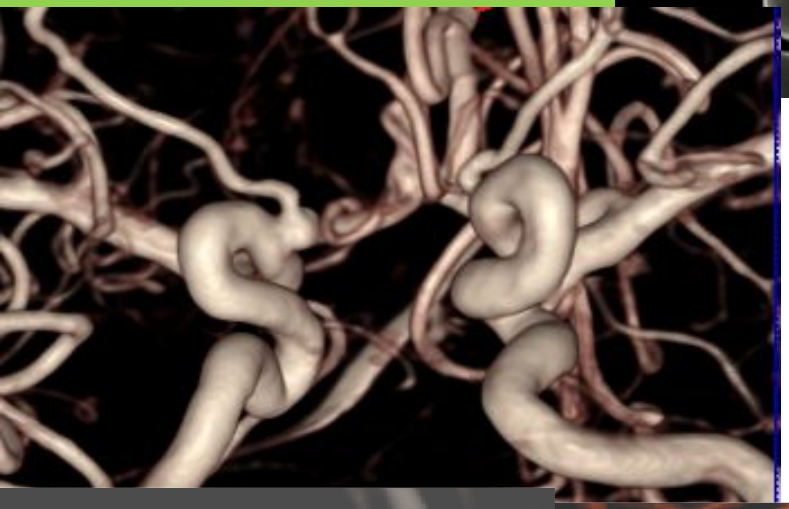
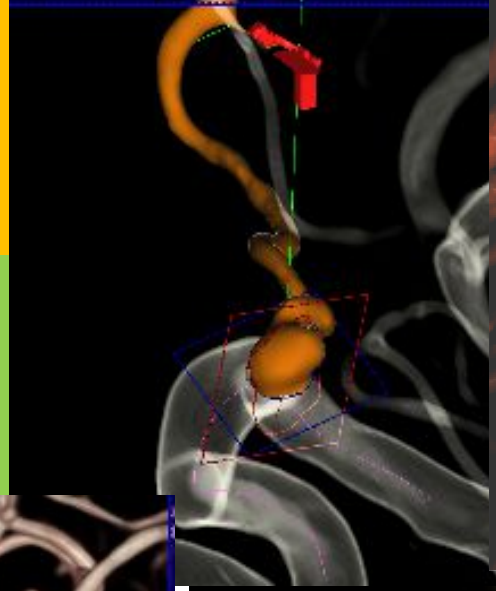
# Aneurisma carotídeo del segmento paraoftálmico con arteria incorporada al saco aneurismático.

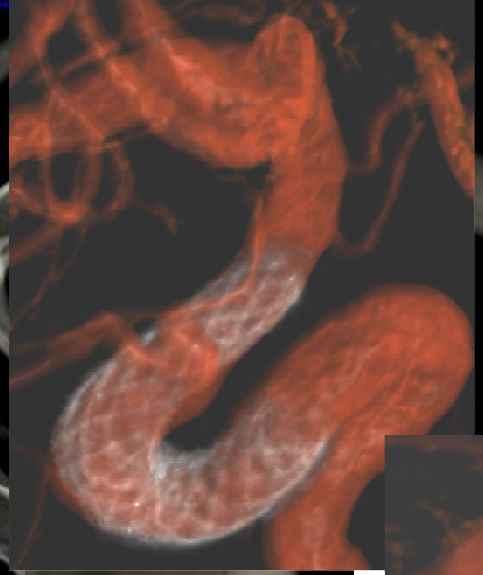
Arteriografía cerebral-3D

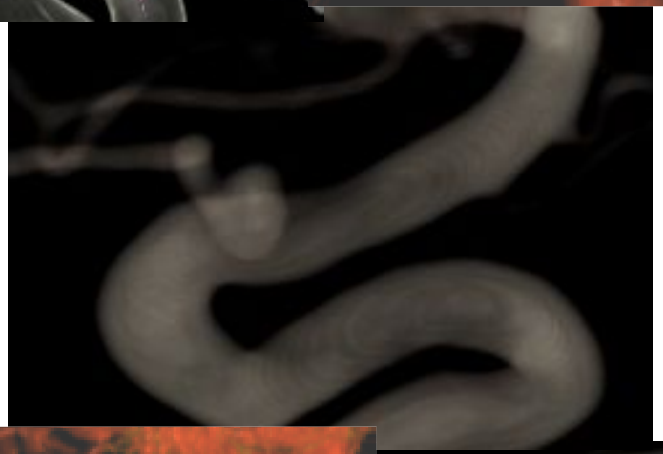
Aneurisma sacular que presenta la arteria oftálmica incorporada al cuello.

