

REPAIR OF INDIRECT INGUINAL HERNIA

MODIFICATION OF KOCHER'S METHOD, SIX-YEAR REVIEW

L. HUMAN, M.B., CH.B. (PRET.), F.R.C.S. (EDIN.), formerly, Department of Surgery, West London Hospital and Medical School

Since Bassini described his method for the repair of inguinal hernia in 1884, the operation has been added to or modified in many ways.

In 1943 at a meeting of the Royal Society of Medicine, Edwards stated that 'recurrence is actually and relatively more common after the Bassini operation than any other and for this reason I think the operation should be abandoned'. The number of recurrences reported by different authorities varies from 5 to 20% for indirect hernias (Fallis, Page) with an average recurrence rate of 10% (Rains).

Kocher described his method for repair of inguinal hernia in 1903. Recurrence rates, from reported cases as far back as 1905, are 4.9% by the Kocher technique compared with 7.8% by the Bassini technique—Deanesly, Hahn and Grosse, Daiches and Brenner (Kocher, 1911). Kocher himself obtained a 97% cure with his transposition-invagination method, using it in uncomplicated cases of indirect inguinal hernia.

Both Willis and Collins stressed the importance of disposal of the sac in the prevention of recurrence, combining it with a formal Bassini repair. Craig reported a series of 114 cases of indirect inguinal hernia treated by inversion of the sac through the abdominal wall. His recurrence rate, 4 years after the start of the operation, was 2.6%.

This article reports a modification of Kocher's operation which has been used in 164 cases over the last 6 years, with a recurrence rate of 1.2%. The number of operations performed each year was as follows: 1954, 9; 1955, 22; 1956, 37; 1957, 34; 1958, 38; and 1959, 24. The operation has been used in all cases of indirect hernia even when complications such as strangulation or adhesions of the contents to the sac were present.

OPERATIVE TECHNIQUE

Patients with a cough are adequately treated pre-operatively with antibiotics and physiotherapy. All patients are requested to stop smoking until they are discharged from hospital.

The usual oblique skin incision, starting just medial to the pubic tubercle half-an-inch above and parallel to the inguinal ligament, is used.

The external oblique aponeurosis and the external spermatic fascia are widely exposed. These are then opened by a 1-inch incision immediately above the external ring, using a scalpel. Each leaf is secured by forceps, held up strongly, and then divided by scissors, care being taken in this way not to damage the ilio-inguinal nerve. (In Kocher's original method the external oblique aponeurosis was not divided and the inguinal canal not exposed.)

The cremaster muscle is picked up between 2 curved forceps and divided, each flap being raised to expose the spermatic cord adequately. If a lipoma is found attached to the cord, this is first dissected off and its blood supply secured.

The sac is now identified, held taut in forceps, and dissected from the cord without disturbing the attachments of the cord to the posterior wall of the canal. A small, non-toothed, dissecting forceps is used and the dissection is continued until the neck of the sac is exposed and carefully dissected from the internal ring without damaging the latter. The contents of the sac are reduced by milking them back

between thumb and index finger and the sac is now ready for invagination and transposition.

In cases of strangulation, or adhesion of contents to the sac, the sac is opened and the contents attended to. The sac is then resutured and invaginated.

The middle of the fundus of the sac is grasped by a curved artery forceps and invaginated upwards and laterally, through the internal ring, keeping the points of the closed forceps close to the anterior abdominal wall. In no instance has the bowel been injured by this procedure. A. Most mentioned 1 case of trauma to small bowel, necessitating closure of an accidental perforation and added 1 case of his own in which small bowel was accidentally incised.

A Czerny retractor is now inserted under the proximal end of the medial leaf of the external oblique aponeurosis, exposing the internal oblique muscle and the ilio-hypogastric nerve. (Kocher made a 1/2-inch incision through the external oblique aponeurosis, at the level of the internal ring, after isolating the sac from below only as far as the external ring.)

The layers of the anterior abdominal wall deep to the external oblique aponeurosis are then opened proximally, at a point which depends on the length of the sac as guided by the tip of the forceps applied to its fundus, high enough to take up the slack of the sac and bring it out. A point 5 cm. above the internal ring is usually most suitable. A small muscle-splitting incision, securing each layer in a forceps, is



Fig. 1. The parietal peritoneum has been incised, its edges being held apart in readiness for the apex of the inverted sac to be pushed through.

used. The nose of the forceps is pushed through, covered by parietal peritoneum, which is then incised, the edges being caught in 4 small curved artery forceps (Fig. 1).

The fundus of the sac is seized with a straight artery forceps and the curved forceps used to invaginate it is removed and withdrawn through the internal ring.



