

Hydrogel-mediated release of basic fibroblast growth factor from a stent-graft accelerates biological fixation with the aortic wall in a porcine mode

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2007 Fiscal Year Final Research Report Summary

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Research Project

Project/Area Number

18591333

Research Category

Grant-in-Aid for Scientific Research (C)

Allocation Type

Single-year Grants

Section

一般

Research Field

Radiation science

Research Institution

Kanazawa University

Principal Investigator

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2006 – 2007

Keywords

aortic aneurysm / stent-graft / basic fibroblast growth factor / hydrogel / biological fixation

Research Abstract

PURPOSE: To evaluate the local reaction of the aortic wall induced by basic fibroblast growth factor (bFGF) released from a gelatin hydrogel coated on the outer surface of a stent-graft for the purpose of biological fixation.

METHODS: A total of 18 nitinol-based, polyester-covered stent-grafts were implanted in 6 porcine aortas for 1 month. The implanted stent-grafts were divided into 3 groups: the control group (uncoated), the hydrogel group (coated with hydrogel containing water), and the bFGF group (coated with hydrogel containing bFGF). After stent-graft implantation, the results of intravascular ultrasound (IVUS) and qualitative and quantitative microscopic examinations were compared among the groups.

RESULTS: In the bFGF group, a thin white lamellar tissue was observed on IVUS images. Significantly more new intimal tissue formation was observed in all the bFGF group animals than in the other 2 groups, and alpha smooth muscle (SM) actin-positive cells (alphaSMCs) were detected in this new tissue. The alphaSMCs within the fabric of tightly woven grafts were significantly more abundant in the bFGF group than in the other groups.

CONCLUSION: The local controlled release of bFGF from the stent-graft significantly accelerated the proliferation of new intimal tissue between the aorta and the stent-graft and within the graft materials. These findings suggest that a graft can be fixed biologically to the aortic wall, which may contribute to the shrinkage of aneurysms following stent-grafting.

Research Products (18 results)

	All	2007	2006
	All	Journal Article (12 results) (of which Peer Reviewed: 5 results)	
		Presentation (6 results)	
[Journal Article] Hydrogel-mediated release of basic fibroblast growth factor from a stent-graft accelerates biological fixation with the aortic wall in a porcine model		2007	▼
[Journal Article] 大動脈ステントグラフト治療におけるMKステントグラフトの特性		2007	▼
[Journal Article] 胸部大動脈ステントグラフト留置術:MKステントグラフトの応用		2007	▼
[Journal Article] Stent-graft deployment to treat aperigraft seroma formed after descending thoracic aortic surgery		2007	▼
[Journal Article] Hydrogel-mediated release of basic fibroblast growth factor from a stent-graft accelerates biological fixation with the aortic wall in a porcine model		2007	▼
[Journal Article] Characteristics of the MK Stent-Graft System for Endovascular Aortic Repair		2007	▼
[Journal Article] Endovascular repair of thoracic aortic diseases with Matsui-Kitamura stent-graft		2007	▼
[Journal Article] Stent-graft deployment to treat a perigraft seroma formed after descending thoracic aortic surgery		2007	▼
[Journal Article] MKステントグラフトの胸部大動脈疾患への応用		2006	▼
[Journal Article] 胸部大動脈ステントグラフト留置術 -MKステントグラフトの応用-		2006	▼
[Journal Article] Endovascular repair of thoracic aortic diseases with Matsui-Kitamura stent-graft		2006	▼
[Journal Article] Endovascular repair of thoracic aortic diseases with Matsui-Kitamura stent-graft		2006	▼
[Presentation] 線維芽細胞増殖因子溶出型ステントグラフト開発における基礎的検討		2007	▼
[Presentation] Hydrogel-mediated release of basic fibroblast growth factor from a stent-graft accelerates biological fixation with the aortic wall in a porcine model		2007	▼
[Presentation] ステントグラフト治療におけるMRIによる経時的観察の有用性		2007	▼
[Presentation] Magnetic Resonance Imaging following endovascular aortic repair with stent-grafts		2007	▼
[Presentation] B型大動脈解離に対するMKステントグラフトの応用		2006	▼
[Presentation] Endovascular repair of thoracic aortic dissections with Matsui-Kitamura stent-graft		2006	▼

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