End to Side Anastomosis Between The Great Saphenous Vein and Subcutaneously Fixed Femoral Artery

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This demonstration describes a new vascular preparation in the thigh as a permanent access to the blood circulation of patients undergoing intermittent haemodialysis when all conventional shunts have been exhausted. The method is a combination of two previously described techniques:

1. The arterio-venous end to side anastomosis between the great saphenous vein and the femoral artery (Izquierdo et al, 1969)

The subcutaneous fixation of the femoral artery itself generates a durable access to the patient’s circulation if the vessel is well developed, not atheromatous and if there are suitable peripheral veins for reinfusion of the dialysed blood. More than 2500 dialyses have been performed using this method in a total of 34 patients. Ten patients have been dialysed more than 100 times and 3 others more than 200 times via the subcuticularised femoral artery.

Should no suitable veins be present for blood return, it is possible to perform the subcutaneous fixation of the femoral artery on both legs, the vessel puncture area being thus extended, allowing arterio-arterial dialysis.

Should severe atheromatous processes or anatomical limitations (limited vessel size) be present, an alternative to this second operation is the combination procedure demonstrated — a subcutaneously fixed end to side anastomosis between the v. saphena magna and the a. femoralis.

SURGICAL PROCEDURE

A skin incision of 20-25 cm length is made between the fossa ovalis and the medial femoral epicondyle (Figure 1). The femoral artery is prepared in a previously published fashion (Brittinger et al, 1969, 1970). The vena saphena magna is dissected with close astenotic ligation of the perforating tributaries from its junction with the femoral vein to the medial femoral epicondyle.
Transection of the saphenous vein is made as far distally as possible near the medial femoral epicondyle and the proximal segment is fixed in loop form anterio-laterally within the subcutaneous tissue by means of a 3 cm incision. An end to side anastomosis is made between the saphena loop and the femoral artery which has been fixed above the fascia lata.

**PUNCTURE OF THE SAPHENA-FEMORALIS SHUNT**

The first puncture of the venous loop should not take place before the 4th postoperative week so that perivascular healing allows cannula withdrawal without an increased danger of haematoma.
1 Double cannulation of the saphenous loop (Figure 2b). One cannula as blood source is inserted against the blood flow pointing toward the anastomosis. The blood return cannula is placed in the proximal portion of the venous loop pointing downstream.

Figure 2. a: single cannulation of the saphenous loop. The loop is cannulated for reinfusion only, the subcutaneously fixed femoral artery on the other thigh serves as blood source. 
b: double cannulation of the saphenous loop

2 Single cannulation of the saphenous loop (Figure 2a). The subcutaneously fixed femoral artery serves as blood source. The blood return needle is placed downstream in the saphenous loop.

RESULTS AND DISCUSSION
The arterio-venous end to side anastomosis between the v. saphena magna and the subcutaneously fixed femoral artery has been used for dialysis in
two patients, and a total of 94 dialyses has been performed using this tech-
nique without any complications. In both cases it was not possible to establish
conventional shunts because all suitable sites had been exhausted through pre-
vious operations. The subcutaneous fixation of the femoral artery alone did
not seem to guarantee dialysis over an extended period for these patients.
One patient showed marked atheroma of the femoral artery angiographically
(Figure 1). The other patient exhibited vascular hypoplasia with no suitable
peripheral veins due to infusion trauma and previous operations. Complica-
tions could be expected in such patients even if the femoral arteries had been
subcutaneously fixed in both legs.

By the subcutaneous fixation of the femoral artery and its subsequent
anastomosis with an antero-laterally displaced saphenous loop, two large
vessels become readily accessible for multiple punctures. Observed condi-
tions indicate that in these two patients with severe vessel limitations and
for similar cases should they exist, successful access to the circulation for
haemodialysis can be made possible for an extended period.

It is not always possible to avoid the important consequence that the shunt
flow for this preparation is large (ca 800 ml/min) and may lead to high out-
put heart failure.

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