgut	15	12	1	1	1	30
Silk and catgut	1	3	0	0	0	4
Silk and animal tendon	1	0	0	0	0	1
Wire and animal tendon	1	0	0	0	0	1
Silkworm gut	0	0	2	0	0	2
Total	67	25	4	1	1	98

It will be seen from these figures that in the case of silk but 17% of the wounds were septic, but that in the case of catgut septic conditions were found in 40%.

Inasmuch as the great majority of ruptures were cases of inguinal hernia, it is, perhaps, more instructive to make a study of these in a class by themselves.

¹ Read before the Surgical Section of the Suffolk District Medical Society, April 4, 1900.

The operation employed in the majority of cases was that of Bassini, although Macewen's method was given a test in the earlier cases. The latter proved complicated and the life of the sac was endangered or destroyed by the quilted suture. After having the entire sac slough out in a case which bid fair at first to heal without sepsis I decided to abandon it. Bassini's method I arrived at by a gradual process of evolution, and found, when I reached a method which corresponded as nearly as possible with Nature's arrangement of the parts, that my operation was identical with that known as "the Bassini."

Studying now the causes of sepsis in these operations we find, first, that the period at which they were performed has materially affected the result. As one might naturally expect, the more favorable results were obtained subsequent to 1895. From 1888 to 1894 there were 10 clean and 11 septic cases, 1 of which was drained and healed by second intention, and 1 in which the clot was evacuated, making in all 23 cases. In the 51 cases which were done after 1895 there were 41 clean cases and only 8 septic cases. In the other 2 cases clot was evacuated. The suture also seems to show important differences in its influence upon the healing of these wounds. In 25 cases in which catgut was used there were 12 clean cases and 11 septic cases, whereas in 42 cases in which silk was used 37 were clean and only 5 were septic. Going back now to the series of 23 cases previous to 1895, we find that of the 11 septic cases catgut was used in 9. The 8 septic cases found in the group operated upon after 1895 are thus made up: 4 catgut, 3 silk, and 1 silk and catgut. Here the results are more nearly even and show the obvious better preparation of catgut than was done in the earlier period.

The above analyses seem to show pretty clearly that better results were obtained with silk than with catgut as suture material. The ease with which silk can be sterilized, its superior strength, and the greater facility in handling it are qualities which make it, in my opinion, far preferable to catgut. The disadvantages claimed for it by Bull and Coley are the slow absorption of the material and the danger of the suture working out through sinus formation long after operation. This complication was, undoubtedly, a common one in the early days of the operation, but a careful search into the records of those of my hospital cases in which the wound had healed by first intention, and their subsequent history, has failed to reveal such, and I have had no experience of this kind in private practice. It seems probable, therefore, that the improved methods of sterilization and the improved aseptic technique of the operation have reduced this danger to a minimum. It is also highly probable that the finest grades of silk are as easily absorbed as chromicized catgut.

Coming now to the question of recurrence, we find 58 cases in which an answer was obtained one year or over after the operation. Forty-five of these were cases of inguinal hernia, and in 7 relapse was reported. This gives 84% of cures. There were 3 cases of femoral hernia with no recurrence; 2 cases of ventral hernia with no recurrence, and 8 cases of umbilical hernia with 3 recurrences.

Comparing the inguinal hernias operated upon prior to 1895 with those since that date we find in the former case there was 69% of cures, and in the latter

92% of cures, showing that improved technique had an important influence upon the result. This is shown by an analysis of the causes of failure.

In septic wounds there was 35% of recurrences; in clean wounds, on the other hand, there was recurrence in 7.6% only of the cases. In cases sewed with silk the recurrence amounted to 9%, but in cases sewed with catgut it was as high as 30%. This difference between silk and catgut is shown still more strikingly if we compare the inguinal cases alone with one another. In 18 catgut operations there were 6 recurrences, or 33%, whereas in 23 operations in which silk alone was used there was no recurrence.

If we take now as a standard the operations for inguinal hernia performed since 1895, we find that the percentage of perfect results (92%) is nearly as good as that laid down by Bull and Coley in their last article in the "International Textbook of Surgery." These authors give 95% as a fair estimate of the cures in Bassini's operation.

The age which is most suitable for operative treatment is a point about which many surgeons differ. In children there is always the chance of cure by the truss. The percentage of cases cured in this way is vastly greater than in adults. After the age of twenty-one years the chances of cure fall to the very small percentage already mentioned.

The station in life is a factor of considerable importance. Children who have parents capable of exercising constant and intelligent care can be treated mechanically, but when the chances of such care are uncertain, or there are any complications, the operation had better be advised.

Bull and Coley state in a general way that fifty years is the age limit for operation in the adult, but hospital experience will hardly bear out this view. It is in hospital practice that we see a larger number of hernias, usually of large size, in individuals above this age. They are as a rule patients who are unable to afford a proper truss, or do not understand how to apply it intelligently. It is precisely in this class that an operation seems to hold out hope of great relief. The table here submitted shows that many are operated upon who had passed that limit, and the recurrences reported were all under fifty years of age.

Age.	Inguinal.	Other hernias.	Total.
0-10	4	3	7
10-20	13	3	16
20-30	15	0	15
30-40	13	5	18
40-50	8	8	16
50-60	11	1	12
60-70	2	3	5
?	2	1	3
Total	68	24	92

In 6 cases there were double hernias.

The following figures give the ages of the 7 cases of relapse reported: 43, 42, 38, 33, 27, 16 and 15.

