A Clinical Lecture

ON A CASE OF HERNIA STRANGULATED IN THE FORAMEN OF WINSLOW:

AND THE
TREATMENT OF GREATLY-DISTENDED SMALL
INTESTINE.

DELIVERED AT THE BRISTOL GENERAL HOSPITAL.

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GENTLEMEN,—The form of internal hernia, an instance of which I am about to describe—hernia into the foramen of Winslow—is a very rare form. There are only about a dozen cases on record (one was reported by Mr. Carwardine in the Infirmary last year), and there is only one successful case of operation for strangulation in this hernia. My own case was unfortunately not successful, but all the symptoms of strangulation were relieved by the release of the strangulated bowel from the foramen, and the patient seemed almost certain to recover, when, seven days after the operation, he died a few hours after developing serious symptoms, and we found *post mortem* some pelvic peritonitis, due to leakage at the attachment of the opened bowel to the parietal peritoneum, into the pelvic cavity. This certainly did not seem sufficient to cause his death, for he was a strong, middle-aged man, but nothing else was found *post mortem* that would account for it.

Mr. W. was seen in consultation with Dr. Burroughs at 12.30 on Tuesday, October 6th, 1908.

History.

Directly after defaecation, about 9 a.m. on the previous Sunday, pain in the central and lower parts of the abdomen came on, and continued. It was paroxysmal and severe. Vomiting commenced the same evening, and had been frequent from that time. The vomit consisted of bile and watery fluid. No flatus had been passed since the onset of the pain, and only a very little hard motion had come away after an enema, and nothing after the administration of purgatives.

Condition on Examination.

The abdomen was moderately distended, and slightly tender just to right and below umbilicus, but not rigid. There was marked intestinal splashing. Nothing made out on rectal examination. No distended coils were seen. There was no history of any previous attacks. Dr. Burroughs told me he had not found his temperature raised above 99° at any time. Pulse was 88 and good strength. There was no external hernia. The symptoms of acute intestinal obstruction (mechanical) were thus obvious and the need for coeliotomy clear.

Operation.

He was admitted to the General Hospital in the afternoon, and I operated at 4 p.m. On opening the peritoneal cavity considerable amount of blood-stained fluid escaped. The last two feet of the ileum were empty, but all the rest of the small intestine was red and greatly distended. On tracing the empty bowel I found it passed through a hole in some fixed structure, which from its position I thought must be the foramen of Winslow; but my incision did not allow me to see it. I drew out the intestine without much difficulty, and found I had withdrawn the junction of empty and distended gut, and on the latter was a groove of constriction.

The distension of the small intestine was so great I did not like to trust to spontaneous evacuation. I tried first to force on the contents through the empty coil into the large bowel, but could make very little progress. So I clamped off a few inches and tied in a very small Paul's tube. Through this, by a kind of "milking" of coil after coil outside the abdominal cavity, I was able to evacuate the intestinal contents in a moderate time, and replace the intestine within the abdomen in a nearly empty condition. The coils of intestine whilst outside the abdominal cavity were as far as possible covered with a sterile towel wrung out of quite hot saline solution. I finally fixed the portion of bowel into which the Paul's tube was inserted to the parietal peritoneum by several fine thread sutures, and closed the abdominal wound around it. A very thin rubber tube conveyed intestinal contents from the Paul's tube into a bottle. The pulse ran up to 140 during the operation and remained at that at the end, but it was a pulse of fair volume and strength.

After-history.

On the following day, October 7th, my note says that there had been no vomiting since the operation (not even anaesthetic vomiting), and that his abdominal pain had ceased. Some liquid faeces had discharged through the tube. His pulse was good. Some moderate distension, with slight abdominal tenderness, was present. On the 8th his condition was much

