STRANGULATED HERNIA

ITS PREVENTION AND TREATMENT UNDER LOCAL AND OTHER ANAESTHETICS

BY

R. WOOD POWER, M.B., F.R.C.S.I.

SURGEON, HEREFORD GENERAL HOSPITAL

The object of this paper is to record the results obtained by operation upon strangulated hernia under local and other anaesthetics. I have noticed that under the former the patients have less post-operative shock, their condition gives rise to less anxiety, and their eventual recovery is less hazardous and more rapid. I have come to the conclusion that it is the anaesthetic *par excellence* for this condition, and that it should invariably be employed. In discussing such vast subjects as toxæmia, pulmonary complications, and shock, I have only considered them from the anaesthetic point of view. Finally, I have endeavoured to show how strangulated hernia should become a tragedy of the past.

The treatment of strangulated hernia within recent years has been very scantily reviewed and too infrequently discussed. At the Centenary Meeting of the British Medical Association, when the subject of intestinal obstruction was debated by the Section of Surgery, one was struck by the absence of any special reference to strangulated hernia. This is all the more to be wondered at if one refers to the admirable statistics prepared by Vick¹ for that discussion; nearly half the cases (3,267 out of 6,892) of intestinal obstruction were due to strangulated or obstructed hernias. The importance of this subject may be judged from the fact that each year in England and Wales, according to the Registrar-General's returns, over 2,000 people die from strangulated hernia. If one takes Vick's mortality rate of 18 per cent., then over 11,000 operations are performed yearly upon this condition.

I do not intend to give detailed statistics of the various types and complications of strangulated hernia. Anyone requiring such information should read Frankau's² excellent paper, in which he has reviewed 1,487 cases from the various London hospitals. I find that my figures, though small, compare favourably with his.

The care of a patient with a strangulated hernia may be broadly divided into two stages: first, when he is in the hands of his own doctor, and secondly, when the surgeon takes charge. It was customary among surgeons at one time to throw the blame for the death of these patients upon the general practitioner. This day has rightly gone, and Sir Henry Newland³ further emphasized this point when he said:

"It is all very well for surgeons with one accord to excuse themselves, and to assert that the responsibility for that death-dealing delay is not theirs. The fact remains that acute intestinal obstruction is a surgical condition. It is to the surgeons attached to the medical schools throughout the Empire that the profession looks for light and learning."

I can only recollect two cases where the diagnosis was missed by the doctor in charge: in the first there was a small femoral hernia in a young girl, who unfortunately had a gangrenous bowel by the time the operation was performed, and died the following day, and in the second no examination was made, but luckily the patient recovered.

THE QUESTION OF TAXIS

When the general practitioner is called to a case there are two lines of treatment open to him, the first of which is taxis. Taxis should only be attempted in the early stages of strangulation, and should always be gentle. It

is impossible to lay down a definite time limit after which taxis is dangerous; it entirely depends upon the degree of strangulation. If I were pressed to state such a time limit, I would say that it was unwise to attempt this form of reduction if the strangulation had existed for more than four or five hours. The general practitioner, as a rule, has a limited experience in dealing with such cases; it is far safer to leave the attempt to the surgeon, who is generally better fitted to judge whether taxis is advisable or not. To effect a reduction *en masse* in a hospital where an immediate operation can be carried out is dangerous enough, but to attempt reduction in the patient's home, perhaps many miles from a hospital, may result in a catastrophe causing death.

When attempting taxis I have found it useless to grasp the fundus of the hernia and apply pressure at this point; it only causes further distension and congestion of the neck of the sac—the very place where relaxation is required. The reasoning of this must be apparent to all surgeons who use the gridiron incision for appendicectomy. In those cases in which it is necessary to deliver the whole caecum out of the wound for the removal of a high retro-caecal appendix, we have all experienced the difficulty at times of returning the bowel to the abdomen, and we all know how futile it is to grasp the caecum at its most dependent part and attempt to reduce it; such a procedure is never successful, and must cause damage to the bowel. The correct method is to replace it in the reverse order from which it was extracted—that is, the part lying between the edges of the wound is first returned to the abdomen, and as each succeeding portion of the intestine enters the wound it is replaced in the same manner. A strangulated hernia is an exactly similar condition, and if we hope to reduce it we must act on the same basis. The best method of taxis is to apply pressure at the neck of the sac or as near it as possible; direct pressure at this point will contract the neck of the sac and, if the constriction is not too firm, reduction may take place and the remaining bowel follow quite easily. This may be feasible in an early case of inguinal hernia, especially if the thigh is flexed and internally rotated to relax the pillars of the ring, but it is quite impossible in a femoral hernia. In the latter, taxis should on no account be attempted either by the general practitioner or by the surgeon. It is quite impossible to reach the neck of the sac, and any attempt at reduction will only damage the bowel further and possibly cause a rupture. I have never known a femoral hernia reduced by taxis, and any attempt to do so should be looked upon as dangerous practice. The same remarks apply to umbilical hernias in stout people: it is impossible to reach the neck of the sac, and so reduction is impracticable.