Bull and Coley say: "If a rupture is sound at the end of one year after operation, there is a reasonable prospect of permanent cure, while if it remains well for two years, the chances of relapse are exceedingly small." An analysis of 38 "perfect" cases shows: 1 case was reported cured eleven years after operation; 1, nine years; 2, eight years; 2, seven years; 4, six years; 2, five years; 7, four years; 5, three years; 11, two years, and 3, one year after operation. In all the cases of inguinal hernia in which relapse was

reported recurrence took place within one year after the operation. It seems, therefore, reasonable to assume that if a patient continues well for one year he may regard himself as cured.

There are some points in the technique of the operation which experience shows worthy of mention. The sac, after being dissected from the cord, should be carefully emptied of its contents, and a continuous suture should be passed through the neck before the sac is excised. A ligature may slip and give rise to hemorrhage from some of the numerous vessels adherent to the outer surface of the peritoneum. The wound should be treated precisely like any other wound in the peritoneum. In some cases the sac is hard to find, but it should always be carefully sought for and removed, as this is one of the most important features of the operation.

When the omentum is small in amount it can be returned into the abdominal cavity, but when there is a large quantity of omentum it is more or less matted together and elongated at the point involved, and may become a source of danger when returned, being liable to form a band capable of producing intestinal obstruction or of facilitating a return of the hernia. There is little danger of hemorrhage if the various clusters of vessels which supply the part to be removed are tied separately. In very large hernia the amount of omentum removed is sometimes enormous; but such hernia, although they seem formidable to attack, present in reality no greater technical difficulties than the smaller hernia.

The sutures with which the skin was brought in apposition were silkworm gut in the majority of cases. This material can be used as an interrupted suture or as a continuous buried suture. The latter gives a somewhat more esthetic result, and theoretically is less liable to produce stitch abscess; but I cannot say that I have seen any special advantage in its use.

Great pains should be taken in the preparation of the skin before operation, as this is a region unusually hard to sterilize. I am in the habit of using the permanganate-oxalic-peroxide of hydrogen process, and of repeating the washings after the dressing has been removed at the time of operation.

Cases of large umbilical hernia are usually observed in stout, elderly women who have borne several children. There is then considerable danger of strangulation. At first these hernia contain only a small nodule of omentum, which acts as a sort of plug to the opening in the sac to which it is usually adherent. As the hernia grows, a knuckle of intestine is liable to be pushed into the sac behind the omentum after some unusual exertion, and this gives rise to an attack of colic for which the patient seeks relief. This pinching of the bowel occurs often, but in very large hernia strangulation is rare. Inflammation and suppuration may, however, be one of the complications of umbilical hernia. Permanent relief from colic is usually obtained by the intelligent adjustment of a truss, and in very fat or elderly patients it is better to try this form of treatment, as recurrence after operation is much more common in this than in other forms of hernia. I believe, however, that increased experience will bring with it a decision to resort to the operation more frequently. In 1 case I have succeeded in curing an enormously large hernia after the second operation. The time of election is in early adult life while these hernia are still small.

Umbilical hernia in children are almost invariably cured by the truss.

I have had 2 cases of congenital umbilical hernia into the cord.¹ In one case the contents of the sac was the liver, in the other a large loop of intestine. Both cases recovered from the operation and one was permanently cured. The other infant had a very small umbilical hernia when last seen, which will doubtless in time disappear.

Congenital inguinal hernia is not always healed by the truss. When a young man, in the neighborhood of twenty years of age, applies for treatment of this affection, the operation should be advised.

In non-descended testicle we find the organ usually in the inguinal canal, and the question arises as to whether or not it should be removed. The patient usually objects strenuously to the removal of the organ, and there is no particular harm in leaving it, but after operation it usually atrophies and slowly disappears. These hernia should not be operated upon in youth, as the testis may eventually descend into the scrotum, and the hernia disappear.

I wish to express my indebtedness to Dr. R. B. Greenough for the preparation of the statistics of these cases.

ACTINOMYCOSIS.¹

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At this session last year several cases of actinomycosis were reported by different surgeons. Increased interest has been aroused on the subject by a very thorough analysis of all the American cases by Dr. John Kulrah, of Baltimore, in the second volume of the *Annals of Surgery*. In that article 62 cases are reported, and 5 more added in a subsequent appendix.

Since the last meeting here, 11 cases have been found at the Massachusetts General Hospital, 1 of primary rib or lung disease, with general actinomycotic pyemia—in this instance the diagnosis was only made at autopsy—and 10 of the maxillary form of the disease. Drs. Homans, Mixter and Balch, 1 each, and 6 of mine were all discovered in the Out-Patient Department. The fact that these 6 cases occurred within three months, and 4 within a week, is, I think, sufficient evidence that the affection cannot be a rare one among us, and that many cases are overlooked.

I will limit myself to the maxillary form, and briefly speak of the histories of these cases.

Though actinomycosis has been considered a relatively rare disease, it seems more probable that it is one which is very commonly overlooked. In its clinical aspects there is little that is characteristic. Though the course of the infection may make the surgeon suspicious, examination by microscope and culture is essential for a positive diagnosis.

The object of this paper is to attract your attention to the possibility that a proportion of the cases ranking as alveolar abscesses may be due to this specific organism, and by a few briefly reported cases to give you an idea of the disease as it affects the mouth, jaws and neighboring regions in man. Statistics of the relative frequency of this disease are really of little

¹ Read before the Surgical Section of the Suffolk District Medical Society, April 4, 1900.

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