the same. On the 9th he had much pain in the right loin, removed by $\frac{1}{2}$ grain morphine. There was no vomiting, and his pulse kept good. On the 11th the abdomen was flat and not tender. On this date I noticed that his Paul's tube had not separated, but at one spot the parietal peritoneum, where it had been sewn to the bowel around the inserted tube, had sloughed and left a funnel-like opening into the peritoneal cavity—that is, amongst some coils of intestines. This space seemed well shut off by intraperitoneal adhesions. However, I packed it with a little iodoform gauze. On the 12th the Paul's tube began to separate and was removed. The bowels were acting freely through the artificial opening and slightly per anum. On the morning of the 13th he complained of pain in the lower abdomen. There was no vomiting. He did not complain of this later in the day, and his pulse kept good. In the evening he was reading the newspaper. There was no pyrexia. But at 10 p.m. the night nurse noticed he was lying partly uncovered, and he must have looked worse, for she felt his pulse and found it very bad; and by 3 a.m. he was dead. It was almost like a sudden death, in a man apparently doing fairly well.

Necropsy.

The *post-mortem* examination showed that the union of the open bowel in the wound to the parietal peritoneum was easily broken down, and that leaking had occurred at the funnel-shaped opening referred to in my note of the 11th. The intraperitoneal adhesion around this had not been firm, and infection of the pelvic peritoneum had taken place. There was a little lymph on a few coils of bowel around this, and an extensive pelvic peritonitis extending from it, but the rest of the peritoneal cavity was free from inflammation. The heart muscle was not degenerated, nor was there any other form of cardiac disease. It was evident that the intestine must have been strangulated in the foramen of Winslow, for there was no other opening in which it could have been gripped. A careful search was made for such openings in the region of the duodeno-jejunal junction and elsewhere. The foramen of Winslow easily admitted one large finger—that is, it was about the usual size, but very often it is hardly open, as it was in this case, and is more of a slit, and in some cases it is closed by adhesion. In some of the cases of hernia into the foramen of Winslow some abnormality of the mesocolon or mesentery has been observed. Nothing of this kind was noticed in this case, but I did notice that it seemed quite easy for the small intestine to reach the oramen: possibly the mesentery may have been unduly long.

The most recent and exhaustive account of retroperitoneal hernia with which I am acquainted is in Mr. Moynihan's book on the subject, the second edition of which was published in 1906. In Sir F. Treves's work on intestinal obstruction you will also find very interesting information on the subject. As you can consult both these works, I will only very briefly refer to the subject.

Either the large or small intestine may be herniated through the foramen of Winslow, and when it has passed into the lesser sac of the peritoneum it may pass out through a rent in its wall, either the gastro-hepatic omentum or the transverse mesocolon, and in one case it was strangulated not by the foramen of Winslow, but by the rent in the transverse mesocolon. The symptoms are those of any form of strangulation of the intestine, with possibly the addition of a resonant swelling in the upper abdomen if a large amount of bowel is herniated into the lesser cavity of the peritoneum. In one recorded case the symptoms were those of subacute obstruction, the gut not being strangulated. Curiously enough, in this case it was impossible at the operation to reduce the large amount of intestine which had passed through the ring, but spontaneous reduction occurred soon after. That has been the difficulty in many of the cases of strangulation. It was so in Treves's own case. The ring is bounded by such important structures that it cannot be divided. Moynihan suggests that the difficulty of reduction may be due to the formation of a volvulus within the lesser sac of the peritoneum, and advises that a free opening into the sac shall be made through the gastro-hepatic or gastro-colic omentum, and that any volvulus should then be untwisted, and, if that is not enough to enable the surgeon to reduce the hernia, that the distended coils should be opened and their contents evacuated, and the opening sutured. Fortunately, in my case there was not the slightest difficulty in withdrawing the small strangulated coil of bowel. The only case of recovery after operation for strangulation in the foramen of Winslow is Delkeskamp's case.² The hernia was a very large one, and consisted of both colon and small intestine. The lesser sac was freely opened, and the contents of the herniated colon was expressed into the colon outside the ring, and thus it was possible to reduce the hernia.

As I have already stated, I noticed nothing abnormal about the intestines in my own case beyond the strangulation.

The foramen easily admitted a fairly large finger. In one recorded case there was a common ileo-caecal mesentery; in another the caecum was "undescended." The following conditions have been suggested by Moynihan as likely to allow of the hernia: (a) A common mesentery for the whole of the large intestine; (b) absence of the secondary fusion of the ascending colon to the posterior abdominal wall; (c) abnormally large size of the foramen of Winslow; (d) abnormal length of the mesentery and consequent undue mobility of the intestine.

