

Thrombogenic Risk Factor Assessment and Correlation with Surgical Outcome after Microvascular Free Flap Transfer

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II

Introduction. Free flap transfer has become a routine surgery to close tissue defects because of standardisation of methods, techniques, and training. Although rare, postoperative microvascular thrombosis leading to possible flap failure still remains a serious threat. Majority of flap anastomoses circulation problems is due to surgical reasons, but flap failure can occur due to the patient's coagulation disorders, such as hypercoagulability.

Aim, Material and Methods. The aim of the study was to evaluate possible influence of patient's thrombogenic factors on incidence of free flap failure in patients undergoing microvascular surgery. In the prospective observational study, 51 patients were enrolled. Demographical data and external thrombogenic factors including thrombogenic comorbidities, history of previous thrombosis, and history of recent trauma were recorded. Preoperatively, rotational thromboelastometry (ROTEM[®]) and routine coagulation tests were performed. Postoperatively, surgical outcomes were recorded in terms of free flap failure.

Results. 51 patients with mean age 39 ± 13 years undergoing free flap surgery between 2013 and 2015 were analysed. Preoperatively external thrombogenic factors were identified for 25 patients: recent trauma for 15/51 (29.4%), ischemic heart disease and atherosclerosis for 6/51 patients (12%), tetra-, para paresis or neurofibromatosis for 3/51 (6%), obesity + recent trauma 1/51 (2%). Moreover, out of 25 high thrombotic risk patients, 3/25 (12%) had hyperfibrinogenemia and 11/25 (44%) had hyperfibrinogenemia combined with thrombocytosis. The incidence of hyperfibrinogenemia and thrombocytosis between patients with recent trauma and other thrombogenic risk factors was similar, 8/15 (53%) vs. 5/9 (55%), respectively. Association between external thrombogenic factors, detected hypercoagulability and surgical outcomes were analysed. Hypercoagulation seen in ROTEM and detected by fibrinogen/platelet ratio (FPR) ≥ 42 was found in 15/51 (29%) patients, mostly in high thrombotic risk patient group: 13 (52%) out of 25 had hypercoagulability. Moreover, hypercoagulability was significantly more often diagnosed by ROTEM in patients with recent trauma compared to patients with other risk factors, 10/15 (67%) vs. 2/9 (22%), $p = 0.03$. Free flap thrombosis was found in 9/51 (18%) but free flap necrosis in 10/51 (20%) cases, both significantly more often developed in high thrombosis risk patients compared to others, 8 vs. 1 and 8 vs. 2, $p = 0.008$ and $p = 0.03$. Although, the incidence of free flap failure was similar between patients with recent trauma and other thrombogenic risk factors.

Conclusions. Patient thrombogenic factors have a notable influence on free flap surgery results, correlating with incidence of transferred tissue thrombosis. Early preoperative identification of potentially high-risk patients provides a possibility to modify surgical and anesthesiological management in order to improve surgical outcome.