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Abstract: Microvascular sutured anastomosis remains the gold standard in microvascular flap surgery but is technically challenging, time-consuming, and sometimes unreliable. The goal of our study has been to develop a microvascular stenting system that can be used for microvascular anastomosis, even without the use of a microscope. Custom-made stainless-steel stents were used to re-establish vessel continuity after the severance of the abdominal aortic vessel in nine rats. At 30 min after re-opening the blood flow, Doppler flowmetry and indocyanine green (ICG) angiography were used to assess vessel patency, and vessels were inspected microscopically for signs of thrombosis. Eight of the nine animals survived the procedure. In one case, the abdominal aorta was torn during balloon dilation of the stent. Four out of the nine stent anastomoses showed an excellent fit. In the remaining four cases, a collagen membrane and fibrin glue were successfully used to stop vascular leakage. However, these additional steps might have had a negative impact on vessel patency, and thrombus formation impaired blood flow completely in one case. Microvascular stent anastomosis is feasible and might in some cases be superior to standard sutured anastomosis. However, a number of technical difficulties remain to be
addressed, and long-term results are not yet available.