In this case, when I had withdrawn the strangulated bowel from the hernial opening, I had removed the mechanical obstruction; and you may ask: Why was I not content with this? Why did I not leave the intestine to empty itself in the course of time? Probably it would not have emptied itself. The obstruction might have persisted though the mechanical obstruction of strangulation in the ring had been removed. When small intestine becomes greatly distended, it may fail to contract, because it is paralysed, and it may be unable to empty itself even if it can contract, because of the kinks in its course, due to the sharp curves of its over-distended, waterlogged coils. You must not think of distended small intestine as presenting gradual round curves along which the intestinal contents can easily pass, but of intestine with very sharp curves, with the coils pressed together, within the confined peritoneal cavity, by their own distension, and heavy with fluid contents. You will then understand why the gut may not be able to empty itself after the removal of such an obstruction as strangulation in a ring. Fortunately, in herniotomy, when the strangulating ring is divided and the bowel returned within the abdominal cavity, in the great majority of cases the bowel does empty itself, for operation is done before great distension has had time to come on, and, of course, in a case of internal strangulation, operated on early, there would be no need to empty the gut. But, if you relieve the obvious mechanical obstruction and leave greatly distended intestine within the abdomen, your operation may fail to relieve the patient. This is well recognized by surgeons. It may, however, be a difficult matter to decide how distended the intestines must be before we need empty them—that is, what condition of distension Nature can deal with. I will give you some details of a case under my care, some weeks before I operated on this case of hernia into the foramen of Winslow, which will impress on you the inability of Nature to deal with much-distended small intestine, due to such an obvious mechanical obstruction as strangulation under a band may cause.

The patient was a man 65 years of age, whom I saw in consultation with Dr. Cook and sent into the hospital and operated on on August 22nd last. I found the small intestine strangulated under a band, a short distance from the ileo-caecal juncture, and the intestine on the proximal side of the obstruction considerably distended. However, it seemed to me at the time of the operation that the distension was not so great that the bowel could not slowly empty itself, and I therefore contented myself with pressing on some of the contents of the over-distended bowel into the empty coils, and did not make any opening for evacuation of intestinal contents. But faecal vomiting persisted and the distension increased. Twenty-four hours later I again opened the abdomen—as at the first operation mainly under stovaine spinal anaesthesia—and fixed a very small Paul's tube into the lower ileum, and almost emptied the intestines through this, in the same way that I did in the case of hernia into the foramen of Winslow. Even this did not relieve the symptoms, for next day offensive vomiting again recurred, and more distension than before. I removed the Paul's tube and passed a soft rubber tube as far up the gut as I could. This did not evacuate any intestinal contents, but a spontaneous evacuation of gas took place just after and the distension lessened.

I passed the stomach tube and removed 2 pints of what looked like bile, but was rather offensive. He did not vomit again, but no faecal discharge took place from the opening in the bowel for another forty-eight hours, and then the abdominal distension subsided; but by this time his strength had failed, and he died four days after the first operation. The *post-mortem* examination showed the upper jejunal coils still very greatly distended. The more

distal coils down to the original seat of strangulation were very dark and loosely adherent.

You very likely think that, if a case of mechanical obstruction of the bowel is operated on, the obstruction removed, and the bowel, if strangulated, is not too severely damaged to recover, the patient will do well, provided he has strength to stand the shock of the operation. I wish it were so. One of the great terrors of the surgeon is great distension of the small intestine. One of the most experienced abdominal surgeons of the past taught us how hopeless it was to leave a patient with greatly distended intestines, even though a mechanical obstruction had been removed. How best to deal with that greatly distended intestine is the problem which I have very anxiously considered, and about which I have something further to say. First, however, let me give you another example of the difficulties you may meet with in the treatment of this condition.

