

AbstractID: 13582 Title: Application of molecular imaging in the monitoring of angiogenesis of a hindlimb ischemia model.

Purpose:

$A_v\beta_3$ integrin expression is a characteristic feature of the angiogenic phenotype of endothelial cells. Targeted molecular imaging of integrins may be a further step forward in the evaluation of specific and early aspects of angiogenesis. The purpose of our study was to investigate the potential of molecular imaging with the aid of a dedicated high resolution γ camera in the rabbit hindlimb ischemia model.

Method and materials:

A ^{99m}Tc labeled cyclic RGD peptide ($[\text{c RGDfk-His}]^{-99m}\text{Tc}$) was employed for angiogenesis imaging in the New Zealand white rabbits hindlimb ischemia model. Imaging of $av\beta_3$ expression was performed in two animal groups. In group A imaging was employed 3 days and in group B 9 days post femoral artery occlusion (2 rabbits in each group). Each rabbit was injected intravenously with 200 μl of $[\text{c RGDfk-His}]^{-99m}\text{Tc}$ (0.5 mCi). Consequently dynamic planar imaging was performed with a high resolution gamma camera with FOV 5x10 cm, equipped with a parallel hole collimator. Static 8 minute images at 80 minutes post injection of the radiotracer were acquired.

Results:

We have imaged 4 rabbits. An increase of 12.2% was observed in group A in relative radiotracer retention at the ischemic hindlimb compared to control. In group B this relative radiotracer retention was increased to 25.8%. The control limbs showed an increase in the radiotracer retention at day 9 but still much lower compared to ischemic limbs. Moreover, radiotracer accumulation was observed to a region distal to the original area of occlusion, where the newly formed proximal collaterals are located.

Conclusion:

Our study demonstrates that the phenomenon of angiogenesis proceeds and is maximized within on day 9 following induction of ischemia in a mammalian experimental model. Further studies are deemed necessary in order to establish this conclusion and provide quantitative results.