Form and Size Matter: Increased Risk of Thrombosis in Microvessels with Surgically Created Endothelial Lesions.

Background Atherosclerosis is a known risk factor for flap loss in microsurgery. Several microsurgical techniques, like plaque removal, have been proposed for atherosclerotic vessels, but these techniques often induce intimal injuries. The aim of this study was to investigate the impact of various endothelial defects on the risk of thrombosis in a rat acute intimal injury model. Methods Endothelial defects of various forms and sizes were created in the abdominal aorta of 30 male Wistar rats following a strict protocol. Defect sizes were measured and classified as round, horizontal, or vertical based on their configuration. An hour after reestablishing the blood flow, the abdominal aorta was harvested and the operation site was assessed for signs of thrombosis clinically and using light microscopy. Univariate and multiple linear regression analysis were performed to identify possible influencing factors on thrombosis. Results The mean defect size was 2.65 ± 1.19 mm². Intimal lesions were classified as round in 36.7%, horizontal in 33.3%, and vertical in 30% of specimens. Thrombus formation was detected in 46.7% clinically and in 50% histologically. Univariate regression analysis revealed that defect size (p = 0.048) and vertical form (p = 0.017) were significantly associated with thrombus formation. Multiple regression analysis corroborated vertical defects as a risk factor for
thrombosis ($p = 0.03$). Conclusion Endothelial injuries are associated with a high risk of thrombosis with highest risks associated with vertical defects. Arteries should be carefully examined for intimal defects before microvascular anastomosis, especially in the atherosclerotic patient.