general symptoms increase. At the end of four to seven days the splint or sling is removed and the limb is palpated through the bandage. If no pain is elicited and no fluctuation felt, he is merely asked to report again a week later, when the bandage is removed. Only if a local abscess has formed is surgery required, and quite often no such abscess forms. Frequently, with quite a severe initial cellulitis of the forearm, a man may return to work in four to seven days still wearing his bandage.

Suppuration

Where an abscess has formed, incision is made and all contents and slough evacuated. Where no marked resulting cavity remains, as in fingers, palm, etc., once bleeding has stopped, adhesive elastic or viscopaste bandage is again applied, and a splint if necessary. The patient does not report again at hospital for one week. Difficulty is sometimes experienced by the patient with the oozing of discharge through the elastic bandage dressing. This is best remedied by washing the part once or twice a day with soap and water, an act which in no way interferes with the efficiency of the bandage. Nothing must be applied over the bandage which might hinder free evaporation: the freer the evaporation the less discharge. By this means severe cases of finger and palmar sepsis are treated with remarkable comfort to the patient and with the elimination from the department of those agonized individuals attempting in vain to gain ease from the fleeting comfort of hot arm baths and the frequent application of fomentations. Where the lesion occurs in soft tissue planes, such as the neck or buttock, and, by virtue of surrounding structures or damage to immediate tissue, a large non-collapsible cavity results, I find it wise to pack such spaces. The best pack I have found to be gauze soaked in pure glycerin, and the optimum time for removal of the pack the fifth day. After drying the skin with surgical spirit, adhesive bandage may immediately be applied, or the first dressing may be of dry, sterile gauze, and the adhesive applied only when the pack is removed on the fifth day.

As a last word on the treatment of sepsis by this method, I would encourage persistence with its application until the lesion is healed. In severe and purulent lesions there are moments when one is tempted to stray to other methods, but I have found none that improves progress. A weekly change of the dressing is usually at first required, but later the interval may be prolonged. Between each dressing the lesion should be cleansed with sterile water or surgical spirit.

Application to Burns

For reasons not distantly estranged from those which led me to apply the elastic bandage and splinting treatment to tissue sepsis, I have applied it also in cases of burns, irrespective of the degree. My experience in this direction has been pleasing, and I find the method to have advantages over that of tannic acid, and to possess few disadvantages. It is much easier to apply, particularly in infants, and gives very quick comfort. Like tannic acid it eliminates the absorptive danger and diminishes and shortens the phase of shock. The method I now use is simply to clip away all blisters and apply the bandages. Unless the area is very foul, preliminary cleansing appears to be unnecessary, and hence no anaesthetic is required. As in all treatments involving the use of the adhesive elastic or viscopaste bandage, air must be allowed to circulate freely about the area involved. Where the patient is so burned that he must be admitted to hospital, he is treated in a hot-air bath with the bed coverings so arranged that free through circulation of air is possible. If the whole of the lower limbs are involved, they are slung to the cage so as to prevent the posterior surfaces from lying in contact with the bed and thus

hindering evaporation. Immediately the shock phase is over the bandaged areas are exposed to the air without bed covering of any sort. Tissue fluids are allowed to exude through the bandages, there dry, and only when excessive need they be removed. By treating these cases uncovered by bed-clothes, whether in the ward or out in the open air, little or no inconvenience is experienced from odour. On an average I leave the first bandaging in place from two to three weeks in the out-patient department and from three to six weeks in the hospitalized case, the length of time depending on the degree of burn present. The deeper the burns the longer the application should be. Epithelialization is a more rapid process by this method than in the presence of the eschar of tannic acid and the problem of sepsis much less difficult to manage. After the first bandages are removed, only raw areas are re-covered, and many of these require merely patches of adhesive bandage. It is found advantageous to dry up the burnt areas at each dressing with a hot-air dryer before the application of bandages, but this is only essential where strips of the bandage cannot otherwise be made to adhere.

As regards the use of the elastic adhesive bandage and the viscopaste bandage, I find very little to choose between them except that the viscopaste one can be twisted round areas, such as the clefts between fingers, where the elastic adhesive cannot comfortably be applied. The use of these bandages, though apparently costly, is not found to be so. Dressings are very greatly reduced in number, antiseptics are practically eliminated, and the staff consequently liberated for other duties.

A MODIFICATION OF LOTHEISON'S OPERATION

UTILIZATION OF THE SAC IN THE RADICAL CURE OF FEMORAL HERNIA

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Lotheison's operation is generally admitted to be the method of choice in the radical cure of femoral hernia. By its means an aberrant obturator artery can be identified and dealt with; an excellent exposure of the neck of the sac can be obtained; the strangulated bowel can be easily inspected and a resection carried out if necessary; and closure of the wound, and in particular the peritoneum after separation of the entire neck therefrom, is a more perfect procedure than is possible by the femoral route. This operation fails, however, to achieve an adequate closure of the femoral canal. One authority states that, given an efficient closure of the peritoneum, the canal should be left alone, staples, mattress sutures, etc., "doing more harm than good." Surely an admission of failure. The number and variety of the methods mentioned in the literature indicates definitely that the majority of surgeons are of the opinion that the canal *should* be closed.

