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Biomechanical and histological analyses of a multilayer stent in a swine model of suprarenal aortic aneurysm

Objectives

To analyze and compare, in an animal model, the treatment of thoracoabdominal aneurysms with multilayer stents and its hemodynamic effects through the biomechanical and histological analysis of the aortic wall in contact with the stent.

Methods

Large White pigs were randomized into two White pigs were randomized into two groups: Stent (n = 6) and Control n = 5 non- stent). All animals were subjected to the creation of a suprarenal aneurysm with a bovine pericardial patch. In the Stent group, a multilayer stent was implanted immediately after aneurysm formation. After four weeks, all animals were subjected to angiographic assessment and intravascular ultrasound, and the stent was explanted before euthanasia for histological and biomechanical analyses.

Results

At histological analysis, the groups did not differ significantly in maximum thickness of the intima ($p = 0.526$) media ($p = 0.129$) or adventitia ($p = 0.662$) . Thrombus formation was observed in 100% of the animals on the intima and media layers of the stented aorta vs. none in the Control group ($p = 0.048$) . At biomechanical analysis, no statistical differences were observed in aortic wall elasticity ($p = 0.158$) , strength ($p = 0.36$) , or thickness ($p = 0.323$)

Conclusion

We identified thrombosis of the aneurysmal sac through the presence of thrombi on the intima of the aorta in 100% of the animals in intima of the aorta in 100% of the animals in the Stent group; as for the biomechanical analysis, this study showed no statistical differences in vessel wall thickness, strength, and elasticity between groups.

Key words: Animal experimentation, Aortic aneurysm, Endovascular procedures, Animal models.

Biography

Dr. Allana Tobita is a vascular and endovascular surgeon with a Master's degree from Hospital Israelita Albert Einstein in Brazil. She is the Director of Clínica Vascular Dra. Allana and founder of Lipedema Care Doctor of Education. Holding a specialty title from the Brazilian Society of Angiology and Vascular Surgery, she is also a speaker for the Sigvaris Group and is recognized as a national reference in modern treatments for varicose veins and lipedema. Dr. Tobita is the founder of the Endolift technique for lipedema and author of the book The Cure of the Single Mother. In addition to her professional accomplishments, she is a proud mother to João Lucas and lives her life as a devoted disciple of Christ.

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