

Tumescent Technique in Vascularized Composite Allotransplantation Secondary Surgery

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Sir:

Hand transplantations have become a clinical reality and have been performed worldwide with good functional results in the last 18 years.

The secondary surgery role for functional improvement is well recognized although infrequently dealt with.¹

The goal of this article is to report our recent experience on secondary surgical procedures in vascularized composite hand allotransplantation, achieving a bloodless operative field by tumescent technique without pneumatic tourniquet, reducing the risk of ischemia–reperfusion injury and the risk of acute rejection.

From 2006, 3 bilateral upper extremity vascularized composite allotransplantations (VCA) have been performed in Valencia, Spain; we reported about 10 surgical procedures performed for functional improvement in the same patients.¹

Recently, 2 of them underwent secondary procedures to fix swan neck deformity, namely a sublimis sling technique and extensor apparatus centralization by creating a new sagittal band.

One per one hundred thousand (1:100,000) tumescent solution was formulated by mixing 1 mL 1:1,000 epinephrine solution in 100 mL saline solution; after general anesthesia, preferred by patients, the tumescent technique was injected locally in the surgical field waiting tissue blanching; surgery was executed without complications.

The described technique successfully created a totally bloodless operative field during the half-hour duration of the surgeries.

The wounds healed normally; there were no septic complications, and a substantial functional improvement was achieved in both patients. No acute rejection was elicited.

Secondary surgery for upper limb transplantation upgrade is risky but should be performed in immunologically stable recipients if a substantial functional improvement is expected; technically, the only challenge is working with and respecting previous repairs.¹

The proinflammatory stimulus of secondary surgical insult can theoretically elicit an acute rejection, above all during a change of treatment, inducing T-cell infiltration within the allotransplant.²

In addition to adequate anesthesia, a bloodless field is indispensable for atraumatic upper limb surgery and, as extrapolation, for upper limb transplantation secondary surgery.³

A blood-drenched operating field makes it impossible to identify the important anatomical structures in the VCA.

Tourniquet and an Esmarch bandage may result in injuries to nerves, vessels, muscle and skin, compartment syndrome, and systemic effects well described in the literature,³ and we can expect the same range of complications in secondary surgery after upper limb transplantation; otherwise, it is known that reperfusion causes more tissue damage than ischemia-accelerating apoptosis.²

Ischemia–reperfusion injury has been identified as one of the factors associated with rejection in the VCA, increasing edema that impairs local circulation, resulting in an increased proinflammatory stimulus.^{2,3}

It is now well established that the use of epinephrine in end-artery organs (finger, nose, ear, and penis) is safe, reducing the need for tourniquet usage in upper extremity surgery⁴; previous studies report the successful use of epinephrine-containing solution in hand and upper extremity procedures, and results can be extrapolated to secondary surgeries in upper limb transplantations.⁵

To reduce risks in secondary surgery, given for granted the clinical utility, we advocate the tumescent technique to create a bloodless operative field, avoiding tourniquet, reducing proinflammatory stimulus and ischemia–reperfusion injuries.

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DISCLOSURE

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