is, that scarcely any food shall have been taken during the entire attack.

3. To pierce the coil exactly at its most convex part. The abdomen should be carefully watched for some time at every visit, and especially before the operation. In some cases, where the walls are thin, the outlines of various coils may be traced even in repose; but this will be more distinct when peristalsis is provoked by pressure, friction, or manipulation of one kind or another; it will be seen also which coils shift and which keep the same position when contracting. The spot chosen for the puncture should be as nearly as possible over the centre of a coil which does not roll about, and by preference in the *linea alba*. If the needle happen to hit the line of contact between two coils, it may tear both.

4. To exercise great care and patience during the escape of the gas. The needle should be held lightly, but rather firmly, perpendicular to the abdominal wall, and should not be allowed to follow too readily any movement of the intestine. Under the circumstances of obstruction, the respiratory movements are not great. As the gas escapes from the coil selected for puncture, it will collapse under pressure from neighbouring coils, and the flow through the needle will cease; very soon, however, the air in the intestine will distribute itself and enter the empty portion, when it will again escape. This may be aided by gentle manipulation and pressure; but they should not be hastily resorted to: nothing is gained by hurry. Should the tube get blocked, aspiration may free it; but it is safer to drive a little air through the tube into the bowel than to exert powerful suction, which may draw the mucous membrane against the sharp needle.

It is better not to put on a bandage after the operation.

Puncture of the intestine can relieve obstruction only very rarely, and under exceptional circumstances. In the case related, in which there was reason to suppose that the cause of obstruction was external to the bowel, and was due to pressure by the tumour, or by adhesion, or to displacement and dragging of a portion of intestine, it was hoped that removal of distension might permit the parts to return to their previous condition and situation; and other conditions may be imagined in which this might occur, but it could have no effect on a stricture or intussusception. My own experience, however, would lead me to recommend puncture as a palliative; and, though I have no experience to guide me, I should think it might be an useful preliminary to inflation, manipulation, suspension head downwards, or other procedures in intussusception, twisting, or imprisonment of the bowel by adhesions.

A CASE OF ACUTE INTESTINAL OBSTRUCTION BY A BAND: OPERATION: DEATH TEN DAYS AFTER.

WITH REMARKS ON THE TREATMENT OF SUCH CASES.*

By W. H. A. JACOBSON, M.B., F.R.C.S.,
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J. M., AGED 46, was admitted into Guy's Hospital, under Dr. Mahomed (for Dr. Fagge), August 17th, 1878. On rising this morning, he was suddenly seized with colicky pains in the abdomen; these rapidly became most acute. Vomiting began soon after the onset of the pain. The bowels were open on the morning of the attack; the motion was scanty. He stated that he was perfectly well up to this morning. There was no previous "abdominal" history, save an occasional "liver attack" while in India some years ago. His work was recently very heavy.

During the first six days after admission, the pain gradually grew less and less; and the vomiting being stopped, but the bowels not open, a tentative dose of castor-oil and laudanum was ordered by Dr. Mahomed, on the supposition that the acute symptoms having passed away, the case would clear up as one of colic. On the morning after this gentle aperient, the bowels were open once, the motion hard and scanty; the severe pain and vomiting now at once returned. The case was then treated with opium and belladonna, but without real relief; and on August 25th, or on the ninth day, I was asked to see the patient by Dr. Mahomed, who considered that surgical interference would be ultimately required, and that, to be successful, it should be made use of early. I found the patient with very severe distress expressed upon his face; the abdomen but little distended; the abdominal-walls somewhat rigid; severe pain, localised just to the right of the umbilicus; frequent vomiting of greenish, not stercoraceous, fluid; evidence of slight, but distinct, swelling in the right iliac region, where there was a patch of dulness on percussion, just above the centre of Poupart's ligament; there was no œdema here, and there had been no shivering throughout, nor any rise

of temperature save once (99.8°). Two utensils were shown to me, partly filled with faecal matter, which had come away a few hours previously after a soap injection, ordered by Dr. Mahomed; the motion was not unlike in character to a typhoid stool, ochrey yellow in colour, liquid, with a few small lumps in it. From the fact that part of it contained recently discharged bile, it was clear that some at least had come from high up in the digestive tract, and in all probability had passed through the point of strangulation. There was no external hernia, and the rectum to the finger was empty and normal. I gave, as my diagnosis: "The symptoms point to some form of acute, but incomplete, intestinal obstruction, possibly a band or some partial nipping, but not complete strangulation of the small intestine."

