Dokumenttyp: journal article

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Abstract: Vascular thrombosis with subsequent distal embolization remains a critical event for patients. Prevention of this life-threatening event can be achieved pharmacologically or mechanically with intravascular filter systems. The ability to evaluate the risk of embolization of certain techniques and procedures in vascular and microvascular surgery, such as, tissue glue or fibrin based haemostatic agents lacks convincing models. We performed 64 microvascular anastomoses in 44 rats, including 44 micro-pore polyurethane filter-anastomoses and 20 non-filter anastomoses. The rats were re-anesthetized and the aorta was re-exposed and removed four hours, three, seven, fourteen, thirty-one days, and six months postoperatively. The specimens were examined macro- and microscopically with regard to the appearance of the vessel wall, condition of the filter and the amount of thrombembolic material. Typical postoperative histopathological changes in vessel architecture were observed. Media necrosis was the first significant change three days postoperatively. Localized intimal hyperplasia, media necrosis, increase of media fibromyocytes and adventitial hypercellularity were seen to a significant extent at day seven postoperatively. Significant neovascularization of adventitia adjacent to the filter was seen after 14 days. A significant amount of thrombotic material was seen after
four hours, three and 14 days interval. Only three intravascular filters became completely occluded (6.82%). The aorta-filter-anastomosis model appeared to be a valid in-vivo model in situations at risk for thrombembolic events, for microsurgical research and allowed sensitive analysis of surgical procedures and protection of the vascularized tissue. It may be suitable for a wide range of in-vivo microvascular experiments particularly in the rat model.