A boy, 12 years of age, was sent to me by Dr. F. Peake at this hospital on March 7th, 1902, with a greatly distended abdomen. I operated at once, and found all the coils of small intestine red and greatly distended, and removed a perforated appendix, and evacuated an abscess in connexion with it. The suppuration was quite localized. As the distension increased after this operation, I opened the abdomen again forty-eight hours later, and found there was a definite mechanical obstruction from matting in the wall of the abscess. Greatly distended and empty bowel joined in the matted segment. I released the adherent coils, and then evacuated the distended intestine, as I did in the case of hernia into the foramen of Winslow, but I did not use a Paul's tube, but evacuated the intestinal contents through a minute incision which I afterwards sewed up. The next day the distension was again very great. I applied cocaine to the sewn-up wound, removed some stitches, sutured a distended coil lying beneath to the skin, and punctured it with an aspirating trocar cannula. One rush of gas occurred, but nothing further, and the distension persisted. Nothing further escaped even after an interval. Clearly only one coil had been emptied up to the next kink above it. The boy died, and the *post-mortem* examination showed that this was so. It also showed that no mechanical obstruction persisted other than the kinks in the distended coils.

Although it is generally agreed that greatly distended small intestine cannot always—perhaps generally—empty itself, yet it has been frequently urged that the right thing to do is to make an opening in the distended bowel through which it may gradually empty itself—to fix a coil in some way in the abdominal wound and drain it. But what can we expect to gain by this? If the bowel is paralysed and kinked, and therefore cannot empty itself, how are you going to overcome these difficulties by making an artificial opening in it? The only way in which it is conceivable such an opening could help would be this. The empty coils within the abdomen, into which the contents of the over-distended ones would have to be discharged, would be under pressure within the peritoneal cavity, and it might not be as easy for the over full coils to empty into them as through a direct external opening.

But there is a fallacy here: By making an external opening you may immediately empty one or two coils (probably only one): now that empty coil also lies within the abdomen subject to the pressure of the surrounding over-distended coils confined within the abdominal cavity, just as the empty coils below the seat of removed obstruction do, and it will therefore be as difficult for the distended bowel to empty itself into the coil as into the empty ones below the level of obstruction.

But if you have a direct external opening, what reason have you to expect that the partly paralysed and kinked gut will be able to empty itself through it? In one case I have related to you I brought a distended coil to the surface and opened it, and gas came out with a rush and the distended coil collapsed, but the coils above remained over-full and kinked just as if I had made no external opening at all. Again and again I have turned greatly distended coils of small intestine out of the abdomen, and opened a coil, but one never sees the one opening empty more than the one coil, up to the next kink above it. Yes, but you may say, you cannot expect coils of intestine protruded from the peritoneal cavity, even if covered up by a towel wrung out of hot saline solution, to contract and

empty themselves coil above coil, as they might do within the abdomen when anaesthesia has ceased. But even within the abdomen, I know from experience, they may not be able to empty themselves. Think of the pressure to which all those distended coils are subjected within the abdomen; how tightly they will be packed together, how waterlogged and kinked they will be—the more kinked the tighter they are packed together within the abdomen. If you try to return prolapsed, greatly distended coils within the abdomen you will then realize the tightness of this intraperitoneal packing. If you wish to make sure of getting your over-distended intestine empty (or nearly so) there is only one way of doing that, and that is to empty it yourself. You must turn the distended coils out of the abdomen, cover them with frequently-changed sterile towels wrung out of hot saline solution, make an opening in the distal end of the distended bowel, and then by passing the whole length of the intestine through your thumb and finger, empty it coil after coil. You must not begin at the proximal end or you will get too much fluid concentrated into the middle coils. You must first empty several coils near the artificial opening, and then work from nearer the proximal end into these. Finally you start at the proximal end and work all along to the opening. It is by no means easy to anything like empty the gut, though it is easy to get away a great quantity of fluid and gas. There is a constant tendency for the contents to escape your finger pressure and to pass backwards. It is therefore well to follow up the evacuating thumb and finger of one hand by the thumb and finger of another used as a sort of travelling clamp, or an assistant can take this part of the work. Rubber gloves, instead of being a hindrance, are really a help in evacuating the gut in this way—"milking the gut," as it is sometimes called—for they let the bowel slip through without the slightest friction. I have tried forcing the contents of the distended coils into the empty (and usually contracted) coils. It is easy to fill these up, and perhaps in time one might succeed in forcing the contents of the distended coils on through them into the large intestine, which could then be stimulated to empty itself by the administration of a hot turpentine enema. But it is a very slow and imperfect method, and I have never been able to get a sufficiently satisfactory evacuation of the distended intestine in a reasonable time by it.

