LETTERE

Autologous fat for the completion of microvascular anastomosis

TO THE EDITOR: Free tissue transfer success is based on the correct execution of microvascular anastomosis. Vessel anastomosis using separate stitches suture is the most widely accepted method. Non-suture techniques, especially for veins, are often used (Vein coupler, Synovis etc.); however, these can be technically challenging and expensive.[1]

In free flap surgery, after evaluation of vessel position and size match, we mostly use end to end anastomosis: arterial and venous vessels are joined together using simple interrupted sutures. After vascular clamps are released, if major leaks are noted along the suture line, these would normally require additional sutures, with or without re-clamping. On the other hand, minor leaks can be stopped by a gentle compression with a moist gauze or, alternatively, a less known maneuver can be performed to manage these kind of leaks.[2] A small piece of fat (about 5-10 mm diameter) can be harvested from the area that is in the microsurgical field and firmly applied over the suture line, where the bleeding site is. This adipose tissue fragment adheres to the anastomotic site (Figure 1). The bleeding constantly stops in 30 seconds to 1 minute without clamping the proximal end of the anastomosis.

If bleeding continues, the leak is probably sustained by a too large gap and an adjunctive suture should be placed.

It has been experimentally demonstrated that adipose tissue reduces the time required for hemostasis after anastomosis in the rat femoral artery, by evaluating the active bleeding time and the blood velocity: both of these factors were found out to be decreased in arteries treated with endogenous fat.[3]

In vascular surgery literature, a novel wrapping technique has been developed for hemostasis in aortic surgery. The harvested fat tissue, fixed to a Teflon felt strip, is inserted around the anastomotic site, being able to gap an eventual leak, thanks to its plasticity.[4] However, aortic repair have different pressure requirements from micro anastomosis.

The precise mechanism of action of how a piece of fat can stop minor anastomosis leaks is not yet clear; recent studies have focused attention on PAI-1, plasminogen activator inhibitor-1, which is probably the principal regulator of plasminogen activation in vivo. It has been hypothesized an association between the increase of adipose tissue and the increase of PAI-1: it appears that fat cells, particularly stromal cells, are involved in the production of PAI-1.[5] This hypothesis needs to be validated.

Since introducing this maneuver, in 2009, additional suture application to the micro-anastomosis has decreased substantially. In this small series of 39 free flaps, vascular complications have not been observed.

This simple trick has shown to be reproducible, safe and at no cost for the completion of microvascular anastomosis.

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Figure 1.—Adipose tissue fragment adheres to the anastomotic site.

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