HARVEIAN LECTURES ON THE MODE OF DEATH FROM ACUTE INTESTINAL STRANGULATION AND CHRONIC INTESTIAL OBSTRUCTION

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649306954

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Edited by Trieste Publishing Pty Ltd.
Cover @ 2017

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Trieste

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DELIVERED BEFORE THE HARVEIAN SOCIETY OF LONDON,
1884.

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LONDON:

PUBLISHED BY J. AND A. CHURCHILL, 11, NEW BURLINGTON STREET.

1885.

[Reprinted for the Author from the British Medical Journal, Nov. 22, 1884.

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By THOMAS BRYANT, F.R.C.S.,

Senior Surgeon to, and Lecturer on Surgery at, Guy's Hospital.

LECTURE I.

The Mode of Death in Intestinal Strangulation and Intussusception, with Reference to their Treatment.

I propose, in the following lectures, to bring before you some points connected with abdominal surgery, and to consider, first, how death is occasioned in intestinal strangulation and intussusception; and, secondly, how life is destroyed by intestinal obstruction. The pathological inquiry will be illustrated by cases,[1] and followed by some practical conclusions.

Hitherto, it has been the custom to place cases of strangulation of the bowel amongst those of obstruction, indeed, to consider them as only one of its forms. There is, I am convinced, in this arrangement a grievous error; since, in strangulation of the intestine, obstruction is only one of its symptoms, but not the cause of danger or of death; whereas, in cases of intestinal obstruction, the obstruction is the prominent and dangerous feature, and from it, or it chiefly, the consecutive changes are brought about.

From this proposed plan of procedure, you will see that the basis of

[1] All the cases quoted in these lectures, unless otherwise expressly mentioned, have been under my own care, or that of my medical and surgical colleagues at Guy's Hospital. The *post mortem* book has been resorted to for illustrative cases in preference to the clinical, since, from the former the most unquestionable data are obtained.

the practical conclusions which I shall draw will be laid upon pathological knowledge, and that what is to be done to save or prolong life, will be educed from what is known of the changes which tend towards its destruction. I do this, moreover, under the assured conviction that it is by this method alone that the scientific practice of surgical art is to be promoted.

And, first of all, with reference to what is commonly called "acute intestinal obstruction," but which should be designated "intestinal strangulation," is it true that patients die from the obstruction—that is, from the arrest of the passage of fæces along the intestinal tube? or is it more nearly accurate that the obstruction is merely a symptom of some condition which, if not relieved, must bring about a fatal result; fatal, however, not from obstruction to the passage of fæces through the lumen of the bowel, but from changes in the bowel itself and the parts above?

I believe this latter interpretation to be correct, and would adduce as proof the case of acute strangulated hernia relieved by operation or taxis, as the case may be, and in which the symptoms, however severe before its reduction, at once cease on this result being effected; although, possibly, no action of the bowels may be obtained for two or three weeks subsequently, the want of action not giving rise to any special symptoms. In fact, in this instance, as, in all other cases of acute or a like nature, the symptoms are directly due to the arrest of the circulation of the venous blood through the strangulated bowel, and not to the obstruction to the passage of the intestinal contents. The action of the bowels may, as a clinical symptom, be one of value to prove the patency of the intestinal tract, and to suggest, consequently, the completed removal of the cause of the strangulation; but it is well to remember that the symptoms excited by a strangulation of the bowel are not due to obstruction alone.

It was from a want of appreciation of this fact that the older surgeons gave purgatives in cases of internal intestinal strangulation, as well as in cases of strangulated hernia after its reduction; and it is, I believe, from the want of a full appreciation of the bearing of the same fact that, in examples of intestinal strangulation not hernial, practitioners seem, even at the present day, to trust too much to physic, and various manipulative and other acts, when there is nothing less than the removal of the strangulating cause from which the slightest good is to be anticipated.

To impress this point, allow me to consider briefly the mechanism of what is called strangulation, and to illustrate it as best seen in an example of strangulated hernia—though, whether the case be one of external or internal hernia, of volvulus or twist, or of strangulation by a band, the mechanical results are identical. And here let me say, when interference with the circulation is mentioned, it is to the venous and not to the arterial circulation that reference is made; and that, by interference to the circulation, is meant obstruction to the passage of venous blood from the parts strangulated to those below, the obstruction varying from mere slowing of the venous blood-current to complete blood-stasis. In a case of hernia, when reducible, the circulation through the displaced knuckle of bowel may not be interfered

with; and, under such circumstances, no other symptoms than those caused mechanically by the swelling are found. But if, from some cause or other, the hernia becomes obstructed, and the venous circulation is retarded by the mechanical pressure of the contents of the knuckle, or any external cause, local symptoms of fulness, or even of pain, and possibly of some swelling of the tumour, may be produced; and, with these local symptoms, there will possibly be the general one of nausea and dragging at the pit of the stomach, passing on, if not relieved, to vomiting and severe local pain. When the venous circulation is entirely arrested, the local and general symptoms of acute strangulation show themselves by vomiting, paroxysmal abdominal pain, and, perhaps, obstruction.