Should taxis fail, or if it has been deemed inadvisable, there is a second line of treatment open to the doctor on the spot—that is, to raise the end of the bed. This allows the distended bowel to fall away from the hernial opening, and must, I think, reduce the pressure at this point; in addition, it has a traction tendency. I have known several cases reduce themselves by this method, especially if morphine has been administered. It should never be used as an alternative to operation unless such has been refused, but may be employed while preparations are being made for the removal of the patient.

When the surgeon takes charge of the case the question of mortality at once presents itself, and may be considered under four heads: the social status of the patient, toxæmia, pulmonary complications, and shock.

SOCIAL STATUS OF THE PATIENT

The social status of the patient appears to be one of the chief factors in connexion with the mortality of strangulated hernia. By this I mean that the hospital class of patient seldom sends for his doctor until the case is far advanced, whereas the well-to-do patient will not tolerate the pain and discomfort for anything like the same length of time. There can be no doubt that if all cases of strangulated hernia were operated upon within the first few hours, the mortality would be extremely small. The present high mortality is very largely due to delay in operating. This delay is more marked in rural districts, where distance, conveyance, and the scarcity of doctors have all to be taken into account.

In considering the immediate causes of death—namely, toxæmia, pulmonary complications, and shock—the question arises: How are we to minimize these complications? This point presented itself to me some years ago, and since then I have been working methodically in an attempt to reduce the mortality. I have observed that many patients who die never appear to rally from the operation, and I have come to the conclusion that if these cases were operated upon under local anaesthesia they would stand a far greater chance of recovery.

TOXAEMIA

Everyone is aware of the early and extreme toxæmia associated with intestinal obstruction. If a small portion of the liver be removed at an operation for intestinal obstruction and sectioned it will be found that the cells show cloudy swelling. If a similar section is made from the liver of a patient who has died from intestinal obstruction it will be difficult to recognize the liver cells at all. The venous return from the intestine passes by way of the portal vein to the liver, and permeates the liver cells. This blood contains highly virulent toxins, and accounts for the condition of the liver cells just described. To put any further strain on the liver cells must lessen the chance of recovery, and by administering chloroform, or a mixture of chloroform and ether, we are undoubtedly doing this, for chloroform is poisonous to the liver and in advanced cases causes necrosis of its cells. Chloroform, then, should on no account be used in operations for strangulated hernia, and Frankau's figures show the highest mortality from this anaesthetic. I am quite convinced that it makes the difference in many cases between life and death.

PULMONARY COMPLICATIONS

It is well known that many of these patients are chronic bronchitics, and that the hernia is gradually enlarged by constant coughing. To administer ether in these cases is to run a very grave risk of setting up pulmonary complications, for such patients are usually aged and infirm, and readily show signs of pulmonary congestion. One of the frequent causes of pulmonary involvement is the inhalation of highly infective material from the stomach, either during the induction of the anaesthesia or following the operation. The chances of this can be greatly reduced by careful lavage of the stomach both before and after operation. The stomach in cases of intestinal obstruction and peritonitis can be compared to a bladder with overflow retention, for as a rule vomiting does not occur until the stomach becomes full. What is vomited is usually of an overflow nature; this can be verified by passing

a stomach tube after a patient has vomited, when large quantities can be drawn off. This overflow retention must be regarded in the same serious light as retention of urine in the bladder; in the latter condition we get back pressure on the kidneys and the consequent amassing of poisonous substances in the blood, while in the former we get toxins of a very lethal nature remaining in the system, if the stomach is not kept empty to receive them. Nothing brings more comfort to vomiting patients than a gastric lavage, after which they settle down to a slumber more restful than any drug can produce.

