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Application of modified no-touch technique in rabbit arteriovenous fistula model and its effect on venous neointimal hyperplasia

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Objectives : To investigate the technical advantages of a modified no-touch technique (MNTT) in constructing arteriovenous fistulas (AVF) compared to the conventional technique (CT) and assess its potential to reduce neointimal hyperplasia in the outflow vein.
Methods : Forty-seven New Zealand rabbits were randomly divided into three groups: control, CT, and MNTT. Rabbits in control group were observed using ultrasound and then euthanized to obtain external jugular vein (EJV) for Hematoxylin-eosin (H-E). We established common carotid artery (CCA)-EJV AVF using MNTT in the MNTT group and the CT in the CT group. AVF patency and complications were compared between the CT and MNTT groups. Rabbits with patent AVF in both groups were observed using ultrasound two weeks after surgery to evaluate changes in the vessel diameter and blood flow spectrum of the AVFs. H-E staining measured the intima thickness of EJV adjacent to the anastomosis and histologic characteristics of the AVF at two and four weeks after surgery.
Results : Five rabbits died after surgery with common symptoms of sneezing, coughing, runny nose, anorexia, and diarrhea; 2 in the MNTT group and 3 in the CT group. There were significant differences in the diameter ($p = 0.010$) and peak systolic velocities (PSV) ($p = 0.001$) of EJV between the CT and MNTT groups two weeks after surgery. Spiral laminar flow (SLF) was observed in CCA and EJV adjacent to anastomosis in the MNTT group. Additionally, histological observations showed less venous neointimal hyperplasia in the MNTT group than in the CT group four weeks after surgery.
Conclusions : The rabbit model of CCA-EJV AVF established using MNTT demonstrated fewer complications, larger vein diameters, and reduced venous neointimal hyperplasia, indicating that this maybe an ideal animal model to further investigate the application of MNTT in AVF surgery.

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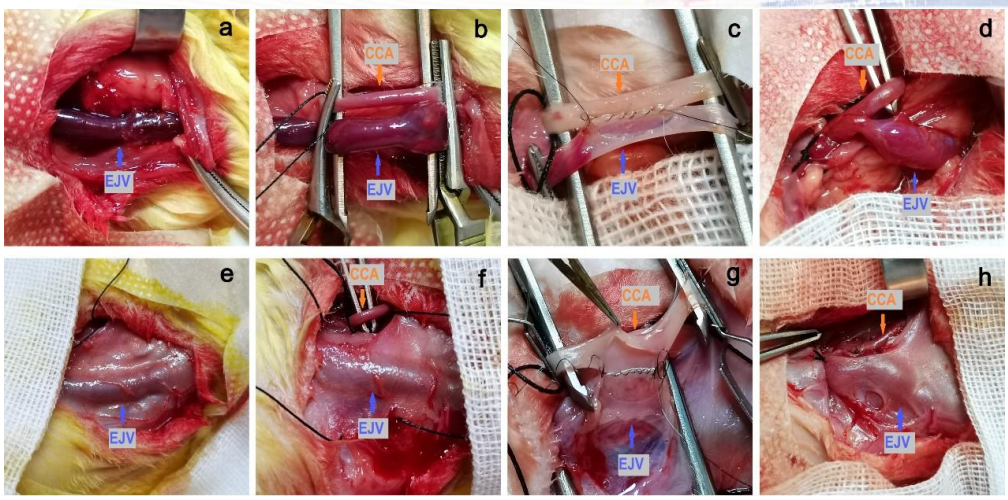

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