During the next three days (the ninth to the twelfth of the attack), the bowels were open at least six times, three or four of these motions being copious, loose, and light-brown in colour. But at this time, or on the twelfth day, the vomiting returned, and now rapidly became stercoraceous; paroxysms of terribly severe epigastric pain again set in, and the patient's strength began to fail rapidly. On the 30th (thirteenth day), I found the following condition of the abdomen. Swelling in the right iliac fossa was rather more marked; there was no distinct tenderness here, redness, or œdema. The abdomen was not much distended; tympanites was slightly and equally marked in every part. No peristalsis nor distended coils were visible on looking at the abdomen; but, on lightly irritating the surface by scratching, a distended coil could be distinctly seen to rise up from the right iliac region; this coil reached upwards into the umbilical and left lumbar, and then curved down again into the right iliac region, where it disappeared. The visible up-springing of this coil, together with the very slight amount of tympanites present, made it probable that as yet there was very little peritonitis.

The question of operation was now finally discussed; and, as the answer to this question must depend on our being able to determine correctly two points—(a) What kind of obstruction is it? (β) Where is it situated?—I will now mention the grounds on which I had given the diagnosis of two days before, and those which now made me willing to operate.

There were not, and there never had been, any material swellings. The entire absence of any premonitory stage negated the probability of the obstruction being due to a gall-stone, or to any growth involving the intestine either *ab intra* or *ab extra*. The absence of any local redness or œdema, the fact that there had been no shivering or rise of temperature, made it unlikely that the attack was due to inflammation about the cæcum or its appendix, though the symptoms pointed so distinctly to the right iliac fossa. Intussusception was put aside, from the absence of any characteristic symptoms—such as passage of bloody mucus, tenesmus, or sausage-like tumour. By this process of exclusion, the cause of the obstruction was brought down most likely to one of three conditions: 1. A band; 2. A twist or volvulus; 3. Some form of internal hernia, either retroperitoneal or through some gap in the mesentery or omenta. Any of these might have caused a partial nipping of the intestine, and so brought about the apparent relief of symptoms which was noticed at one time in this case. Of the three, strangulation by a band was the likeliest in point of frequency; and the presence of a band was made more likely by the localisation of some of the most marked symptoms to the right iliac fossa; for, putting aside those cases in which the band is connected with the vermiform appendix, or that relic of the umbilical vesicle the diverticulum from the ileum, where one extremity of the valve will always be found within two feet of the ileo-cæcal valve, it is impossible to look through recorded cases of obstruction by bands, due to other causes, without being struck with the frequency with which the intestine involved is from within a few inches to two or three feet of the ileo-cæcal valve. On this point, I should lay more stress; because, if an operation be performed, the surgeon will do well, on the introduction of his hand, in order to search for the band, to pass it down into the right iliac region, and find the cæcum, and, if possible, the ileum, entering into it, and then trace upwards the small intestine to the point of obstruction.

Such being the diagnosis, the advisability of an operation was laid before the patient on the following grounds. The attack had now lasted thirteen days; the improvement of a few days before had quite passed away, leaving the patient decidedly weaker; the pain returning in more severe and frequent paroxysms, and with vomiting now persistent and stercoraceous; and the feet and hands were now becoming cold. On the other hand, his pulse was fair, the temperature not raised, and the abdomen still but little distended, and showing very little evidence of peritonitis.