These symptoms, it must be remembered, are the same in all forms of acute intestinal strangulation. They are alike in every variety of external as of internal hernia. When we are, therefore, called to a case of external or internal strangulation, we should mentally see either the gradually increasing venous congestion of the strangulated part, or its rapid congestion; we should picture to our minds the venous blood-congestion passing on to a more or less rapid complete blood-stasis; and, when this stage is reached, we must not forget that the death of the strangulated bowel is not far off. Let us remember that slight interference with the circulation through the bowel gives rise to symptoms of incarceration; that greater interference excites those of obstruction, and that complete interference produces those of strangulation, as signified by vomiting. Should the process of increasing congestion be slow, inflammation may complicate the change, as demonstrated by effusion, or possibly ulceration; should the process be rapid, static gangrene, the direct result of the venous blood-stasis, is the pathological result. When the blood-stasis is great, as it is in the acute forms of strangulation of the intestine, hæmorrhage from the bowel, as a mechanical result of the congestion, is by no means an uncommon complication. I have seen it many times in the acute congenital form of strangulated inguinal hernia, both in the form of extravasated blood into the knuckle of strangulated bowel in the hernial sac, as well as of extravasated blood into the intestine above the seat of strangulation. In some cases, blood may even be vomited, and passed *per anum*, as reported in Case XI. Under both circumstances, the hæmorrhage is clearly due to the suddenness, as well as to the completeness, of the arrest of the venous circulation at the seat of strangulation, and the mechanical rupture of the turgid veins from their overdistension. Such a condition of intestine, when seen in a hernial sac, is serious, but not necessarily of fatal import; it means that the intestine thus engorged is in the condition that precedes static gangrene, though it has not reached that state; and it should lead the surgeon, where the subject of the hernia is otherwise favourable for repair, to hope for a good result, since such blood-stasis is, so long as the bowel is alive, capable of complete repair.

In cases in which the strangulation is subacute, and in which the bowel above the seat of obstruction is much distended and full of fæces, ulceration is often met with, the ulcers being due to the me-

chanical pressure and irritation of the fæcal contents upon the distended and, possibly, inflamed bowel. Such ulceration is seen in the chronic forms of obstruction, as in the more acute varieties; and, in both cases, it is due to the mechanical irritation of retained fæces. In other cases, the bowel may even rupture.

In the following cases of obstruction of the small intestine, due to the presence of a band, possibly the result of an antecedent hernia, these points are well illustrated.

CASE I. *Small Intestine Obstructed by a Band associated with Hernia; Ulceration of the Bowel above the Obstruction.*—James C., aged 46, was admitted into Guy's Hospital, under the care of Mr. Cock, on January 25th, 1869, and died twelve days later, on February 6th. He had been ruptured on the right side for years. Two days before admission, when carrying a sack of flour, he had sudden pain in his abdomen, which was soon followed by vomiting; but the bowels acted twice. The vomiting continued, with abdominal paroxysmal pain and obstruction. The hernia was explored without benefit, omentum alone being found, and the man died, unrelieved, on the fourteenth day after the commencement of the symptoms. At the *post mortem* (38) examination, made by Dr. Moxon, the omentum was found ligatured, in a hernial sac, on the right side of the scrotum. The thoracic viscera were healthy. The abdomen was distended, and, when opened, distended coils of the small intestine were visible. This distension suddenly ceased at the right sacro-iliac synchondrosis, where the bowel was obstructed as follows. The last two feet of the ileum, and the corresponding mesentery, were fastened down to the psoas muscle by a band of old inflammatory thickening, the bowel being flattened rather than constricted. At the proximal end of the obstructed bowel, the distended coil hung down into the pelvis; the mesentery was narrowed, probably congenitally. The intestine, above the seat of obstruction, was full of ulcers from distension.

CASE II.—A female child, aged 9, was admitted in 1876, with severe symptoms of intestinal obstruction of thirteen days' standing. She died, unrelieved, on the fourteenth day. After death, the lower half of the ileum was found bound down to the spine by old peritoneal adhesions, and the distended jejunum was ruptured.

In the first case, the man lived fourteen days after the first onset of the symptoms, which were typical of what has hitherto been described as sudden intestinal obstruction, but what I would wish to call internal strangulation. The band causing the obstruction was not rigid, but was enough to flatten the bowel and so obstruct it as to interfere with its venous circulation, and to bring about distension of the intestine above and collapse of it below. The small intestine above was, moreover, ulcerated from distension. Had the man lived longer, it is probable that he would have died from perforation of the intestine from ulceration. In the second case, the jejunum was directly ruptured from overdistension; and in the following case, ulceration took place in the cæcum from obstruction backwards, the cause of the obstruction being an omental adhesion to the ascending colon.