Fig. 2. A transfixing suture is passed through the edges of the parietal peritoneum and through the middle of the inverted sac which is being forcibly drawn up.

The inverted sac is now forcibly drawn up, its neck transfixed and firmly ligatured, using medium linen-thread sutures which also include the drawn-up edges of the parietal peritoneum, thus closing the peritoneal cavity (Fig. 2).

The redundant sac is excised $\frac{1}{4}$ -inch distal to the ligature. Each end of the ligature is picked up in a curved round-bodied needle and passed outwards, picking up the layers of the abdominal wall held up in forceps, including approximately $\frac{1}{4}$ -inch of tissue. The 2 ligatures are then loosely tied, superficially to the internal oblique muscle, to avoid atrophy of the intervening tissue and the ends cut in the usual way. (Here Kocher closed the small opening in the external oblique aponeurosis and closed the inguinal canal by a series of interrupted silk sutures in the undivided external oblique aponeurosis.) The cremaster muscle is now carefully sutured with continuous catgut, leaving the spermatic cord in its normal position.

If a combined inguinal hernia with a saddle-bag or pantaloon sac is found, the posterior wall of the inguinal canal is opened, each layer of the fascia transversalis carefully raised, and the direct sac freed. By invaginating and applying traction on the sac of the indirect hernia, a double hernial protrusion can be united into a single sac for transposition. Closure of the posterior wall is performed by overlapping the fascia transversalis without tension, using interrupted medium linen-thread sutures. In this series, 27 of the total 264 inguinal hernias which were repaired had double sacs, an incidence of 10.2%. This stresses the importance of looking for both types of hernia in every case. No repair is made to the posterior wall unless a protrusion is present.

The external oblique aponeurosis is now closed, carefully reconstituting the external inguinal ring in the normal position, using 2 interrupted No. 2 chromic catgut sutures at the pubic tubercle and completing the rest with a continuous suture, avoiding the ilio-inguinal nerve. A snug fit (little-finger size) of this ring is important, but tightness should be avoided.

The deep layer of the superficial fascia is sutured with interrupted No. 00 plain catgut. Absolute haemostasis is secured and the skin is closed with interrupted mattress sutures of silk. A gauze dressing and adhesive plaster is applied.

COMPLICATIONS

So far, no case of subsequent herniation (Spigelian type) through the transposition incisions has occurred and no cases of femoral hernia were seen following this operation.

Infected haematomata in the subcutaneous tissues of the wound occurred in 2 cases, but no recurrence has followed. Some dragging sensation in the wound has occurred in 3 cases; this has caused little disability. One patient had a small hydrocele, 5 had a varied degree of varicocele, and 1 had atrophy of the testicle. The mortality in this series was nil.

STRANGULATION

Eighteen cases of strangulation were operated on. In all the sac was opened; resection of small bowel was performed in 4 and appendicectomy in 2. In these cases the sac was resutured, invaginated, and transposed as described.

RECURRENCES

If recurrence is going to take place, it usually does so within a comparatively short time.

According to Page and Edwards (1943), and Edwards, 75% of recurrences appear in the first 12 months and 90% in the first 24 months. Erdmann (1923) reports that 74% of his recurrences took place in the first 12 months and 98.6% in the first 24 months. Judd found that 70% of his recurrences were noted in the first 6 months and 90% in the first 12 months.

Indirect Recurrences

There were 2 cases with indirect recurrences. Case 1 was that of an extremely obese 52-year-old patient who developed a combined hernia 8 months after his first operation. This was again repaired, after weight reduction, with no further recurrence. Case 2 was that of a 67-year-old patient, with severe chronic bronchitis, who developed a recurrent indirect hernia 6 months after operation. Re-operation has not yet been undertaken owing to an exacerbation of his chronic bronchitis and a subsequent attack of amoebic hepatitis.

Direct Hernias

In this series 4 cases of direct hernia followed the operation. Two were proved at re-operation, the third was controlled with a truss, and the fourth was only a slight bulge requiring no further treatment. No repair of the posterior wall was performed at the original operation, in accordance with a policy of not interfering with the posterior wall unless a hernial protrusion is present. For this reason these are not regarded as recurrences. McVay and Chapp state that a direct hernia, appearing years after the repair of a simple indirect hernia, is a brand new hernia and not a recurrence.

