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[Simultaneous noninvasive monitoring for radial forearm and fibula flaps using laser Doppler flowmetry and tissue spectrophotometry.]

[Article in German]

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AIM: In the literature currently available monitoring devices are usually divided into two major groups: those for monitoring perfusion and those for measuring tissue oxygenation. The O(2)C (oxygen to see) system combines these two ways of monitoring free flap viability. The aim of this prospective study was to determine the necessity of flap revision and when unnecessary revision can be avoided. Another point of interest was the question of whether critical values for the successful course of free flaps could be defined and in addition whether such values would differ for different flap types.**PATIENTS AND METHODS:** In a prospective study 82 free flaps (61 radial forearm flaps and 21 fibula flaps) were monitored with the O(2)C monitoring unit. Measurements were carried out intraoperatively and postoperatively up to 14 days.**RESULTS:** Perfusion compromise occurred in 12 (14.6%) of 82 monitored free flaps. Operative exploration was performed in seven cases, in five of them successfully. Five flaps (three radial forearm and two fibula flaps) were lost due to vascular compromise, which led to an overall success rate of 93.4%. Venous congestion was identified by a rapid increase in hemoglobin concentration of more than 30%. An abrupt decline of blood flow and hemoglobin oxygenation indicated arterial occlusion. Vascular complications were detected in all cases prior to clinical assessment with no false positive or negative results. For radial forearm flaps a hemoglobin oxygenation of 15%, a superficial flow of 10 AU, and a deep flow of 20 AU were identified as minimum values for flap viability. For fibula flaps a hemoglobin oxygenation of 10%, a superficial flow of 5 AU, and a deep flow of 15 AU were determined as minimum values.**CONCLUSION:** O(2)C combines laser Doppler flowmetry and tissue spectrophotometry and for the first time allows simultaneous measurement of the microcirculatory parameters including blood flow, flow velocity, hemoglobin concentration, and hemoglobin oxygenation. We found this new noninvasive technique to be a reliable and accurate method for evaluating flap viability and improving the success rate in free flap transfer.

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