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壁剪应力变化对动脉重建影响的在体研究

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为探讨动脉血流受阻后壁剪应力(Wall shear stress,WSS)变化对动脉适应性重建的影响,在60只实验兔建立动脉血流减小模型,术后0～30天8个不同时相点,检测动脉样本的壁厚及内径,单位面积(mm^2),动脉内皮细胞(Arterial endothelial cell,AEC)棱数目和平滑肌细胞核数目。结果显示WSS变化通过调节动脉的舒缩而致使动脉管径适应性缩减,动脉壁腔比(WT/LD)保持恒定。动脉壁细胞成份中AEC受WSS变化的影响,而平滑肌细胞则不受影响。在术后3天、7天,AEC密度较正常对照显著降低($P<0.01$);而在术后14天、30天,AEC密度显著增高($P<0.01$)。说明WSS对动脉适应性重建的影响,是通过调节动脉的舒缩所致,而非壁腔比的改变。WSS的变化在AEC的适应性重建过程中可能起着重要调节作用。

ARTERIAL REMODELING BY THE CHANGES OF WALL SHEAR STRESS IN VIVO

To explore the changes of wall shear stress (WSS) effect on arterial remodeling after reducing arterial flow, the reducing flow model was established in 60 rabbits. The following detections were carried out at 8 different time intervals from 0 to 30 days: wall thickness, lumen diameter, arterial endothelial cell (AEC) and smooth muscle cell density. Decreased arterial diameter may be correlated with vasomotion modulated by the changes of WSS. There was no significant difference both in the ratio of wall thickness/lumen diameter (WT/LD) and the numbers of smooth muscle cells comparing with that of control. The density of AEC was affected by the changes of WSS, which decreased significantly at 3 and 7days, and increased at 14 and 30 days ($p<0.01$). The results suggested that WSS influences arterial remodeling by regulating its vasomotion and not changing WT/LD. The changes of WSS may play an important role in AEC remodeling.

关键词

剪应力(Shear stress); 动脉(Artery); 内皮细胞(Endothelial cell); 重建(Remodeling)