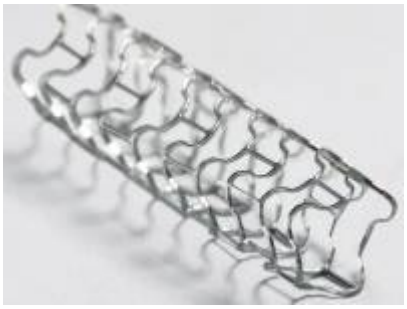
Bioabsorbable Magnesium Alloy Stent



Advances in stent-assisted coiling have incrementally expanded endovascular treatment options for complex intracranial aneurysms. After successful coil consolidation and aneurysm occlusion, endovascular scaffolds are no longer needed. Thus, bioresorbable stents that disappear after aneurysm healing could avoid future risks of in-stent thrombosis and the need for lifelong antiplatelet therapy.

To assess the applicability and compatibility of a bioresorbable magnesium- alloy stent (brMAS) for assisted coiling.

Saccular sidewall aneurysms were created in 84 male Wistar rats and treated with brMAS alone, brMAS + aspirin, or brMAS + coils + aspirin. Control groups included no treatment (natural course), solely aspirin treatment, or conventional cobalt-chromium stent + coils + aspirin treatment. After 1 and 4 weeks, aneurysm specimens were harvested and macroscopically, histologically, and molecularly examined for healing, parent artery perfusion status, and inflammatory reactions. Stent degradation was monitored for up to 6 months with micro-computed and optical coherence tomography.

Aneurysms treated with brMAS showed advanced healing, neointima formation, and subsequent stent degradation. Additional administration of aspirin sustained aneurysm healing while reducing stent-induced intraluminal and periadventitial inflammatory responses. No negative interaction was detected between platinum coils and brMAS. Progressive brMAS degradation was confirmed.

brMAS induced appropriate healing in this sidewall aneurysm model. The concept of using bioresorbable materials to promote complete aneurysm healing and subsequent stent degradation seems promising. These results should encourage further device refinements and clinical evaluation of this treatment strategy for cerebrovascular aneurysms [1].

1)
Grüter BE, Täschler D, Strange F, Rey J, von Gunten M, Grandgirard D, Leib SL, Remonda L, Widmer HR, Nevzati E, Fandino J, Marbacher S, Coluccia D. Testing bioresorbable stent feasibility in a rat aneurysm model. J Neurointerv Surg. 2019 Mar 9. pii: neurintsurg-2018-014697. doi: 10.1136/neurintsurg-2018-014697. [Epub ahead of print] PubMed PMID: 30852526.