5. The clinical results of the Bassini operation in repair of direct inguinal hernia are associated with a recurrence rate which is too high for satisfaction and which is higher than the recurrence rate associated with fascial repair.

6. The clinical results for indirect inguinal herniae which need repair are associated with a recurrence rate again too high for satisfaction, and higher than that associated with fascial repair.

The fact remains that many workers maintain that the Bassini operation or one of its modifications gives good results in their hands. This contrasts with the experience of many sound surgeons and of important teaching centres where the operation has been tried and found wanting. The reason for this conflict of thought is obscure and probably insoluble.

It may be said that no expression of opinion in regard to the efficiency of an operation is of value unless supported by careful follow-up examination not only for recurrence but for late post-operative morbidity. Papers have been published describing the late morbidity after operations for the repair of hernia by several methods, and again the conclusions in regard to the Bassini are somewhat less satisfactory than those for fascia (Bloodgood, 1899; Erdman, 1923; Russell, 1925; Lyle, 1928; Patterson, 1928; Gibson and Felter, 1930; Foster, 1936; Fallis, 1940).

Although opinions differ in regard to the treatment of hernia there is agreement, at any rate, about one thing—that the treatment of hernia is highly controversial, has been for many years, and is likely to remain so for many more. Such a state of affairs can arise only where the results of treatment fail to reach the highest levels of satisfaction; and until some advance is made which will conclusively and universally solve the choice of operation for hernial repair controversy is likely to rage.

REFERENCES

- Andrews, E. (1924). *Ann. Surg.*, **80**, 225.
 — (1928). *Ibid.*, **88**, 874.
 Bloodgood, J. C. (1899). *Johns Hopk. Hosp. Rep.*, **7**, 223.
 — (1918). *South. med. J.*, Nashville, **11**, 366.
 Burdick, C. G. (1928). *N.Y. St. J. Med.*, **28**, 1269.
 Burian, F. (1919). *Rev. Chir.*, Paris, **57**, 221.
 Cattell, R. B., and Anderson, C. (1931). *New Engl. J. Med.*, **205**, 430.
 Coley, B. L. (1924). *Ann. Surg.*, **80**, 242.
 Cowell, E. (1930). *Clin. J.*, **59**, 417.
 Edwards, H. (1943). *Brit. J. Surg.*, **31**, 172.
 Erdman, S. (1923). *Ann. Surg.*, **77**, 171.
 Fairfield, W. E. (1915). *Surg. Gynec. Obstet.*, **21**, 777.
 Fallis, L. S. (1936). *Ann. Surg.*, **104**, 403.
 — (1940). *British Medical Journal*, **2**, 113, quoted by O'Connor, J. F.
 Fantino, G. (1912). *Clin. Chir.*, Milan, **20**, 1033.
 Farr, C. E. (1927). *Surg. Gynec. Obstet.*, **44**, 261.
 Foldes, D. (1920). *Ibid.*, **31**, 402.
 Foster, G. V. (1936). *Ibid.*, **63**, 632.
 Gibson, C. L., and Felter, R. K. (1930). *Ann. Surg.*, **92**, 744.
 Gould, F. P. (1940). *J. roy. nav. med. Serv.*, **26**, 122.
 Grace, R. V., and Johnston, V. S. (1937). *Ann. Surg.*, **106**, 347.
 Gray, W. (1940). *British Medical Journal*, **1**, 568.
 Gray's Anatomy (1942). 28th ed., London.
 Joyce, T. M. (1940). *J. Amer. med. Ass.*, **115**, 971.
 Koontz, A. R. (1926). *Surg. Gynec. Obstet.*, **42**, 222.
 Lyle, H. H. M. (1928). *Ann. Surg.*, **88**, 870.
 MacGregor, W. W. (1930). *Surg. Gynec. Obstet.*, **50**, 438.
 Ogilvie, W. H. (1937). *Proc. roy. Soc. Med.*, **30**, 532.
 Oudard and Jean, G. (1922). *Rev. Chir.*, Paris, **60**, 143.
 Page, C. M. (1943). *Proc. roy. Soc. Med.*, **36**, 185.
 Patterson, D. C. (1928). *New Engl. J. Med.*, **198**, 191.
 Polya (1906). *Orv. Hetil.*, p. 38.
 — (1912). *Presse méd.*, May 11.
 Randall, G. M. (1930). *Med. J. Rec.*, **131**, 96, 139.
 Roberts, G. W. and K. (1925). *Ann. Surg.*, **81**, 833.
 Robins (1940). *Ibid.*, **111**, 610, quoted by McClosky, J. F., and Lehman, J. A.
 Rosenblatt, M. S., and Cooksey, W. B. (1927). *Ibid.*, **71**, 86.
 — and Meyers, M. (1928). *Surg. Gynec. Obstet.*, **47**, 836.
 Russell, R. H. (1906). *Lancet*, **2**, 1197.
 — (1922). *Brit. J. Surg.*, **9**, 502.
 — (1925). *Surg. Gynec. Obstet.*, **41**, 605.
 Seeliger, M. G., and Chouke, K. S. (1923). *Arch. Surg.*, Chicago, **7**, 553.
 Skillern, P. G. (1922). *Ann. Surg.*, **86**, 82.
 Skillern, P. G. (1922). *Surg. Gynec. Obstet.*, **34**, 230.
 Stein, H. E. (1942). *Amer. J. Surg.*, **56**, 480.
 Taylor, A. S. (1920). *Arch. Surg.*, Chicago, **1**, 382.
 Turner, G. G. (1937). *British Encyclopedia of Medical Practice*, **6**, 488, London.
 Turner, P., and Eckhoff, N. (1929). *Guy's Hosp. Rep.*, **9**, 234.
 Watson, J. F. (1924). *Hernia*, St. Louis.
 — (1925). *Surg. Gynec. Obstet.*, **40**, 119.