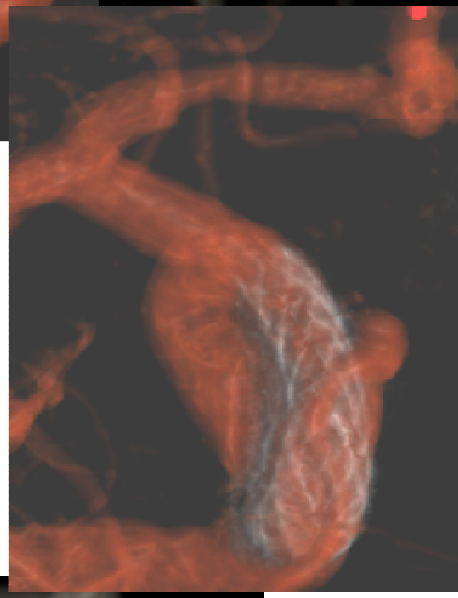
Tratamiento con Stent diversor de flujo.

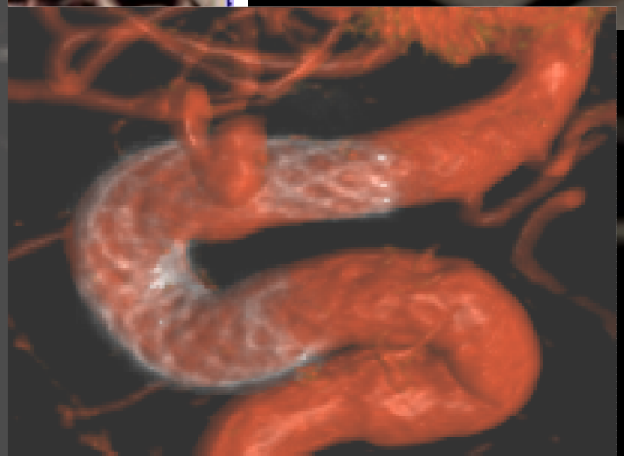












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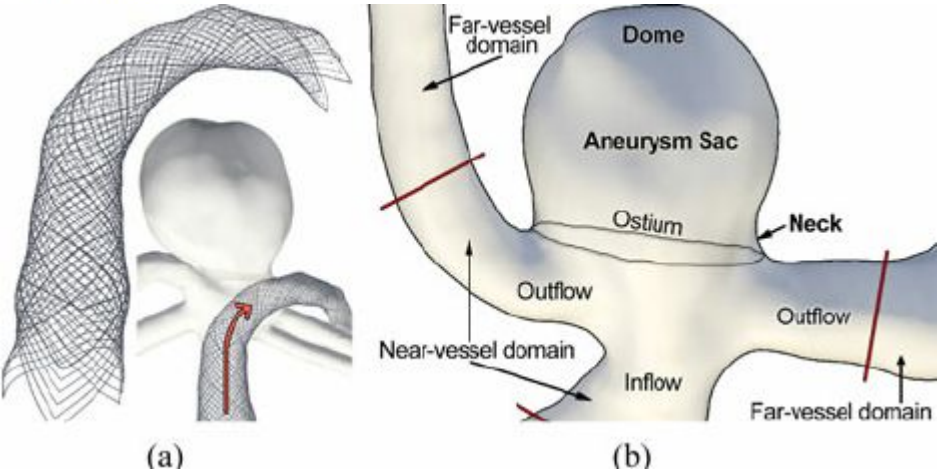
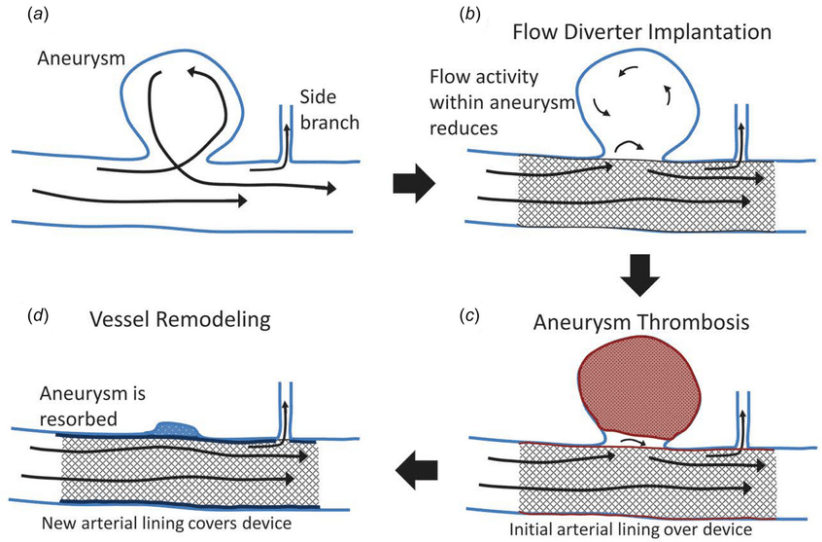
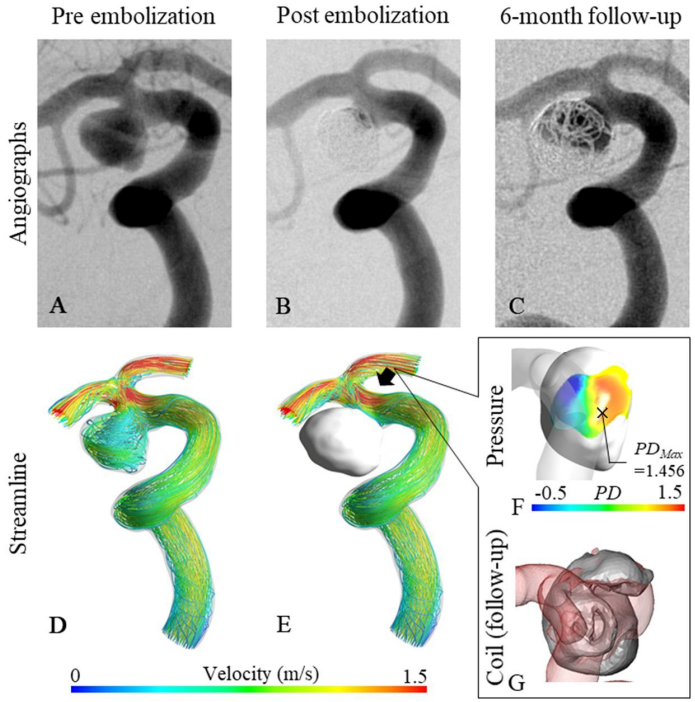
Review Article