SHOCK

The fourth cause of death—shock—occurs in advanced cases. No one would consider anaesthetizing a patient suffering from shock following an accident unless it were imperative, yet here we have a patient on the very verge of this condition. It is little wonder that such patients never regain consciousness, and rapidly succumb after the operation. Spinal anaesthesia, as we know, causes a fall in blood pressure with resultant shock; this anaesthetic method is excellent when the abdomen has to be opened for intestinal obstruction, but people who suffer from strangulated hernia are often, as I have stated, aged and infirm, and it seems unreasonable to anaesthetize half the body, and so predispose them to shock, when a limited circumscribed area of anaesthesia is all that is required.

CAUSE OF DEATH

There have been fourteen deaths in seventy-eight of my cases, giving a mortality of 17.94 per cent. If reference is made to Table I the various causes of death will be found tabulated, together with the type of anaesthetic used in each case.

TABLE I

Cause of Death	No. of Cases	Anaesthetic Employed		
		Spinal	General (C. and E.)	Local
Toxaemia	8	2	4	2
Peritonitis	2	—	1	1
Pulmonary	1	—	1	—
Shock	3	1	2	—

Eight patients died from toxæmia—that is, they survived the immediate shock of the operation and succumbed within, as a rule, the next forty-eight hours. Two of these deaths occurred following spinal, four following general, and two following local anaesthesia. The degree of toxæmia depends on two factors: first, the time the strangulation has existed, and secondly, its intensity. If this condition were to continue there must come a time when any form of operation will fail to save the patient's life, but it is the period immediately preceding this stage that is the important one, and it is this period, I think, where the employment of local anaesthesia can make all the difference between life and death. Two patients died from peritonitis; they were very advanced cases, in which the bowel was found gangrenous at the operation. Such cases are usually hopeless, for a generalized peritonitis on the head of extreme toxæmia is more than the patients can endure. One patient who was operated upon under general anaesthesia died from pulmonary complications on the fifth day. Three patients died after the completion of the operation, and must be classified under shock. In one spinal anaesthesia was used; in the other two a general anaesthetic was given.

Table II shows the percentage mortality under each anaesthetic. The high mortality rate under spinal anaesthesia is accounted for by the fact that it was used in a small number of serious cases some years ago when stovaine was in vogue. I have often found this drug to cause an alarming fall in blood pressure, and it has now, I believe, been largely replaced by percaine and tropacocaine. There were eight deaths in thirty-eight cases

TABLE II.—Mortality Rate under each Anaesthetic

—	No. of Cases	No. of Deaths	Mortality Percentage
Spinal	6	3	50.0
General (C. and E.)...	33	8	21.05
Local	34	3	8.82

under general anaesthesia, giving a mortality of 21.05 per cent., and three deaths in thirty-four cases under local anaesthesia, giving a mortality of 8.82 per cent. The cases operated upon under local anaesthesia have been an uninterrupted series, so that all types and conditions are included. These figures are admittedly small, but still they are sufficiently suggestive to point to the fact that local anaesthesia is the ideal one for operations on cases of strangulated hernia.

OPERATIVE TECHNIQUE

On admission the patient is examined and taxis tried, if it be deemed advisable. Failing this the stomach is washed out until the fluid returns clear; the foot of the bed is then raised and the patient given 1/4 grain of morphine and 1/100 grain of hyoscine; the area for operation is shaved and the usual preparation of the skin carried out. I cannot speak too highly of the effect of twilight sleep, for by the time the patient is ready to go to the theatre he is invariably sound asleep, and can only be aroused with difficulty. These drugs are seen at their best in patients who have been in pain and without sleep for some time; these people have no recollection of going to the theatre or undergoing the operation. On several occasions I have been asked by them next morning when the operation was going to take place. I prefer these two drugs to the barbiturates; they are less toxic, simpler to administer, and more certain in their action. If one of the barbiturates is preferred, it should be given intravenously, since it is very doubtful if a secreting stomach has the power to absorb it.

When the patient reaches the operating theatre he is at once placed upon the table, and the area for operation infiltrated with 1 per cent. kerocaine. This drug is of British manufacture and extremely cheap; I have employed it in all my cases, and have found it as efficient as any other. It is non-toxic, and I have used as much as sixteen ounces at an operation without any ill effect. I infiltrate with Labot's syringe and needle; this needle is fine and long, and allows practically the whole area to be infiltrated through the one puncture. The needle is inserted about an inch and a half internal to the anterior superior spine; the deep tissues are first infiltrated around the hernial swelling, next the subcutaneous tissues, and finally the needle is reinserted at the top of the scrotum and passed up along the spermatic cord beneath the hernial sac to the internal ring, and this area infiltrated. This is a most important area to anaesthetize if the operation is to be painless, and it cannot be reached by a direct route. If this is not done there is bound to be pain when dealing with the peritoneum.

