PARA-OESOPHAGEAL DIAPHRAGMATIC HERNIA

BY

NORMAN C. LAKE, M.D., M.S., D.Sc., F.R.C.S.

SENIOR SURGEON, CHARING CROSS HOSPITAL

While the essential factors in the cure of herniae in general are well established, defects of the diaphragm present a special problem to the surgeon for several reasons, the chief of which are: difficulty of access, congenital shortage of tissue (rendering approximation of the edges of the "ring" without tension almost impossible in some cases), and the continual movements of the diaphragm. When to these primary difficulties are added those of adhesion of contents to the sac and, in certain cases, the congenitally high position of the diaphragm, shortening of the oesophagus, and "thoracic stomach," the operation may become really formidable and fraught with considerable risk. In the case recorded here some of these problems were solved in a rather unusual manner. As over four years have elapsed since the performance of the operation without any recurrence of symptoms the method may claim to be considered satisfactory.

CLASSIFICATION

S. W. Harrington, in reviewing forty-five cases of diaphragmatic hernia dealt with at the Mayo Clinic, adopted the following classification:

Non-traumatic	Congenital (usually without sac)	Through foramen of Bochdalek
		Through dome
		Through oesophageal opening
		Through foramen of Morgagni
		Through the gap left by the absence of the left half of the diaphragm
	Acquired after birth	Through points of embryonic fusion
		Through the same sites as the congenital type
		Through the oesophageal hiatus (with sac)
Traumatic	Indirect	Through any of the points mentioned above (when through the oesophageal opening there is usually a sac, but in the other types there is no sac)
	Direct	Commonly following penetrating wounds (usually there is no sac)

Of the forty-five cases, thirty-one were through the oesophageal hiatus. Of these, twenty-three were acquired (history of trauma in ten), while in three there was a congenitally short oesophagus; thirteen were through the posterior half and dome of the left side, ten being due to indirect injury and three to direct injury. One case only was congenital, through the foramen of Bochdalek. The common type of hernia found in adult life, especially in the absence of trauma, is thus seen to be the para-oesophageal, and as the symptomatology of this variety is fairly definite and uniform it becomes possible at times to hazard a diagnosis upon this basis alone.

The development of the diaphragm is an exceedingly complicated and involved process, so that it is frequently difficult to determine with certainty the exact point at which developmental failure has occurred. In the case of para-oesophageal hernia, however, the failure probably lies in the development of that portion derived from the dorsal mesentery and the mesoderm of the receding Wolffian body. This not only leaves a defect of varying extent in the muscular and tendinous structures, but is also often associated with deformity in the conformation of the diaphragmatic dome and shortness of the oesophagus, with, perhaps, a "thoracic stomach." The surgeon contemplating closure thus not only has insufficient suitable tissue for suturing but may have to effect his closure round an oesophagus an inch or two shorter than normal. Even so, these difficulties have sometimes

been overcome by the performance of a preliminary phrenicotomy, when the resulting diaphragmatic paralysis allows the defect to be closed without tension, while the elevation of the dome (of necessity less than is usually obtained, on account of the drawing together of the edges of the aperture) to some extent compensates for a short oesophagus. Indeed, in bad operative risks phrenicotomy may be adopted as the sole treatment: it prevents spasm with incarceration of the stomach, which usually is the only abdominal viscus involved in this type. In the case now to be described another method of overcoming these difficulties was adopted, and it proved entirely successful. In a short report there is no need to elaborate the pros and cons of the method, most of which, in any case, are self-evident.

CASE HISTORY

H. P., a well-developed man of 51, sought advice for a feeling of ill-defined discomfort under the left costal margin coming on a few minutes after a meal had been taken. The history extended back for two years, and started with occasional attacks of sudden dysphagia at long intervals. Recently, however, the attacks had increased in frequency, and now occurred with every meal. The sensation was described as a "pain having a character akin to obstruction to the gullet." Eructation brought relief, but was invariably accompanied by small quantities of fluid and food recently taken. He had developed a real fear of food, and had reduced his intake to two small feeds daily. Nevertheless there was no loss of weight, nor had blood or slime been observed in the vomit. The alarm and distress occasioned by the taking of food resembled that of an anginal attack, and afforded an explanation of the wrong diagnosis of angina pectoris sometimes made in these cases. The only other points of interest in the history were two incidents when the intra-abdominal pressure may have been unduly raised: five years previously, after a severe cold and violent coughing, a small supra-umbilical hernia had developed; while two years previously he had carried an adult male from one room to another after an accident, which effort caused "aching of the shoulders."

