Biomechanical and histologic analysis in aortic endoprosthesis using fibrin glue.

Authors: Almeida M.J., Yoshida W.B., Hafner L., Sequeira J., Dos Santos J.H., Masseno A.P.B., Moreno J.B., Lorena S.D.S.

Publication Date: 2011

Abstract:

Background: The absence of incorporation between endoprosthesis (EP) and the arterial wall may lead to device migration and endoleaks around the stent graft. Alternatives have been tested aiming to improve this incorporation. Fibrin glue is used in many operating procedures promoting adhesion and tissue regeneration; however, its use to improve EP incorporation by arteries is unknown. Objective: The objective of this study was to analyze dislodgement forces needed to extract the EPs implanted in pig aorta, compare different oversizing and fibrin glue injections, and to analyze histologic changes among groups. Methods: Straight EPs were implanted in the thoracic aorta of pigs using 10% oversizing plus fibrin glue in the interface between the EP and the artery (group 1), using 20% oversizing (group 2), and 10% oversizing (group 3). Fourteen days after the implant, the animals were killed to enable biomechanical analysis of the EP and to verify histologic changes of the aortic wall and its interface with the EP. Results: Group 1 showed a dislodgement force of 21.9 +/- 5.3 Newton (N) being higher than the other groups and statistically significant when compared to group 3 (15.6 +/- 3.6N), P = .003%. Group 2 had a higher dislodgement force and statistically more significant than group 3 (19.5 +/- 7.8N). Histologic analysis showed tissue reaction with inflammatory cells and fibroblasts higher in group 1 and group 2 compared to group 3. Conclusion: This study reports a large animal survival model of thoracic aortic stent graft placement by testing the impact of fibrin glue on EP incorporation. Compared to oversizing alone, fibrin glue placed between the stent graft and the arterial wall increases EP incorporation. Additional studies are needed to determine

the potential utility of fibrin glue in the setting of human arterial endografts.