E. J. Donovan and T. V. Santulle (*Amer. J. Dis. Child.*, 1945, **69**, 176), who record ten cases, state that, though gastric and duodenal ulceration are rare in infancy and childhood, the diagnosis would probably be made much more frequently if it were realized that it may occur at this age. Haemorrhage, which is the commonest complication, was found in six out of the ten cases. Perforation and pyloric stenosis were also observed. Malignant disease was not encountered.

BASSINI'S OPERATION FOR INGUINAL
HERNIA

BY

THOMAS L. GORDON, F.R.C.S.Ed.

Dispensary Surgeon, Western Infirmary, Glasgow

During the last few years the value of Bassini's operation for inguinal hernia has been deprecated, and many alternative procedures have been recommended. In my view there is, however, still a wide field of usefulness for Bassini's method, and, provided the technique is skilfully applied, the results are as good as, if not better than, most of the other procedures. Naturally, this operation is not indicated in every case of hernial repair, and its choice in any particular instance can as a rule be definitely decided only when the canal is exposed. In the young or even in the middle-aged, with good musculature and a well-formed inner ring, usually no more is required than a thorough removal of the sac, but in patients with poor musculature, a weak transversalis fascia, and a large internal ring Bassini's operation gives very satisfactory results. The following is the procedure usually adopted.

Technique

After the usual skin toilet an inguinal incision is made, 3 to 4 in. long, in the line of the inguinal canal; a good length of incision is advisable for proper exposure. Haemostasis must be complete throughout and, where possible, vessels are picked up before division; this prevents staining of the tissues and allows clearer differentiation of the various structures. The external oblique aponeurosis is then divided by making a small incision 2 in. from the external ring and, with a pair of scissors, cutting from this incision along the line of the fascia to the centre point of the external ring and upwards as far as the level of the internal ring. Both upper and lower margins of the fascia are picked up by two pairs of pressure forceps. Traction through these forceps is now applied to the upper layer, and with a gauze swab it is freed from the underlying internal oblique and rectus abdominis, as far as this can be carried out without undue force. The lower layer is pulled down and the upper surface of the inguinal ligament is well exposed by gauze dissection of the areolar tissues. At this point two nerves are noted—the ilio-hypogastric and ilio-inguinal; the latter, lying along the cord usually on its anterior surface but occasionally on its lower and posterior, is picked up, divided, and ligatured at both ends, as there is usually an accompanying vessel; the ilio-hypogastric, running superior to the cord below the external oblique aponeurosis, may have to be treated in a similar fashion if it is so low that it might be included when suturing this later.

The cremasteric muscle is divided along the line of the cord and the latter is lifted from its bed, two small gauze swabs being passed below it to allow light traction. Below the cord, where it lies over the pubis, the areolar tissue is cleared, either by gauze or scissor dissection, depending on its thickness, until the inner end of the inguinal ligament, the pubic spine, and the approximating area of the pubis are clearly exposed. Dissection of the cord in the usual manner is carried out until the sac has been well separated, and this is ligatured as high above the neck as possible, the internal oblique being retracted to enable this to be done satisfactorily. It is possible that retraction of the epigastric vessels may also have to be carried out to give good exposure for this procedure.

