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A Thin Film Nitinol Neurovascular Covered Stent For Small Vessel Aneurysms

Tech ID: 31995 / UC Case 2007-430-0

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OTHER INFORMATION

KEYWORDS

Thin films, Micro-Stents, Aneurysm,
Neurovascular, Nitinol, Implants

CATEGORIZED AS

- ▶ **Biotechnology**
 - ▶ Health
- ▶ **Materials & Chemicals**
 - ▶ Composites
 - ▶ Thin Films
- ▶ **Medical**
 - ▶ Devices
 - ▶ Disease: Cardiovascular
and Circulatory System
 - ▶ Therapeutics

RELATED CASES

2007-430-0

SUMMARY

UCLA researchers in the Department of Pediatrics have developed a thin and flexible stent that can be implanted in small vessels in the neurovascular system.

BACKGROUND

Aneurysms are a spherical out-pouching of blood vessels from a weakened artery wall that can sporadically rupture and cause life-threatening hemorrhage. Aneurysms are typically treated using stents to keep the blocked passageway propped open. While effective, current stents (that have thick coverings) are too large for implantation in the narrow blood vessels such as those in children and the central nervous system. Current approaches to treat aneurysms in narrow vessels include surgical clipping of the aneurysm neck and transcatheter procedures to fill the weakened area with material to reduce the risk of bleeding (coil embolization). However, surgical clipping is limited as treatment for accessible aneurysms and coil embolization can only be used with aneurysms that have narrow necks. There is a need for thin flexible stents that are biocompatible, durable and small enough to access any narrow blood vessel including those found in the brain.

INNOVATION

UCLA researchers in the Department of Pediatrics fabricated a small and thin film (4-10 μ m) flexible stent to treat aneurysms in small blood vessels. The stent is made of a biocompatible and durable nickel titanium alloy (nitinol) patterned using various etching patterns to give the stent high flexibility. The material has shape memory properties, making it adaptable to reach and treat aneurysms that are in small vessels. The developed stent is also compressible, for delivery using small diameter catheters, and can self-expand to cover the inner surface of the blood vessel into which it is deployed.

APPLICATIONS

- ▶ Aneurysm treatment in narrow blood vessels
- ▶ brain, children, etc.
- ▶ Blood flow restoration in vascular system
- ▶ Versatile material for body implants
- ▶ Vascular implant

ADVANTAGES

- ▶ Flexible and thin material
- ▶ Biocompatible and durable
- ▶ Shape memory

RELATED MATERIALS

- ▶ [Levi, D. S. et al. "Thin film nitinol covered stents: Design and animal testing" ASAIO 2008, 54\(3\): 221-226](#)
- ▶ [Chun Y. J. et al. "Thin film nitinol microstent for aneurysm occlusion" J. Biomech. Eng. 2009, 131\(5\)051014-1-8.](#)

STATE OF DEVELOPMENT

Device has been prototyped and successfully demonstrated in *in vivo* studies in swine cranial vasculature.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	9,833,309	12/05/2017	2007-430