The patient having readily given his consent, the following operation was performed antiseptically. Ether being given, the chest and limbs covered with warm blankets, and the knees elevated over a pillow, a vertical incision (about three inches and a half long) was made in the centre of the

* An abstract of a paper read before the Hunterian Society.

right iliac region, running upwards from a point about an inch above and to the outside of the centre of Poupart's ligament. The aponeurosis of the external oblique and the fleshy parts of the next two muscles having been incised, the fascia transversalis and peritoneum were opened together; this opening was then enlarged, so as to admit a finger, on which the two layers were slit up to an extent corresponding to the superficial incision. No very marked protrusion of the intestines followed; the neighbourhood of the cæcum was first examined with the finger, and no evidence of ulceration or suppuration found about this or the appendix. The internal abdominal, the femoral and obturator apertures were then explored to make sure that no small hernia had escaped detection from without; and I may here mention that I know of a case which presented the symptoms of acute intestinal obstruction, where, *post mortem*, a tiny strangulated femoral hernia was discovered. The finger was next swept upwards, and just to the left of the incision, or nearer the middle line, a very weak and delicate band was felt, which gave way at once before the finger. In the belief that this could not have caused strangulation, a further exploration was made in the same direction, and another and stronger band was met with; this felt granular and somewhat irregular, and apparently ran down from the omentum to lose itself about the brim of the pelvis. While attempts were made to lift up this band off the intestines, so as to divide it safely, it gave way, and a loop of bowel now at once sprang up into view, bearing at one spot a distinct pressure mark, which felt thickened and like a small pylorus. One or two shreds of lymph were noticed on this coil, which was still shapely and cylindrical, of a scarlet colour, save where, at the point of constriction, it was of a much darker tint. There was no appearance of general peritonitis. The wound was brought together with silver (deep quill and superficial) sutures. No vessel required ligature.*

The incision was made in the right iliac region, as the seat of mischief appeared localised to this neighbourhood. The median incision is said to have two advantages: one, that there is no hæmorrhage; the other, that ventral hernia is less likely to occur. In this case, there was no trouble from hæmorrhage or muscular contraction; and, from what is seen after ovariectomy, I imagine that ventral hernia is as likely to occur after one incision as the other.

Immediate and most marked relief followed the operation. The patient was sick but once, and that within the first three hours; his skin became warm again, and his face expressive of relief. On September 1st (the fifteenth day), or forty-eight hours after the operation, the bowels were open twice; for two days more, he improved, taking fluid food well. On September 3rd, or four days after the operation, the bowels were open again, and from this date the patient lost ground; obstinate diarrhoea set in, and continued day and night repeatedly, and, gradually sinking, the patient died at 11 P.M. on September 9th, the symptoms having pointed to an irrecoverable condition of that part of the bowel which at the time of the operation was set free from the constriction.

For notes of the *post mortem* appearances I am indebted to Dr. F. Taylor. "Intestines of moderate size, not distended with air. Their surface sticky here and there; two coils slightly adherent; nowhere any tangible lymph or pus. Some coils adherent to the abdominal wall by the slightest possible filamentous new tissue. In the left side of the true pelvis, close by the rectum, was found a coil of dark-greenish purple colour, easily lifted out, not adherent, nor in any way fixed. This was found to be small intestine, about ten feet from the pylorus; two transverse lines of indentation, three inches apart, seemed to indicate where this coil had been nipped. There was no adherent lymph on this dark coil, nor any alteration of its mucous membrane. Attached to the sigmoid flexure (which was empty) were two elongated appendices, two inches in length, with free extremities. It is possible that these had something to do with the constriction; but if so, they showed now no sign of ligature or cut surface. The omentum lay quite free over the upper intestines, caught only in its lower end in the inflammatory adhesion of the wound."

Such being the case, I cannot say if the strangulating apparatus consisted, as I thought at the time of the operation, of two processes from the great omentum passing down and becoming adherent below, and resulting insidiously from some old peritonitis. It is also difficult to account for the relief which followed from the bowels between the ninth and the twelfth days of the illness, unless we consider that up to that time the bowel had only slipped beneath the more delicate of the two bands, and that subsequently it passed beneath the second and stronger one.

Two questions will very probably be put: one, Why, before any

operation was performed, was not any trial made of that method of treatment to which Mr. Hutchinson has given the name of "abdominal taxis"? The other, Was the operation of opening the abdomen justifiable at all in this case? I propose to try and answer these questions together.