The patient was admitted to Charing Cross Hospital in March, 1929, and after a complete clinical examination, which proved negative, a provisional diagnosis of cardiospasm was made, with, it was thought, the possibility of gastric ulceration in addition. Radiography after a barium meal revealed an hour-glass stomach, the proximal loculus of which lay above the general level of the diaphragm and close to the lower end of the oesophagus, in which a certain amount of the meal was retained. It thus became clear that the diagnosis was one of para-oesophageal diaphragmatic hernia, but no evidence could be obtained as to the exact length of the oesophagus or the possibility of adhesions between stomach and sac.

The Operation

Operation was undertaken on April 18th, 1929, under intra-tracheal ether anaesthesia, skilfully administered by Dr. Howard Jones. An epigastric, paramedian laparotomy was first performed; the constriction of the stomach, where it passed through the diaphragm, was examined without any evidence of permanent damage to the wall in this situation being found. There were no intrasaccular adhesions, and, after the admission of air to the sac, the stomach was easily reduced into the abdomen. The peritoneal sac passed through the diaphragm immediately to the left of the oesophagus and aorta (corresponding to a para-oesophageal defect), and was about 2½ inches wide by 5 inches long. The sac could not be inverted into the abdomen, and efficient repair of the aperture from the abdominal aspect appeared unlikely. The abdominal wound was therefore packed and the patient turned on his right side for thoracotomy. The eighth rib was resected for practically its whole extent through a long incision extending back to the spinous processes. The pleura having been opened widely, the lung was allowed to collapse by reduction of the intratracheal pressure. After application of the usual protective measures, the lung was retracted upwards and the heart somewhat forwards, so giving a satisfactory exposure of the hernial sac, the parietal pleura over which was incised

vertically. A thin fibrous layer covered the peritoneal sac; this was also incised, and, the greater part of the sac having been removed, the aperture was closed by a ring catgut suture. The muscular defect was now discovered to be considerable, but closure without any tension was accomplished by the use of tendino-muscular strips cut from the semispinales muscles at the vertebral end of the incision. Some six such sutures were "darned" over the aperture without strain, using the well-known Gallie technique for fascial sutures. The oesophagus was slightly short, but the level of closure was carried somewhat upwards as the oesophagus was approached. The reflected pleura was now sutured over the fascial "raft," and the superficial wound shut in the usual manner, the pleural cavity being completely emptied of air by raising the intratracheal pressure and so expanding the lung before the last pleural suture was tied. The patient was turned again on his back and the stomach was anchored to the anterior abdominal wall, after the fashion of a Rovsing gastropexy, before the abdomen was closed. This, it was thought, would prevent for the time any tendency on the part of the stomach to force the diaphragmatic barrier during the period of its consolidation.

Post-operative Progress

A small left-sided pleural effusion formed with slight fever, and there were signs of pleurisy at the right base. Repeated attempts at aspiration failed, however, to remove more than a few drops of sterile fluid from the left side. Further convalescence was uneventful, and the patient left hospital forty days after admission, taking all food without discomfort. Three weeks after the operation the radiogram showed the stomach in normal position with a small effusion at the left base. Six months after operation there was some flattening of the left dome and a suggestion that the bolus had been caught up in the oesophagus for a moment before entering the stomach. The patient was quite well, but said that he could "just feel" the food entering the stomach. His general health is now (1933) excellent and all dysphagic symptoms have completely disappeared. The notes from which the above record was compiled were made after the operation in 1929, but publication was delayed in order to test the permanency of the result. Since that time several cases have been recorded in which Gallie sutures or more massive grafts cut from the fascia lata were successfully used to close the diaphragmatic aperture.

