

Analysis of Main Risk Factors for Free Flap Thrombosis and Influence of Anticoagulation on Thrombosis Rate

*Jevgeņijs Stepanovs*¹, *Karina Drizlionoka-Gorovenko*¹,
*Maksims Mukāns*², *Agnese Ozoliņa*¹, *Liene Ņikitina-Zaķe*³,
*Indulis Vanags*¹, *Biruta Mamaja*¹

¹ Rīga Stradiņš University, Department of Anaesthesiology and Intensive Care, Latvia

² Rīga Stradiņš University, Statistical Laboratory, Latvia

³ Latvian Biomedical Research and Study Centre

Introduction. Perioperative anticoagulation strategy in microvascular free flap transfer remains a controversial problem, particularly considering risk of bleeding. Nowadays, anticoagulants are randomly tailored to risk profile patients. Furthermore, it is still unclear which patients are particularly prone to free flap thrombosis.

Aim, Materials and Methods. The aim of the study was to analyse the main thrombogenic risk factors and the role of anticoagulation in free flap transfer surgery.

Patient demographical data, including the main risk factors for free flap thrombosis (recent trauma, smoking, thrombogenic comorbidities) were registered. Standard coagulation tests, as well as rotational thromboelastometry (RTE) were performed preoperatively; hypercoagulation was defined as functional fibrinogen to platelet ratio (FPR) ≥ 42 . Thromboprophylaxis was provided with enoxaparin 40 mg once a day, starting on the first postop day by decision of the surgeon. Incidence of free flap thrombosis was analysed as primary outcome, secondary main risk factors and role of anticoagulation were evaluated.

Results. In total, 89 patients were included in observational case control study. Recent trauma (< 1 month) was detected for 29/89 patients. Hypercoagulability in RTE (FPR ≥ 42) was found for 21/89 patients, $n = 14$ with recent trauma, $n = 7$ with delayed surgery, $p < 0.001$. Free flap thrombosis developed in 18, with subsequent necrosis in 16 patients on average during the first postoperative day.

We found slight association between FPR ≥ 42 detected by RTE and free flap thrombosis, AUC 0.597, $p = 0.2$, sensitivity 33%, specificity 78.6% and free flap necrosis AUC 0.628, $p = 0.11$, sensitivity 37.5%, specificity 81.3%. Thromboembolic prophylaxis demonstrated correlation with decreased rate of free flap thrombosis OR 0.21 (CI 95% 0.054–0.86); $p = 0.030$. Additionally, raised platelet count was found as potentially thrombogenic factor in our series ($p = 0.023$). For recent trauma patients, prolonged operation time correlated with higher thrombosis risk ($p = 0.021$). In contrast, association with thrombotic events was not found for other factors such as smoking ($p = 0.94$), recent trauma ($p = 0.902$), FPR ≥ 42 ($p = 0.283$).

Conclusion. Postoperative anticoagulation can improve outcome in free flap reconstructive surgery. Patients with thrombocytosis have to be considered at higher risk for pedicle thrombosis. Other thrombogenic risk factors did not show any influence on surgical outcome.