More than twenty years ago (*Medical Times and Gazette*, 1858, vol. i), Mr. Hutchinson contended for the two following points.

1. Gastrotomy for abdominal obstruction is not ever justifiable.
2. As a rule, the method to which he gave the name of abdominal taxis was much to be preferred to any exploratory operation.

In August 1878, at the Bath meeting of the Association, Mr. Hutchinson again advocated these two points; but in this paper no results of this method in his hands were given. All that Mr. Hutchinson says on this head is: "Since that paper was written, I have practised this kind of treatment in many cases, and I have never once opened the abdomen without knowing with tolerable certainty what I might expect to find"; but, as to his own personal results of abdominal taxis and abdominal section, there is an entire silence; and I think that this is to be regretted, and the more so as it is well known how extensive and how ripe that experience is.

I am quite aware that there are several cases on record in which a strangulated hernia has been returned by inversion of the body, combined with taxis—a very old method in this country, and of late years more used in America. I also know of two cases in which abdominal taxis was used successfully in cases of acute intestinal obstruction: one recorded by Mr. Tay, in which the attack set in with acute pain, rapid onset of vomiting, very soon after the patient had had a slip while walking; vigorous kneading of the patient's abdomen, followed by well shaking of the body while the feet were uppermost, combined with the injection of large quantities of water, brought speedy relief; vomiting occurred but once afterwards, and free fecal evacuation followed the next day. (*Medical Times and Gazette*, vol. ii, 1872; Sydenham Society's *Biennial Retrospect*, 1871-1872, page 194.) The other case is one recorded by Dr. Fagge. (*Lancet*, 1872, vol. ii.) Here, too, the symptoms came on suddenly; from the fact that enemata, on the third day, brought away a little blood and mucus, Dr. Fagge points out that this case (which is throughout a very obscure one) may have been one of intussusception becoming strangulated as soon as formed. With opium and belladonna, the patient grew gradually worse; and on the seventh day, Mr. Brookhouse having thrown up with a long tube a pint of gruel, with turpentine and castor-oil, manipulated the abdomen for a quarter of an hour. Five hours afterwards, the injections came away with two or three pints of broken-down feces; twenty-four hours later, the enema and kneading were again repeated, and the patient rapidly recovered.

In my case, I did not make any trial of this method, because it was already the ninth day when I was asked to see the case; and I then thought that the time for manipulation had gone by. I now quite think that in this belief I was wrong; for I had not paid sufficient attention to the fact that, for the first eleven days, the obstruction was only partial. I had too clearly in my mind a case of acute intestinal obstruction by a band, in which abdominal taxis was practised on the tenth day, without good result; and when, on the eleventh day, the abdomen was opened and the band found, feces were seen escaping, the band having now cut into the intestine.

While I attach the greatest importance to abdominal taxis, if used early, I think that perhaps this method, combined with inversion of the body, is *a priori* more likely to be successful in attempting reduction of hernia where a knuckle of bowel has passed from above downwards, more or less vertically, through one of the normal apertures, than in a case where a loop of intestine has passed horizontally under a constricting band, as in this case of J. M.

That Mr. Hutchinson has recommended this method so strongly, is quite enough to show that it deserves a more extended trial than it has yet received; but, in trying it, three points especially should, I venture to think, be borne in mind.

1. If not employed early, there must be considerable risk of doing further damage to a constricted, and so already weakened, intestine.
2. The manipulations may only send the strangulated loop more deeply beneath the strangulating band, or send more intestine beneath it, than what is already there.
3. Large injections of fluid may cause vomiting; and have this further objection, that the injected fluid may pass above the obstructed point and be retained there.

As regards the second question, whether any operation was justifiable in this case, Mr. Hutchinson, writing more than twenty years ago, contends that gastrotomy is never justifiable, on account of its fatality. I believe that, as time goes on, this opinion will be more and more modified. I will merely mention a few cases in which, the opening of the abdomen

* Throughout the operation I profited by the advice and assistance of my colleague Mr. Howse.

in some, and in others the opening of the intestine as well, has been performed with success.