THE INGUINAL OPERATION

I do not wish to dwell on the technique of this operation, except to make a few remarks on the repair of the hernial opening. When the sac has been removed my procedure is to turn down a flap of fascia from the internal oblique and suture it to Poupart's ligament, which is scarified to receive it. These two raw areas of fascia unite firmly, and make a strong and lasting floor to the inguinal canal. It was my custom at one time to take strips of fascia from the thigh for this repair, but I now consider this unnecessary, except in rare instances. The graft from the internal oblique is a living one, and I have not yet experienced any ill effects from the use of it. In large hernias in elderly patients I remove the cord and testicle; this permits complete closure of the inguinal canal, and adds greater strength to the wound. In these cases, after the internal oblique fascia has been sutured to Poupart's ligament, the upper edge of the external oblique is sutured to the same position, the lower edge overlaps this, and is sutured down in completion of the operation. This operation provides a treble layer of fascia, and I have never seen a recurrence of the hernia. When it is completed the scrotum is raised and firmly bandaged to the pubis to prevent the occurrence of an haematoma.

THE FEMORAL OPERATION

In considering the femoral operation we have the choice of two approaches—namely, the inguinal or Lotheisen's, or the femoral, associated with the name of Lockwood. Of the two the inguinal route is the better, and is more frequently employed. The advantages of this operation are: (1) the constricted neck of the sac is easier to deal with; (2) a better inspection of the intestine can be carried out and a resection performed if necessary; (3) it allows better repair of the wound; and (4) there is less danger of wounding the bladder or an abnormal obturator artery. The real danger of the femoral operation is the possibility of the bowel slipping back into the abdomen before the sac is opened, and thus preventing a proper examination being carried out. Those who employ the femoral route claim that it is a quicker operation, and this is undoubtedly a fact, but I do not think the saving of a few minutes (especially when local anaesthesia is used) outweighs the advantages of the inguinal operation. I only perform this operation in early cases, when the necessity of a resection is unlikely and the patient a poor operative risk.

When repairing the hernial orifice I bring down a living graft from the internal oblique, as in the inguinal operation, and suture it to the pectineus fascia. I think this is a wise procedure, for Husted⁴ has reported 21 to 32 per cent. of recurrences following the operation of suturing Poupart's ligament to the pectineus fascia or the periosteum of the pubic bone.

Hey Groves has introduced a modification into Lotheisen's operation which is worthy of note. It consists in detaching Poupart's ligament from the pubic bone and turning it outwards, after which the sac can be lifted from its bed without any difficulty. I had a very striking example recently of the usefulness of this, when I came across a very inflamed and adherent sac of a femoral hernia, which turned out to contain a pus tube. To have attempted to deal with it in the ordinary manner would have caused considerable damage, and the probable rupture of the tube into the abdominal cavity. This modification is to be strongly recommended in those cases where one is led to expect some damage to the bowel, for even very gentle manipulation may cause a rupture of the intestine if it is damaged.

THE UMBILICAL OPERATION

The Mayo operation is the operation of choice in this type of hernia. After the sac has been removed and the peritoneum closed, the fascia of the rectus sheath is overlapped and sutured in position. The transverse incision is usually employed.

AFTER-TREATMENT

In cases of strangulated hernia the usual post-operative treatment to combat toxæmia and shock is carried out, and stomach lavage is continued until the patient ceases to vomit.

PREVENTION OF STRANGULATED HERNIA

I have already stated that over 2,000 people die yearly from strangulated hernia, and I hope I have outlined a method by which this mortality can be reduced; but if things continue as they are we shall still have a heavy death roll. There is a way, and only one, by which we can eradicate this mortality; that is a radical cure of the hernia as soon as it appears. Wilkie⁵ has stated:

"If we are to reduce the distressingly high mortality in acute intestinal obstruction I believe we must spread the knowledge of the *early signs* of the malady, first, among our students and practitioners, and secondly, among the public, through our health organizations."

There can be no doubt as to the wisdom of these words in cases other than strangulated hernia, but why in this condition should we advise students and practitioners to await until strangulation has occurred? We have taught them in the past the wisdom of removing a troublesome appendix before it can cause serious symptoms; surely the time has come to teach them the same about a hernia. As to the public, we can teach a certain class, but there is a far larger class which we shall never educate. I have heard this "spreading of knowledge" advocated ever since I qualified, but one has only to refer to the Registrar-General's returns (Table III) for the decade 1921-30 to realize that this is bearing little fruit, for strangulated hernia is on the increase.