The cremasteric muscle and fascia are now dealt with. This muscle is very variable, sometimes being exceedingly thick and tending to interfere with proper repair. In some cases it is not necessary to remove it, but in the majority it is better to do so completely, as this allows closer approximation of the internal oblique to the inguinal ligament. If the remaining part of the cord is still very thick or contains a large mass of veins, portions of these should be removed to allow more accurate closure of the external ring. For obvious reasons care should be taken not to remove too much of the pampiniform plexus. Running over the transversalis fascia are some veins which, at times, may be very large and closely adherent to the cord at the level of the external ring, and it is as well to ligature these in two places, removing the intervening portion and leaving the bed of the canal clear.

One is now ready to carry out the repair. Using No. 1 or No. 2 chromic 20-day catgut, interrupted sutures are inserted at 1/2 in. intervals. The first of these takes in the lower portion of the rectus, the conjoint tendon, and the periosteum of the pubis close to the pubic spine. The next includes the conjoint tendon and inguinal ligament, and the remainder the internal oblique, transversus abdominis, and inguinal ligament; with each a good bite of the muscle is taken, the needle being inserted 1/2 to 3/4 in. from its lower border. The last suture closes the internal ring until only the tip of the forefinger can be inserted comfortably; occasionally,

if the ring is very large, an extra suture is put in on the outer side of the cord. A continuous suture of No. 0000 chromic 20-day catgut is inserted over the interrupted sutures, picking up the muscular margin and the inguinal ligament. When inserting the needle into the inguinal ligament, for both the interrupted and the continuous sutures, slightly different levels are taken to prevent splitting of the fibres. The remains of the cord are now laid back in this bed and the external oblique aponeurosis is sutured with No. 0 chromic catgut till the external ring admits the tip of the forefinger. The deep fascia is sutured with No. 0000 chromic catgut and the skin wound closed with interrupted silkworm sutures. After dressing, a firm spica bandage is applied.

After-care.—The stitches are removed on the 8th to 10th day and the patient is kept three weeks in bed, and a further two months must elapse before he starts heavy work. For the first week patients are nursed so far as is possible in the extended position, as it has been found that in some cases in which a knee pillow has been used or they have been allowed to sit up there is a complaint of slight discomfort in the groin of a dragging nature for a few months after the operation. After the first week, however, they can move about the bed as much as they care to do, although no special exercises are performed, but, when lying, the leg on the affected side should be kept extended. After leaving hospital the only instructions given are, for a period of three months, to lift no heavy weights which would necessitate their having to hold the breath to do so, as when the diaphragm is fixed in this manner a very considerable strain is put on the inguinal regions.

Points regarding the Operation

The *transversalis fascia* varies considerably in its strength. In some it is a good solid structure which could be used for repairing the posterior wall of the canal, but in the great majority it is thin, and by itself would be unlikely to stand up to much stress, particularly in cases of direct hernia. Bassini himself, however, used to divide the fascia and overlap it as well as bringing down the internal oblique muscle. This fascia is closely adherent to the under-surface of the internal oblique, and when this muscle is brought down there is bound to be a degree of plication and ultimate contraction. In cases in which the inner ring may be on the wide side and this fascia is of good quality there does not appear to be any reason why it should not be used for narrowing the ring, and in cases of direct hernia a wedge should be removed, after which the edges are sutured and the usual repair then done.

Internal Oblique.—When this muscle is brought down to the inguinal ligament before separating it from the external oblique there is often considerable tension, but once this manipulation is carried out remarkably little tension occurs in the great majority of cases. It has been contended that the margin of the muscle is destroyed and that its valvular function is diminished. This, however, is quite definitely not the case when the operation has been performed satisfactorily. The margin of the muscle does become stretched, attenuated, and fibrosed; but it forms a very excellent posterior wall to the inguinal canal, and if, in these cases, a finger is put into the internal ring and the abdominal muscles are contracted it is quite obvious that there has been no loss of function in the musculature of this region.

Occasionally at the inner angle considerable tension on the suture is present, and in these cases a flap from the anterior sheath of the lower rectus can be turned over to cover this defect, or a vertical relieving suture in the fascia can be made. In only one of the series quoted below was the latter procedure required.