Mr. Bryant (*Medico-Chirurgical Transactions*, vol. 65) operated successfully in a case of strangulating band; and Mr. Howse (*Guy's Hospital Reports*, third series, vol. xix) has met with like success in a similar case.

Abdominal section and enterotomy, with an artificial anus, was performed six times by the late M. Nélaton, three times successfully (*Gazette des Hôpitaux*, 1862, page 273). Three similar operations have been performed successfully in this country by Mr. Maunder, Mr. McCarthy, and Mr. Wagstaffe.

In the *London Medical Record* for December 1878 are two successful cases of abdominal obstruction and enterotomy for the removal of foreign bodies, quoted by Dr. Studsgaard of Copenhagen; one in his own practice, the other in that of M. Reali of Orvieto. Quite recently, Mr. H. Marsh, in a case of a woman of forty with acute intestinal obstruction, opened the abdominal cavity, and, finding a stricture of the sigmoid flexure, established a false anus by fixing this part of the intestine to the linea alba.

All that I would maintain is that, in certain cases of acute intestinal obstruction, where previous treatment has entirely failed, to open the abdomen is not only justifiable, but imperatively indicated. I know how fatal such operations have been; but I know also that very rarely (I speak of *acute* intestinal obstruction) a case gets well if left to itself. To some, the very recommendation of an operation at all may savour of that rashness which comes of inexperience. I would reply that the very want of success in previous operations is accounted for by the fact that they were too often not performed under those conditions which I am about to point out as being essential to success.

Very briefly, these conditions are the following: 1. The operation of opening the abdomen is only to be performed where certain previous treatment has failed. 2. It is only to be performed antiseptically, so that the risk of septic peritonitis may not be added to the list of dangers against which the patient has already to struggle. 3. But, above all, the operation must be performed earlier than has heretofore been the case. It is hopeless to perform it when symptoms of peritonitis or enteritis have set in. Those who wait, as I venture to say too many have waited, till the abdomen is generally and enormously tympanic—till the temperature is persistently high, or is only falling before the inevitable end—till the pulse is running down and the patient in a condition of irrecoverable collapse; those who wait till any or all of these conditions are present, had far best not operate at all. It is only too easy to foretell the operation that follows. The abdominal cavity is opened readily enough, and then the difficulties begin; coils of enormously distended intestine at once crowd up at the mouth of the incision; the operator has the greatest difficulty in finding a contracted portion, and so of tracing out the point of obstruction; perhaps, during his endeavour to do so, a faecal odour becomes apparent, showing that the intestine has already given way; or, granting that the seat of mischief is found, and the cause of strangulation removed, in spite of all his endeavours the surgeon finds himself with several coils of intestine outside the abdomen, and is at his wits' end to get them in again; perhaps he punctures them with the aspirator-needle; but, owing to the paralysis of the muscular and the infiltration of the cellular coat, which has by this time taken place, the puncture in the mucous coat is not closed, or does not slip away from directly beneath the opening in the serous covering; as the collapsed intestine is returned, liquid feces are seen escaping at three or four points; any attempt to close these points with sutures only makes matters worse, and the patient sinks quickly after his removal from the table.

I have already pointed out the conditions which would guide us as to the time at which an operation, to be successful, must be performed. I will now mention a few points to be observed during the operation itself.* The strength of the solution to be used for spray and sponge must not be above 1 in 40; the solution must be duly warmed. If the operator be obliged to draw any coils out of the abdomen for the purpose of examination, the spray must not be allowed to play upon these coils, which are to be covered with carbolised lint, taking care that the smooth and not the fluffy surface of the lint is in contact with the intestine. If any amount of carbolised solution be believed to have entered the peritoneal cavity, this is to be removed by careful sponging; and finally, in closing the wound, catgut being unreliable, twisted silver sutures are to be employed.

In conclusion, I venture to suggest to you the following points in the treatment of a case of acute intestinal obstruction.

