

Summary and conclusion

Angiogenesis is the creation of new blood vessels from preexisting one that may occurs either physiologically or pathologically.

Angiogenesis is facilitated via administration of angiogenic growth factors, recombinant human vascular endothelial growth factor 165 was used in this study (rh VEGF165).

This work was done to study the effect of aging on angiogenesis in ischemic vascular diseases and the effect of administration of rh VEGF165 on angiogenesis in both young and old animal group models .

Three groups of NZW rabbits were studied in this work:

Group 1:

10 NZW rabbits were used as control.

Group 2:

Operative resection of one femoral artery of one hind limb to produce ischemia of the medial group muscles was performed in 10 NZW rabbits of this group to stimulate the angiogenic cascade .

Group 3:

Operative resection of one femoral artery of one hind limb to produce ischemia of the medial group muscles was performed in 10 NZW rabbits of this group to stimulate the angiogenic cascade and then administration of rh VEGF 165 (500 ug) intra-arterial on tenth postoperative day.

Specific angiography was done at forty days postoperatively which revealed that the number of angiogenic blood vessels visible in rabbits

showed lower number of collaterals in old ischemic group than in young ischemic group.

Treatment with rh VEGF165 induced significant increase in angiographic blood vessels in the ischemic medial thigh muscles in both groups although it was still higher of angiographic score in young group than in old group.

The following immunohistochemical and histochemical techniques were used to detect the capillary density , T-lymphocytes and sites of inflammation and phagocytosis in ischemic tissues before and after Treatment with rh VEGF 165:

1- Immunoperoxidase staining CD 31:

To detect capillary density (the average number of angiogenic blood vessels / 10 high power field).

2- Immunoperoxidase staining CD 3.

To detect T-lymphocytes (the average number of T-lymphocytes /10 high power field) in the obtained tissue.

3- Alkaline phosphatase staining:

To detect sites of inflammation and phagocytosis in the ischemic tissue.

The results obtained can be summarized as follows:

Immunocytochemical results :

Capillary density: (the average number of angiogenic blood vessels /high power field):

Group1: (control group):

Showed lower number of blood capillaries .

Group 2:(ischemic group):

Showed higher number of blood capillaries (angiogenic blood vessels) than in group 1, and the capillary density was higher in young ischemic animals than in old animals.

Group 3: (treated group):

Showed an increase in number of blood capillaries (angiogenic blood vessels) than in group 2 in both young and old animals after injection of rh VEGF 165, and the capillary density was higher in young treated animals than in old treated animals.

T-lymphocytes: (the average number of T-lymphocytes /10 high power field):

Group 1: (control group):

Showed no T-lymphocyte infiltration in normal tissue.

Group 2:(ischemic group):

Showed infiltrating T-lymphocytes in ischemic tissues in both old and young groups, and the number of infiltrating T-lymphocytes was higher in young ischemic animals than in old animals .

Group 3: (treated group):

Showed increased number of T-lymphocyte infiltration than in group 2, in both young and old animals after Treatment with rh VEGF 165, and the number of infiltrating T-lymphocytes was higher in young treated animals than in old treated animals .

Histochemical results :

Alkaline phosphatase staining : (demonstrated sites of inflammation and phagocytosis /high power field) .

Group1: (control group):

 Showed no alkaline phosphatase staining.

Group 2:(ischemic group):

 Showed alkaline phosphatase staining in ischemic tissues in both old and young groups, and the sites of inflammation and phagocytosis were higher in young ischemic animals than in old animals.

Group 3: (treated group):

 Showed a decrease in sites of alkaline phosphatase staining than in group 2, in both young and old animals, after Treatment with rh VEGF 165.

Conclusion :

 Angiogenesis responsible for collateral development in limb ischemia is impaired with aging. However, advanced age does not prevent augmentation of collateral vessel development in response to exogenous angiogenic cytokines.