

Preliminary in vivo evaluation of a novel intrasaccular cerebral aneurysm occlusion device Roham Moftakhar MD

Introduction

Current endovascular technology does not offer a perfect solution for all cerebral aneurysms. Our group has built two versions of a novel aneurysm intrasaccular occlusion device (AIOD) to address drawbacks associated with current occlusion devices. The objective of the present study was to perform pilot, proof-ofconcept in vivo testing of this new AIOD in swine and canines.

Methods

Two configurations of the AIOD, termed "coil-in-shell" and "gel-inshell", were implanted in surgically created sidewall aneurysms (n=4) in swine for acute occlusion studies, as well as sidewall (n=8) and bifurcation aneurysms (n=3) in canines to assess long-term occlusion efficacy. Occlusion at all time points (immediate, 6, and 12 weeks) was evaluated by angiography. Neointimal healing at 12 weeks post-implantation in canines was examined histologically.

Results

Angiographic analysis showed that both the coil-in-shell and gel-in-shell devices achieved complete aneurysm occlusion immediately following device delivery in sidewall aneurysms in swine. In longer-term canine studies, initial occlusion ranged from 71.3%-100%, which was stable with no recurrence in any of the sidewall aneurysms at 6 or 12 weeks. Histological analysis at 12 weeks showed mature fibromuscular tissue at the neck of all aneurysms and no significant inflammatory response.

Conclusions

The AIOD tested in this study shows promise in terms of acute and chronic occlusion of aneurysms. Our findings suggest that these devices have the potential to promote robust tissue healing at the aneurysm neck, which may minimize aneurysm recurrence. Although proof of principle has been shown, further work is needed to deliver this device through an endovascular route.

Learning Objectives

preliminary results of a novel intrasacular aneurysm device

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