1. From the very first, it is not enough to refrain from giving solid food. The patient is to be fed by enemata, given *per rectum*, and

consisting of milk and egg, wine or brandy, and given carefully twice or three times daily. If possible, only ice out of milk is to be sucked by the mouth.

2. If possible, no opium is to be given, as this drug has a dangerous tendency to mask symptoms; instead of opium, belladonna is to be given, and to be pushed in large doses. Many of those present may remember a paper in the *BRITISH MEDICAL JOURNAL* (August 31st, 1878), by Dr. Norman Kerr, on "Large Doses of Belladonna in Intestinal Obstruction". Five cases are given, somewhat briefly, and therefore incompletely recorded; all got well under the use of belladonna, though in three acute cases, two grains were given every hour, and sixteen, twelve, and fourteen grains were administered in these cases. I do not pretend to explain the benefit of this drug. I admit that its action would seem somewhat contradictory in the one case, as when rubbed into the perineum for spasmodic stricture, appearing to remove spasm; in another, to set up contraction of involuntary muscular fibre. But in a case like the one which I bring before your notice to-night, where a coil has, perhaps by irregular action, slipped under one or more bands, I can imagine that belladonna, if given early and in large doses, may enable the bowel, if this remain empty, by its own contraction to set itself free once more. But on this point I should be grateful for any information.

3. At an early date, the method of abdominal taxis should be made use of. Mr. Hutchinson, in bringing this method forward, recommends that it should be carried out as follows. Under chloroform, a very copious enema of water is to be given by a long tube, and, the anus being kept closed round the tube with a cloth, the fluid should be forced in to the utmost point of distension. Then, simultaneously with the withdrawal of the tube and the escape of the water, the surgeon, with the flat of one hand on each side of the abdomen, should press gently but firmly on alternate sides, in such a way as to facilitate the movements of the coils upon each other. As much of this having been done as shall seem advisable, and the water having flowed out, let the patient (by means of a girth fastened to the bedposts) be raised by the feet till the trunk is inverted; and, whilst the patient is in this position, let the surgeon, with both his hands placed on the lowest part of the abdomen, press the whole mass of the intestines as high up as possible in the abdomen. Of course, during the whole of the time an assistant should carefully watch the effects of the chloroform on the pulse and breathing.

I have only one small alteration to suggest in the above details; and that is, knowing the difficulty of inverting a heavy patient, I think that it will be found better to overturn a chair, so that its sloping back be against the bed; over the chair-back let some clothes be laid, and the patient's body be gradually inverted over this by assistants standing on the bed. This will not only be found easier in the case of a heavy patient, but in that of a female one more decent in the eyes of any friends who may be present.

The above methods failing, I have only to urge an early operation, performed under the conditions already mentioned. It may be said, in answer to this, that recovery may and does ensue sufficiently often to make it worth while to wait. From the cases that I have seen, my own opinion would have been distinctly to the contrary—that, apart from those chronic or subacute instances where a case does well by an intussusception slipping back again or sloughing off; where a long-impacted scybalus or gall-stone passes on, or where a stricture is set free by partial ulceration of itself—that, putting aside such cases as these, acute intestinal obstructions, which have not yielded to such preliminary treatment as that sketched above, will end but in one way if left to themselves. No doubt the justifiability of these operations depends on the probability of a successful result; but hitherto, in nearly every case, the operation has been performed too late to guarantee any such success. For my own part, considering what has been attempted and what has been done in antiseptic surgery, and believing that great advances have yet to be made in the surgery of the abdomen, I trust that I do not assume too much when I say that, in a few years, we shall be able, in cases similar to that brought before you to-night, to promise a successful result with something like certainty.

NOTE ON THE DIAGNOSIS OF INTESTINAL STRICTURE.

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I AM led, by reading the interesting papers which have lately appeared in the *JOURNAL* on the important subject of intestinal obstruction, to draw attention to a point in diagnosis which I have not seen noticed in recent writings, except by implication, and which I have learned in the course of clinical work. It is this. *The presence of a*

* Similar precautions have been already insisted upon by Mr. Howse (*loc. supra cit.*).