Effect of anastomotic length on the development of intimal hyperplasia in the distal anastomosis of bypass graft

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Many hemodynamic factors have been proved to be associated with intimal hyperplasia at the distal anastomosis of arterial bypass graft. However, the relationship between the length of anastomosis and development of such complication has not been studied before. The aim of this study is to assess this relationship at the distal anastomosis with Dacron graft.

Material and Methods: Sixteen femoro-popliteal bypass using 6-mm Dacron grafts were performed in 8 German Shepherd dogs using 4 distal anastomotic techniques (4 groups) in randomized sequence. The first 3 groups were end to side anastomosis with anastomotic length 3, 3.5, and 4 times the internal diameter of the artery respectively. The 4th group was end to end anastomosis with anastomotic length 4 times the internal diameter of the artery. The vessels were harvested at 6 months after the operation and specimens were processed for histological studies. Quantitative analyses were performed to assess the extent of intimal hyperplasia (mean ±SD) at the heel, toe and mid-zone of the bed.

Results: Light microscopy revealed significant decrease in intimal hyperplasia at the heel with increasing the length of anastomosis (595±109 µm vs. 443±129 µm vs. 185±81 µm vs. 168±94 µm, p=<0.001 at group 1, 2, 3 and 4 respectively). The same observation was at mid-zone of the bed (56±155 µm vs. 432±87 µm vs. 192±88 vs. 106±46 p=<0.001 at group 1, 2, 3 and 4 respectively) and at the toe (581±131 vs. 394±35 vs. 266±162 vs. 136±73, p=<0.001 at group 1, 2, 3 and 4 respectively).

Conclusion: The current study showed that the length of the anastomosis is one of the hemodynamic factors that involved in the development of intimal hyperplasia. The anastomotic techniques that resulted in the least intimal hyperplasia were end to end or end to side with length 4 times the internal diameter of the artery.