DISCUSSION

The development of the indirect inguinal hernia, congenital in origin, is dependent upon the protrusion of a viscus in the persistent processus vaginalis. Invagination, transposition and adequate removal of this part of the peritoneum, without additional 'repair', should therefore preserve the normal inguinal anatomy and function regardless of how stretched the internal ring appears to be at operation. The disposal of the sac by the technique

described removes it from the inguinal canal and places a barrier over the internal aspects of the internal ring. It is conceivable that the space between the peritoneum and the fascia transversalis which is left after displacement is filled with blood and serous fluid which later forms an adequate barrier to recurrence.

In this series, the youngest patient was 16 and the oldest 86, the average age being 51.6 years.

A point of some significance is that there were no recurrences following repair of 10 recurrent hernias using this technique. The initial operation had been done by other methods.

Both Marsden and Craig had no doubt that repair of the posterior wall, as is done in Bassini's operation, damages the mechanism controlling the internal ring, so aptly described by Sir Arthur Keith (Rains, Blunt).

Regarding damage to the inguinal canal, it is pertinent to ask whether those large indirect hernias seen so frequently some years back, are particularly common nowadays. Has the present system of free hospitalization in Britain helped to solve the problem? Patients do not seem to carry their ruptures with them for as long as they used to do. By coming for treatment earlier, less damage is done to the mechanism of the inguinal canal.

SUMMARY

A 6-year review of 164 cases of indirect inguinal hernia, following a modified Kocher repair, has been presented. The follow-up was 84% and the recurrence rate 1.2%.

No repair or approximation of the margins of the inguinal canal was performed. Using this method there is no interference with the shutter-like action of the inguinal muscles closing the canal (Blunt).

Four cases were found to have direct hernias after operation, 1 of which showed only a slight bulge just above

the pubic tubercle (unnoticed by the patient) but as no repair was performed on the posterior wall at the original operation for indirect hernia, these direct hernias are regarded as brand new hernias and not recurrences.

The commonly practised method of simple ligation and resection of the sac, without some sort of fixation, must be responsible for a certain number of recurrences. Bulging of the peritoneum as a factor in recurrence is completely eliminated by using this method of repair.

This conservative operation gave results as good as and better than many other methods.

These cases were under the care of Mr. G. F. G. Batchelor who introduced the operation to the West London Hospital and personally operated on many of the cases. I wish to thank the Records Officer and his staff for their great help.

BIBLIOGRAPHY

- Andrews, E. (1924): *Ann. Surg.*, **80**, 225.
 Bassini, E. (1890): *Arch. klin. Chir.*, **40**, 429.
 Blunt, M. J. (1951): *Brit. J. Surg.*, **39**, 230.
 Bracey, M. (1956): *Ann. Roy. Coll. Surg. Engl.*, **19**, 383.
 Burton, C. C. and Ramos, R. (1940): *Surg. Gynec. Obstet.*, **70**, 969.
 Collins, J. D. (1942): *Ann. Surg.*, **115**, 761.
 Craig, C. (1950): *Med. J. Aust.*, **1**, 622.
 Edwards, H. (1943): *Brit. J. Surg.*, **31**, 172.
 Erdmann, S. (1917): *Ann. Surg.*, **66**, 702.
 Estes, W. L. (1956): *Amer. Surg.*, **22**, 948.
 Fallis, P. (1940): *Brit. Med. J.*, **2**, 113.
 Jason, A. H. (1952): *J. Int. Coll. Surg.*, **17**, 853.
 Judd, E. S. (1908): *J. Minn. Med. Assoc.*, **28**, 65.
 Kocher, T. A. (1903): *Textbook of Operative Surgery*, 2nd ed., p. 240.
 London: Adam and Charles Black.
 Ilem (1911): *Ibid.*, 3rd ed., p. 518.
 Longacre, A. B. (1939): *Surg. Gynec. Obstet.*, **68**, 238.
 Macleod, C. (1955): *Lancet*, **2**, 497.
 Moloney, G. E. (1958): *Ibid.*, **1**, 273.
 Marsden, A. J. (1958): *Brit. J. Surg.*, **46**, 234.
 McVay, C. B. and Chapp, J. D. (1958): *Ann. Surg.*, **148**, 499.
 Most, A. (1927): *Zbl. Chir.*, **54**, 1058.
 Page, P. (1943): *Proc. Roy. Soc. Med.*, **36**, 185.
 Rains, A. J. H. (1951): *Brit. J. Surg.*, **39**, 211.
 Rose, T. F. (1959): *Med. J. Aust.*, **1**, 756.
 Ryan, J. (1953): *Surg. Gynec. Obstet.*, **96**, 343.
 Soresi, A. L. (1930): *Amer. J. Surg.*, **10**, 130.
 Tanner, N. C. (1942): *Brit. J. Surg.*, **29**, 285.
 Willis, D. A. (1940): *Surgery*, **7**, 212.