Most femoral herniae are acquired. The maximum incidence is at about 45 years of age, and it is twice as common in women as in men. The physical condition of these patients is not likely to improve after 45 years, and if the canal is left untreated at operation or inadequately treated a recurrence of the hernia is probable, especially in the type of patient whose intra-abdominal pressure is increasing. The recurrence of femoral herniae is generally estimated as between 4 and 5 per cent. Husted considers it as high as 21 to 32 per cent. The higher figure is probably more accurate. Patients are loath to return for a further operation if the first has

failed until the recurrent hernia gives trouble. If they do return it is frequently to a different surgeon.

In some herniae the femoral canal, even after removal of the sac, is quite small. In these cases tendon or catgut sutures passed through Poupart's and Hey's ligaments above and the reflected fascia over the pectineus below may be sufficient to achieve closure without tension. In most cases the femoral canal after removal of the sac is far from "chink-like." It frequently admits a finger with ease, and an attempted closure by any form of mattress suture means a suture under gross tension. This is rendered inevitable by the anatomy of the femoral canal, and a suture under gross tension is not to be relied upon. It would be interesting to know for how many hours these forcible closures remain closed. A flap of periosteum or deep fascia has been advocated. These are usually too thin to be useful. A flap turned down from the internal oblique, or one turned up from the pectineus, is better in principle. Both methods have the disadvantage of weakening one part to reinforce another, and neither can be rapidly and efficiently carried out at an emergency operation.

In adding yet another method to the long list of those suggested for the closure of the femoral canal, the writer offers as his excuse that the method is simple and efficient. It is inapplicable only in those cases where the contents, bowel, appendix, or ovary are gangrenous and the sac literally an abscess. In such cases the radical cure of the hernia is of secondary importance to the saving of life, and Hey Groves's modification is the method of choice.

Method Advocated

The initial steps are those of Lotheison's operation. Incision is as for inguinal hernia, the external oblique being cut in the same line; the transversalis fascia is then incised and the deep epigastric vessels identified. The next step is isolation of the neck of the sac under direct inspection (Fig. 1). At this stage the conjoined tendon is retracted and the parietal peritoneum incised, the incision passing almost vertically downwards and finishing on the medial side of the neck of the sac. The peritoneum is picked up with forceps, the edges retracted, and the contents of the sac identified. If bowel is strangulated a light clamp is applied across the loop, and attention is directed to the fundus of the sac below Poupart's ligament.

FIG. 1.

FIG. 2.

FIG. 3.

Only the anterior and medial surfaces of the sac should be wiped clear at this stage. No attempt should be made to isolate the whole sac, as, however tempting it may be to wipe the whole sac clear down to the femoral ring, such manipulation may rupture the contents.

The sac is packed off and a small incision is made on the antero-medial surface. A hernia director is passed into the sac, with its groove directed upwards and slightly medially. In most cases the director can be passed through the neck of the sac until its tip appears at the lower end of the incision in the parietal peritoneum. The two incisions—that in the parietal peritoneum and that on the antero-medial surface of the sac—are now made, one by passing the back of the knife along the

groove in the hernia director and cutting medially and slightly upwards. If Gimbernat's ligament is constricting the neck of the sac on the medial side it will be incised (Fig. 2). If the director cannot be passed through the neck force should not be used. By proceeding piecemeal with director and knife the two incisions can be connected. Thereafter the contents are easily released and dealt with as is necessary. The bowel having been returned to the abdominal cavity the neck of the sac is cut through at its junction with the parietal peritoneum, and the peritoneum closed with a continuous suture (Fig. 3). It then remains to deal with the sac and close the wound.

The sac is utilized to plug the femoral canal. Its fundus is wiped clear down to the femoral ring. An artery forceps

FIG. 4.

FIG. 5.

FIG. 6.

is passed into the sac from above Poupart's ligament, the fundus is picked up, and, by traction on the forceps, the sac is turned inside out (Fig. 4). The empty sac now lies on the inner surface of Poupart's ligament, between it and the parietal peritoneum (Fig. 5). The attachments of the neck of the sac to the femoral canal have been left intact, except where the incision passes through the medial surface. Viewed from the outer surface of Poupart's is the cuff-like protrusion of the now doubled neck and the small medial incision into Gimbernat's ligament. The neck and the incision is now closed with one or two catgut sutures (Fig. 6). There is never any need for tension on these, as the amount of protruding sac can be adjusted as required. In the majority of cases the sac is sufficiently adherent to the floor of the femoral canal. If there is any doubt as to this the fundus should be stitched down to the pectineus above Poupart's ligament.

The fundus now protrudes on the peritoneal aspect of Poupart's like the head of a rivet, and precludes the possibility of any recurrence. Where infection of the sac is suspected a very small rubber tube is inserted at the medial end of the wound between the edges of the external oblique, and a stab drain is brought out through the lower skin flap. If the sac is very redundant or very thin-walled it may be trimmed or plicated to form a more suitable "rivet head."

Conclusions

The following claims are made for the procedure described above.

1. It is easily carried out in all cases of femoral hernia, except where the sac is an "abscess," when it is inapplicable.
2. It can be more rapidly performed than resection of the sac and attempted closure of the femoral canal.
3. No damage is done to the ring except a small medial incision.
4. The doubled neck fills up the canal, and the edges can be apposed without tension.
5. The fundus forms a "rivet-head" plug at the inner end of the femoral canal.
6. The only weak part—the attachment of the neck to the underlying pectineus—can be reinforced by one or two stitches without tension if necessary.
7. It forms a living graft.