CONCLUSIONS

My experience of cases of diaphragmatic hernia is too small to enable me to make any worthy comparison of the abdominal and thoracic routes of approach. In previous cases performed entirely through the abdomen I have felt dissatisfied not only with the access provided but also with the closure of the aperture solely by sutures, applied with difficulty and usually under tension. As these cases were chiefly ones in which incarceration had occurred or were post-traumatic, it would, however, hardly be fair to make any comparison. Harrington advocates the abdominal route, perhaps accompanied by phrenicotomy, and has obtained a large number of cures by this method. W. Salisbury, in this country, has recently described a case of herniation, apparently through the foramen of Bochdalek, in which, operation being by the abdominal route, the aperture was closed "with eight mattress sutures of double catgut, and the parts came together without any tension or difficulty." He states that he found the abdominal approach very satisfactory in every way, and considers that the thoracic approach should be reserved for cases with intrathoracic adhesions. This was, however, a definite congenital case without a sac, so that the problem of the efficient removal of the sac from the abdominal aspect did not arise.

It is suggested that the method here described, while undoubtedly necessitating a more severe operation than the abdominal approach, allows a closer approximation to the ideal radical cure than the mere suture of the edges of the aperture.

ELECTRO-SURGICAL TREATMENT OF MINOR ANAL CONDITIONS

BY

W. ARCH. MEIN, F.R.C.P.Ed., F.R.C.S.Ed.

BOURNEMOUTH

W. J. Morton, in 1881, was the first to apply oscillating currents to surgery. Since then many workers have enlarged the scope of this field of surgery.

There are at present three types of electro-surgical currents in surgical use: (1) the *monopolar*, or *Oudin*, current, which is one of highest voltage, as compared with (2) the *d'Arsonval*, or *bipolar*, current, of highest amperage, and (3) the *cutting* current, also a bipolar current. The difference in the effect on the tissues of these three currents is that the Oudin is a dehydrating current. The other two are coagulating currents. The difference between these latter two is one of damped and undamped oscillations, which in practice means depth of coagulation, the cutting current having a minimum of coagulation as small as 0.1 mm., whereas the other varies the depth of coagulation up to several centimetres. The cutting current, though sealing minute vessels and lymphatics, is not used for haemostasis. I have used all three currents in the treatment of ano-rectal conditions, and with one exception the operations have all been performed under local anaesthesia.

TECHNIQUE

Local Anaesthesia.—Two to three ounces of 1/2 per cent. anaesthetic solution are used. Commencing at the right anterior aspect of the anus, half an inch from the muco-cutaneous junction, a zone of fluid is injected round the anus subcutaneously, sufficient solution being used to raise the skin above the surrounding tissues. On the completion of the ring the tissues are massaged in order to disperse the solution into the subcutaneous tissues. With the left index finger in the anus the operator injects another deep zone into the sphincter muscle, which can be felt to relax as the injection takes effect. Operative proceedings should not be commenced until the finger in the rectum is swept round and meets no area of resistance. The actual procedure is practically painless, and occupies about five minutes. A useful adjunct is 1/4 grain of morphine and 1/150 grain of scopolamine between one and one and a half hours before operation.

Pre-operative Aperient.—The usual pre-operative treatment for this region is carried out—that is, bowels are well opened three to four days before by some aperient, and then the lower bowel is washed out until clear. The patient is then given 10 minims of nepenthe three times a day, and a fluid diet.

Post-operative Treatment.—Nepenthe is continued as before operation, and the bowels are not allowed to act for anything up to seven days. This, of course, varies with individual patients, the criterion being the tolerance of the patient. On the sixth night cascara is given, and half an hour before the bowels act the following day four to six ounces of warm olive oil are slowly injected into the rectum and retained. The evacuation is then free and painless. All patients are advised to finish their toilet with cotton-wool moistened with some mild antiseptic.

FISSURE, POLYPUS, AND FISTULA

Anal Fissure.—The current I use here is the monopolar, or Oudin, current. After anaesthesia a rectal speculum is introduced, and the fissure located and "sprayed" with this current. The result is a dehydrated eschar, which is left *in situ*. The immediate result is cessation of pain, due to the sealing of the exposed nerve endings. Three to four days after the operation the anus is gently swabbed out with a mild antiseptic. The patient is allowed up on the day after the operation.