TECHNIQUE FOR BY-PASS OPERATIONS IN FEMORAL ARTERIAL DISEASE

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The results of resection and end-to-end grafting in the treatment of obstruction of the femoral artery due to obliterative arterial disease have been disappointing, there being a very high incidence of further thrombosis. This has led many surgeons to reconsider the by-pass type of operation recommended by Kunlin *et al.* (1951) and more recently used by F. B. Cockett (1953, personal communication), Crawford and de Bakey (1955), and Linton and Menendez (1955).

So far as the positioning of the patient is concerned, those authors appear to have used the positions designed for complete exposure of the femoral and popliteal vessels. The usual position, with the patient lying on the affected side and the unaffected leg flexed, gives good access to the lower femoral and popliteal arteries but obscures the upper femoral.

Method

A method of operation has been devised which gives good simultaneous access to the common femoral and popliteal arteries by two surgeons operating together in a synchronous combined procedure. The patient lies on the unaffected side, and a small wooden table, designed so that its legs are firmly engaged on the operating table, is placed over the normal leg (this table was designed by J. Crawford Adams for use in hip arthroplasty operations). The table is covered with a "sorbo" rubber pad on which the diseased leg rests (Fig. 1).

FIG. 1.—The operative position, showing the type of table used to support the diseased leg.

The position is maintained with the normal back rest and chest support used in kidney operations. These are placed fairly high so as to allow slight rotation of the patient should better access to popliteal or groin incision be required. One surgeon sits opposite the popliteal fossa and the other faces the groin. Each assistant sits opposite his surgeon.

The popliteal incision is made first in order that the popliteal artery may be inspected and its suitability for end-to-side

anastomosis assessed. Should it be suitable, the second operator makes a small vertical incision exposing the common femoral artery bifurcation, while the first operator continues his popliteal dissection. A tunnel is then made from one incision to the other, this being started with an index finger from each end. In some patients it may be possible to complete the tunnel by digital dissection, but in others a long instrument such as a sponge-holding forceps or Lloyd Davies artery forceps is passed. A plane is found easily from the upper end passing deep to the sartorius medial to the femoral artery. The tunnel may be made to transverse the adductor magnus by enlarging the normal arterial hiatus or a fresh opening may be made. This is the only point where even slight difficulty has been found, and slow, careful exploration with a finger from the lower incision may be needed. The exact anatomical site of the tunnel is difficult to determine throughout its length, but it is probably within the subsartorial canal for most of its distance. This dissection is almost bloodless. A tube is then introduced through the lower incision and guided through the tunnel by the instrument from the upper end. An oesophagoscope has been found to be a useful tube (Fig. 2). It is

FIG. 2.—The passage of an oesophagoscope from popliteal to femoral incision.

essential to ensure that the graft will pass easily through the tube. The purpose of the tube is to allow the graft to be threaded through the tunnel without any possibility of uneven tension or kinking or twisting. The graft has a number of small silk sutures or ink marks placed in a straight line down its length as a further precaution against twisting. The graft or implant is then drawn through the oesophagoscope with long biopsy forceps and the oesophagoscope withdrawn. After carefully assessing the length required, the ends of the graft are trimmed and each operator proceeds to make his end-to-side anastomosis, the lower being to the popliteal artery and the upper to the common or superficial femoral. The method of anastomosis is that used by F. B. Cockett. With this technique a by-pass procedure is a relatively short operation. It may be done by two surgeons, working synchronously, in little over an hour. In single-handed surgery the position is of advantage as it allows good access without turning the patient. Slight adjustment can be made to the position by rotating the leg and patient through a few degrees so as to improve the lighting and access without any change in the towelling.

The by-pass type of operation is of too recent introduction for any opinion to be formed on its merits, but it was thought that this simple technique might be of use to others who are experimenting with by-pass operations.

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