But unfortunately all this manipulation of the gut is just the very thing most likely to bring on shock; indeed, the turning out of the intestine alone is likely to do this. We may then return the intestines empty within the abdomen, but the patient may speedily die from shock. If the patient is in a condition of collapse at the time of the operation, it is, it seems to me, useless to attempt it, for we shall only hasten the end by the shock produced. But if the pulse is fairly good I think it is the right thing to do. That it is the only way in which we can satisfactorily deal with greatly distended, partly paralysed, and kinked small intestine, I feel convinced, and I pointed this out in a letter which I published in the *Lancet* of April 11th, 1903. If you have greatly distended large intestine, every one knows it is quite enough to make an artificial opening, and it will empty itself. It does not lie in a series of loops which form kink after kink when over-distended and subjected to pressure. However distended the colon may be behind a mechanical obstruction, if you make an artificial opening it will empty itself in a reasonable time, and generally very quickly. This makes me sceptical whether over-distended small intestine is really paralysed, or even partially; whether it is not wholly a question of kinking at its flexures.

I have in this lecture spoken of it as paralysed, for this is the generally received view, and we might expect intestine as obviously congested as such distended intestine almost always is, to have its muscle contraction somewhat interfered with, at any rate. And when we do colotomy for a growth in the sigmoid, we must remember that the process has been slow, and there has been time for hypertrophy of the muscle of the colon to take place. Still, I must say it seems to me that if great distension can so little paralyse the large bowel, it is a question whether it can to any extent the small.

I have so far said nothing about the kind of opening that should be made in the bowel for the purpose of evacuating its contents. This must be so arranged that

there will be a minimum risk of soiling the peritoneum. I used to get an assistant to take a coil of bowel, and hold it over a basin well away from the other coils, isolate it and his hands with a towel, nick the gut, and let the contents flow out, then clean it up, and sew up the opening. I now adopt what I think is a safer method. I clamp a few inches of gut, and fix into this a very small Paul's tube, less than $\frac{1}{2}$ in. in diameter. To this tube several feet of very soft light rubber tubing, as thick as the rubber of an operating glove, is attached, and, as all the intestinal contents are conveyed through this to a receptacle removed from the area of operation, there is no risk of infecting the intestines, provided the gut and the hands are cleaned well after inserting the Paul's tube. A Carwardine's tube could, of course, be used for the same purpose if it was determined to remove it at the end of the evacuation and close the opening, but I prefer Paul's tube myself. But it seems to me a question whether one is wise in closing the opening. The condition of the intestinal wall is not the best for repair, and the stitching will take up time at the end of an operation already too long for the patient. My own feeling at the present time is that it is perhaps better to leave in the Paul's tube, and sew the coil to the parietal peritoneum in closing the wound. The faecal fistula thus formed ought to close before long with no mechanical obstruction on the distal side of it. If, however, the distension of coils only involved the upper portion of the small intestine, and the opening had to be near the middle, I should not make a faecal fistula so high, but would rather take the risk of leakage at my junction, and remove the Paul's tube and sew up the opening. Unfortunately in the case which I have made the subject of this lecture, even fixing the gut to the parietal peritoneum did not lead to a firm union at the end of several days, and leakage into the peritoneal cavity occurred. It was particularly disappointing, as the patient had really recovered from the obstruction.