Inguinal Nerve.—In all the cases cited below the ilio-inguinal nerve has been removed without any complaint afterwards of numbness or other symptoms. It is advisable to remove this nerve, for if it becomes incorporated in any fibrous tissue a very acute ilio-inguinal neuritis can be set up, and the canal has to be reopened and the nerve removed. Recently a patient had to be operated on for this complication after a Bassini operation had been performed elsewhere. As well as finding that the nerve had been incorporated in the external oblique sutures, it was noted how well the posterior wall of the canal and the internal ring were supported by the attenuated muscular bed.

Results

This paper is a review of 143 cases submitted to Bassini's operation since 1936, by either Mr. A. J. Hutton or myself, in Mr. Hutton's wards in the Western Infirmary. They included all types of hernia, both simple and strangulated, and all ages.

In the whole series there were two deaths, both of these in patients over 70 operated on for strangulated hernia.

A questionnaire was sent to all survivors, and 118 replies were received. Of these, eight had since died from some other cause than the hernia, which apparently was quite satisfactory at the time of their death, but they are not included in this list. In 10 cases the letters were returned "Not found," leaving 100 cases suitable for analysis. In the 100 cases 107 herniotomies were performed. These were subdivided as follows: bilateral, 7; right direct hernia, 8; left direct hernia, 6; right indirect hernia, 47; left indirect hernia, 32. Of this series 5 were recurrent and 11 strangulated. The age groups were: 10–20 years, 4; 20–30, 11; 30–40, 19; 40–50, 20; 50–60, 27; 60–70, 16; 70–80, 2; 80–90, 1.

Altogether there were three recurrences: the first of these was in a man 48 years of age, with a direct hernia and exceedingly poor musculature, and not really very suitable for this type of operation; the second, in a man of 65 who had had a bilateral operation nine years previously and had developed a recurrence with strangulation, also of the direct type of hernia, and with very poor musculature. The third of these patients, a man aged 62, returned to his work very shortly after operation and slipped while lifting a heavy weight, after which his hernia recurred.

The average time before resuming work was eight weeks, varying from three weeks to six months, and all returned to their normal occupations except four who were over 60, and of these two retired and two returned to lighter work.

Bassini's series of cases, numbering 216 simple herniae between 1884 and 1889, showed a recurrence rate of 3% and a suppuration rate of 5%. In the cases quoted above, beyond slight reddening of the skin round the silkworm sutures in a few cases, no further evidence of sepsis was found. At the Pio Istituto Bassini at Milan, where this operation is the method of choice, in a series of 10,000 cases, they state that the recurrence rate is between 1 and 2% for simple herniae.

Although figures can be very misleading they do give a fair indication when assessing results, and those quoted compare favourably with any given previously. This operation should therefore be considered as a standard operation and especially indicated in the middle-aged and old where a fairly satisfactory musculature is present. It must, however, be meticulously carried out to obtain satisfactory results. In fact, the tissues—both muscular and fascial—have to be exceedingly poor before the operation is contraindicated. The technique is easily acquired, and there is much less scope for error than in many of the procedures in common use to-day.

RELATION BETWEEN GASTRIC ACIDITY AND THE ANTERIOR-PITUITARY-LIKE HORMONE CONTENT OF URINE IN PREGNANT WOMEN

BY

STANLEY WAY, M.R.C.O.G.

Assistant, Department of Obstetrics and Gynaecology, the Medical School, King's College, Newcastle-upon-Tyne

(From the Laboratory of the Princess Mary Maternity Hospital)

The earliest observations on gastric acidity in pregnancy were made in 1925 by Nakai, who showed that there was a striking diminution in both the free and the total acid content of gastric juice in response to a test meal. This was confirmed by Artz (1930) and Anderson (1932), both of whom drew attention to the fact that the lowest secretion of free acid coincides with the period of pregnancy when nausea and vomiting are common. Strauss and Castle (1932), investigating anaemia in pregnant women, confirmed that secretion is diminished, and further showed that there is a rise in secretion of free acid in the last month of pregnancy and a very great rise immediately after delivery. They also showed that the gastric response to histamine was greatly diminished.

In 1938, during a statistical investigation into the incidence of hyperemesis gravidarum, I noticed an extraordinarily high incidence of this disorder in patients who were suffering from