CASE III.—It occurred in the subject of Alfred R., aged 37, who was suddenly seized, on January 27th, 1877, with abdominal pain,

vomiting, and intestinal obstruction. He was admitted on the 28th, the day following his attack, when the abdomen was greatly distended, and relief was afforded by paracentesis with a fine trocar and cannula. This benefit was, however, only temporary, and the man sank on the eleventh day. After death, the cæcum was found to be enormously distended, and situated in the centre of the abdomen. In it were circular ulcers exuding fæces, with recent peritonitis. The ascending colon was wonderfully twisted with an omental band, and to this the obstruction was due. The descending colon was contracted and empty. In this, as in the former cases, the ulceration was due to the pressure backwards of the intestinal contents. In it, the walls of the bowel were perforated, and general peritonitis was the result. In the first case, a like result would have ensued, had the patient lived longer. In all cases of subacute strangulation, the probability of this result occurring should be entertained.

What bearing, then, should these facts have upon surgical practice? Are they such as to lead the practitioner to depend upon a Surgery of Hope, based upon the administration of drugs which mask symptoms, but do nothing towards the relief of the mechanical conditions upon which the symptoms depend? Or should they lead him to look boldly at each case as it presents itself, and to act decidedly and with precision? In a case of strangulated hernia, the rule is now well recognised that, on the appearance of vomiting—from the first occurrence of which symptom the date of strangulation is calculated—no time should be lost in the reduction of the hernia, either by taxis or herniotomy; for surgeons and pathologists well know that nothing less than the mechanical relief of the mechanical condition which is called strangulation in a hernia can be of essential service; and that, until this end be secured, opium only masks symptoms and brings about a fool's paradise, where the Surgery of Hope may exercise itself at the expense of scientific knowledge and patients' lives.

In a case of internal hernia, or of internal strangulation, from whatever cause—conditions ushered in by the same series of symptoms as indicate an external hernia, though without an external swelling—surely the same sound principles of surgery are equally applicable; and it behoves the surgeon, in the one case as in the other, to relieve the mechanical condition which is called strangulation by the only means by which relief can be afforded, and that is by operation.

In cases of external, or of internal, strangulation, the same series of changes that I have sketched out take place. In the one instance, as in the other, the slight retardation of the venous blood-current, which may, at first, have existed, becomes aggravated; the blood-stasis, which was, at first, slight, rapidly becomes more nearly complete, passing on to static gangrene. Under such circumstances, unless relief be found, nothing but a fatal result is to be expected. Whether the cause of the obstruction be an internal hernia, a volvulus, or band, the mechanical condition called strangulation exists, and, unless this can be relieved, the end by death cannot be averted. To make a more special diagnosis as to the form of strangulation is not required; to wait for it, is often to wait for a *post mortem* investigation. An ex-

ploratory abdominal operation is the only scientific surgical proceeding, and this should be undertaken as soon as a diagnosis of strangulation is made. In the case of a patient suffering with symptoms of strangulated bowel, and the subject of an old hernia, the rule of surgery is to explore the hernia, and, if nothing should be found in the hernial swelling to explain symptoms, to explore the neck of the hernial sac or abdominal cavity. In a case of a patient suffering with symptoms of strangulated bowel, but without an actual hernia, I trust a like rule of practice will soon be followed; and that a surgeon, in the future, will at once, on the diagnosis of strangulation being made, explore the abdomen, first to find out the true cause of the strangulation, and, secondly, to relieve it. In either case, failure will often follow the attempt; but success is likely to attend an early effort, when it will fail to follow a late one. And where success ensues, it means a life has been saved that, under other circumstances, would to a certainty have been lost.

I am well aware of the objections which may be raised against this advice; that it may be said that, since the diagnosis of any given case is uncertain, the treatment of it should not be heroic; and likewise that, since many cases, which appeared to be hopeless, have recovered without operation, the surgeon is not justified in submitting his patient to an operative ordeal. I can only answer to the first of these objections, that an operation is only suggested in cases in which symptoms of acute intestinal strangulation, similar to those of an acute external hernia, are present, and that, under such circumstances, an exploratory operation for investigation, as well as for relief, is not only justifiable, but absolutely demanded. In the one case, as in the other, the object of the operation is first to find, and then to remove, the cause of strangulation.

With respect to the second objection, I would say that it is well known that, in cases of strangulated hernia, recovery sometimes takes place without operation; but that no prudent surgeon, on that account, would use such cases as an argument against operative interference. An operation in a case of strangulated hernia may not be absolutely necessary; nevertheless it is the surgeon's duty to propose it. With a like object, I hold that, with symptoms of acute intestinal strangulation, though recovery may possibly take place by natural processes without operation, there is every probability against such a result being brought about. Under these circumstances, therefore, I hold that an exploratory operation is not only justifiable, but right. By the general adoption of this practice, I feel convinced that more lives would be saved than by the expectant principle which now too generally predominates.

The following brief notes (extracted from my note-book) of cases in which relief could have been afforded by operation support this view. They are taken at random, and are only a few out of many that I could adduce.

Case iv.—James H., aged 46, who had been ruptured two years, was admitted in 1869, with symptoms of acute strangulation of two days' standing. The hernia was explored, but nothing was found, and the man died unrelieved on the thirteenth day. After death, a band