We must realize that, given great intestinal distension in the small intestine in association with mechanical obstruction, the condition will be a very difficult one to deal with, and that its treatment will involve fresh perils, and that if the condition of the patient is such that obviously shock must be fatal, our chance of effectively dealing with it is small. I have not forgotten the use of spinal anaesthesia by stovaine in such cases. Anaesthesia of the upper abdomen by this method is always uncertain. It has seemed to me in some of my own cases of operation within the abdomen to prevent shock, and also in reports I have read of others (Mr. Barker's and others); yet it seems as if it did not wholly abolish shock in all cases, for I have been told by some one watching the pulse in some cases during my operation that it has shown signs of failure when I have been dragging on the abdominal viscera, though the patient felt no pain. How this can be I must leave the physiologists to explain. If the spinal cord is absolutely locked to sensory impulse, how can any impulse be conveyed to the vasomotor centre in the medulla, which would paralyse that centre? I think it will be wise to use stovaine spinal anaesthesia in these cases of marked distension and bad pulse, if the pulse is not so desperately bad as to make such an operation unwise, for even if it only acts on the lower two-thirds of the abdomen it may do very much to reduce shock in evacuating the intestine, even though a little general anaesthetic is required as well. In one of the cases related to you to-day you may remember I used it, but a little general anaesthetic was required as well. There was no serious shock in this case, though manipulation of intestine was considerable.

I have said that I think the only satisfactory way of dealing with the greatly distended, kinked, (?) paralysed bowel is to empty it at the time of operation. But alas! this is not always successful, even when it does not induce fatal shock. I have given you two instances in which the great distension present before such evacuation returned directly after, and vomiting also returned. Why should this be so? It may be that the manipulation of the gut sets up a very mild peritonitis (non-septic), and that to this is due the secondary distension. Adhesive peritonitis was found in both the cases, that is, a degree of peritoneal inflammation causing adhesion but no lymph or pus exudation. This condition was quite marked in the case of the elderly man who had had strangulation, but my

note of the boy only says that "the coils of small intestine had a tendency to adhere together."

The difficulties, then, with which the surgeon has to contend in dealing with the greatly distended small intestine are many. If he only makes an external opening, the kinked and (?) paralysed bowel may not empty itself; and if he empties it at the time of the operation, his manipulations may lead to fatal shock; or, if they do not, the intestine may soon fill up with gas and the obstruction continue. In the face of all this discouragement, what is the lesson to be learnt? I think it is the absolute importance of operating early before great distension can set in, and of operating in acute appendicitis before mechanical obstruction from matting around the diseased appendix can occur. One surgeon of large experience in abdominal surgery has recently written: "The surgery of acute obstruction is disheartening work," and that the mortality is far larger than it ought to be owing to delay in operation.

I have been speaking about greatly distended small intestine in mechanical obstruction. If due to peritonitis, I think the treatment must be the same and the risks will be the same. The uselessness of simply making an opening in a distended coil and expecting all the other over-distended coils to empty themselves through it, seems, if anything, more evident when the whole bowel is inflamed than when it is not.

I do not wish you to think that I consider that it is useless to open distended small intestine without oneself emptying the bowel by a manipulation in every case. It depends on the degree of the distension. There are some cases of mechanical obstruction in which this is the right thing to do. Not long ago I had to do colotomy for a large, fixed, irremovable cancer of the lower colon, and a few months later the man got further obstruction from fixation of small intestine to the mass. In this case, knowing I could not deal with the cause of the obstruction, I brought out a coil of small intestine and fixed a very small Paul's tube in it, and relieved the obstruction in this way. But, if this man's small intestines had been enormously distended and kinked, I do not believe they would have discharged their contents through the opening.

There is just one other matter to which I should like to call your attention. Some surgeons have recommended that we should empty the distended coils by pushing a long rubber tube into them, through the incision made for drainage (I am not now speaking of the method advocated by one surgeon of drawing many feet of small intestine on to a glass tube at the time the intestines are all exposed during the operation); but how can he expect to succeed in passing such a tube through coil after coil of kinked, overlaid small intestine? It is interesting that the recommendation has been made, because it implies the recognition of the fact that simply to open distended small intestine may not be sufficient to drain it. But I have proved in the *post-mortem* room how, instead of passing from coil to coil, the rubber tube simply coils up when it meets with the obstruction of the bend, as one might expect. You may think it curious that, if I have no faith in the use of a rubber tube, I should actually have used it in one of the cases I have recorded. I only used it to clear the coil just beyond the opening and had no hope of its doing more.