TABLE III.—Registrar-General's Returns, 1921-30

Cause of Death	Sex	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Strangulated hernia	M	752	830	822	867	830	842	957	593	1,090	950
	F	900	885	916	947	931	923	1,008	974	1,039	1,002
Appendicitis	M	1,474	1,524	1,608	1,545	1,624	1,535	1,524	1,623	1,657	1,693
	F	1,237	1,211	1,218	1,211	1,238	1,175	1,136	1,245	1,169	1,248

If one refers again to Table III and compares the death rate for strangulated hernia during the past decade with that of appendicitis one must be struck with the nearness of approach of these figures. No medical man would allow a patient to go about with a grumbling appendix, yet the country is teeming with men and women going about their daily work with hernias, not realizing that the mortality nearly approaches that of appendicitis. Are medical men fully alive to the significance of these figures, and, more important, do they impress the meaning of them on their patients? I think the answer must be in the negative, for I know of no greater prejudice among general practitioners than that against advising operative cure for hernias in patients over the age of 45.

It is not my wish in this paper to disparage general practitioners in any way, but I cannot help feeling that the safety of this operation at the present time is not wholly realized by them. I hope that any who read this paper will acknowledge that I am making full allowances for their views when I say that up to a few years ago theirs was the accepted teaching—namely, that it

was unwise to operate on such cases, as there was invariably recurrence. But since then Gallie has come forward and shown us how recurrence can be prevented by the use of fascial grafts. Gallie's operation consists in taking strips of fascia lata from the thigh and interlacing them across the hernial opening. I have performed this operation on several occasions with most satisfactory results, but I only employ it in very large hernias where the tissues have been greatly stretched. The operation of fascial repair which I have previously described is a modification, and has the advantage of being a living graft. This operation performed under local anaesthesia is perfectly safe, and recurrences do not take place.

The technique of the operation is the same as I have described above. In elderly patients I give an injection of ephedrine about ten minutes before the operation is started; this greatly lessens any tendency to shock. Should they have a double hernia I perform two operations at fortnightly intervals. On returning to bed the patient is placed in the sitting position, and provided everything is satisfactory he is allowed to sit out of bed on the second or third day. This procedure is to be highly commended, since it lessens the chances of pulmonary complications, and, provided there is no strain on the fascial graft, it can do no harm.

The truss has still its adherents, and will continue, I suppose, for the present, to have a certain amount of popularity. If it fulfilled all that is claimed for it, strangulated hernia would be unknown. When we remember that some 11,000 people are operated upon yearly we cannot with a clear conscience consider it as a satisfactory form of treatment. For some years I have invariably advised a radical cure for all types of hernia, and so far I have had no reason to regret this advice. All patients over 40 are operated upon under local anaesthesia. Table IV shows the number of patients, with age

TABLE IV.—Operations upon Non-strangulated Hernia under Local Anaesthesia

Age	No. of Cases	Deaths
31-40	4	—
41-50	16	—
51-60	18	—
61-70	27	—
71-80	9	—

incidence, on whom I have performed this operation, and I have not yet lost a single case. The few under 40 were operated upon because of complications, usually pulmonary.

In conclusion I should again like to stress the safety of this operation and the enormous saving of human life resulting from its timely use.

REFERENCES

- ¹ Vick: *British Medical Journal*, 1932, ii, 546.
- ² Frankau: *Brit. Journ. Surg.*, 1931, xix, No. 74, 176.
- ³ Newland, Sir Henry: *British Medical Journal*, 1932, ii, 539.
- ⁴ Husted: *Zentralbl. f. Chir.*, June, 1932, 1465.
- ⁵ Wilkie: *British Medical Journal*, 1932, ii, 545.

At a recent meeting of the Permanent Committee of the International Office of Public Health, Sir George Buchanan gave an account of an outbreak of acute poliomyelitis which had occurred six weeks after the commencement of the summer term in a boarding school in the country, containing eighty-eight boys aged from 10 to 18. Between June 10th and 30th, 1933, eleven boys contracted the disease, of whom five recovered completely in two to six days, two in a somewhat longer period, four developed paralysis, and one died in four days. The chief points of interest in the outbreak were its intensity and short duration, the small number of cases in which paralysis actually occurred, and the rapidity of recovery, in spite of the severity of the symptoms in several cases. No convalescent serum was used in any case.