REFERENCES.

¹ Hernia into the Foramen of Winslow: Laparotomy; Recovery. A. Neave, *Lancet*, May 28th, 1892. ² Beiträge zur klinischen Chirurgie, lvii, No. 3, 644.

THE AFTER-RESULTS IN A SERIES OF OPERATIONS FOR THE RADICAL CURE OF HERNIA.

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FOR some years I have paid particular attention to the subject of hernia, especially in regard to its etiology, and the more I study the question the stronger is my belief that the essential cause of all ordinary abdominal herniae is a congenital defect, the presence of a peritoneal diverticulum.

In several communications I have advanced evidence in favour of the sacular theory of hernia. I have pointed out how the same types of sac are met with in the infant and in

the adult, how clear the distinction is between the sac of a congenital and that of a traumatic abdominal hernia, and how impossible it is in the case of an inguinal hernia in an adult to distinguish between the so-called "acquired" and the congenital sac.

I have also considered the question from the point of view of comparative surgery; but perhaps the strongest point I have hitherto made in favour of the sacular theory was that, in 200 consecutive *post-mortem* examinations made upon persons in whom during life there was no history or evidence of hernia, in 47 bodies 68 peritoneal diverticula were found either in the inguinal, femoral, or umbilical regions. In many cases the diverticula were bilateral, and in one case occupied both femoral and both inguinal canals.

I now propose to bring forward clinical evidence in favour of the congenital origin of hernia by directing attention to the after-results in a series of operations performed for the radical cure of hernia upon persons whose ages varied from 1 month to 72 years. I have selected the years 1905-6-7 because during that time I adopted the same principle in operating, and also because the cases have now undergone a fair time test. I do not say all these cases are certainly cured, but as over 80 per cent. of recurrences take place during the first twelve months following operation, it is reasonable to believe that the vast majority of these persons have been permanently cured.

The figures include every case of hernia I operated upon during that period, whether in hospital or in private practice, except cases in which the bowel was strangulated.

I have been at considerable pains to ascertain the after-results, and as this is the chief point in the present communication I may say that any bulging at the site of operation was regarded as a recurrence; and, further, that in almost every instance the examination of the patient was made in the presence of other medical men.

In the accompanying tables (p. 645) I have grouped the cases according to the age of the patients at the date of the operation, and it is at once seen that up to middle life the probabilities of a complete and permanent cure are considerable.

As to children under 10 years of age, it is now so generally recognized that a radical cure follows complete removal of the sac that it is unnecessary for me to dwell upon the results obtained in this series, except to draw attention to the mortality, which, I regret to say, has been far too high.

One child, 4 months old, was operated upon in the summer of 1905, and died a week later from diarrhoea.

Another child, 2 years old, died two days after operation from delayed chloroform poisoning.

The third case, a child of 3 months, died suddenly and altogether unexpectedly two days after operation. No definite cause for the child's death could be discovered at the necropsy.

Although these deaths should certainly be attributed to the operation, still I am glad to be able to say that in no case was there anything wrong with the wound.

METHOD OF OPERATING.

As in the case of the adult patients the operations performed for inguinal, femoral, and umbilical hernia differ in some important respects from those generally adopted, I will describe them under the several varieties of hernia.

Inguinal Hernia.

Everybody is agreed, and for a great many years everybody has been agreed, that it is very important to completely remove the sac, and I have not the least doubt that any and every surgeon who has ever operated for the radical cure of inguinal hernia is perfectly satisfied that he did completely remove the sac. I very much doubt it. This is a matter of very great importance, for I am quite sure that the chief cause of failure after operation is incomplete removal of the sac. In examining patients in whom hernia has recurred I have been at once impressed by the position of the scar. The skin incision had been made far too low—in fact, it encroached upon the scrotum, and did not extend upwards further than the external abdominal ring. Through such an incision it is impossible to excise the sac completely. The lower end of the skin incision should not extend more than $\frac{1}{2}$ in. below the