# Present Status of Flow Diverter in the World

*Satoshi Tateshima*



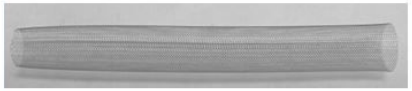



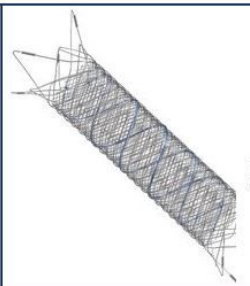




## Neurovascular Flow Diverters

**Surpass™ Streamline** (Stryker)

Cobalt-chromium with 30% metal coverage. Can be repositioned both proximally and distally.





**FRED** (Microvention)

Integrated 16 wire outer and 48 wire inner stent with self-expanding closed cell design

**Pipeline® Embolization Device** (Medtronic)

Braided cylindrical mesh remodels the parent artery, provides a scaffold that promotes endothelial growth, and excludes the aneurysm



**SILK** (Balt)

48 braided nitinol and platinum strands with varying diameter (2-5 mm) and length (15-40 mm)

Not all devices are available in the United States, but are included to support research projects and international users.

# The Fate of Side Branches Covered by Flow Diverters—Results from 140 Patients

*Pervinder Bhogal[1], Oliver Ganslandt[3], Hansjörg Bäzner[2], Hans Henkes[1,4], Marta Aguilar Pérez[1]*

BACKGROUND: Flow diverter stents (FDS) are a recognized treatment option for intracranial aneurysms. There remain ongoing concerns regarding the safety of FDS, especially regarding the fate of covered side branches. We report the patency of side branches covered by FDS.

METHODS: We retrospectively reviewed our database of prospectively collected information for all patients treated with FDS for an unruptured saccular aneurysm of the clinoid, ophthalmic, and terminating segments of the internal carotid artery between September 2009 and July 2016. The aneurysm location, fundus size, and the state of covered branches at last angiography were recorded compared with preoperative angiography.

RESULTS: We identified 140 patients, with 147 aneurysms, who met our inclusion criteria. Five patients had bilateral aneurysms. There were 31 male patients in our cohort (21.9%) and the mean average age was 56.2 ± 13.7 years. Sixty-seven aneurysms arose from the communicating, 58 from the ophthalmic, and 22 from the clinoidal segments. At last follow-up (mean, 22.3 months) 116 aneurysms were completely occluded (78.3%). On the most recent angiogram, 7 ophthalmic (5.3%), 20 posterior communicating (42.6%), 0 anterior choroidal (0%), and 2 anterior cerebral arteries (14.3%) were completely occluded. Reduced vessel caliber was seen in 11 ophthalmic (8.3%), 3 posterior communicating (6.4%), 0 anterior choroidal, and 6 anterior cerebral arteries (42.9%). One patient died during follow-up.

CONCLUSIONS: The side branch occlusion rate was 20% and included ophthalmic, posterior communicating, and anterior cerebral arteries. Consistent with other studies, we did not see occlusion of the anterior choroidal artery.

## INTRODUCTION

Flow diverter stents (FDS) have gained increasing acceptance among the interventional and neurosurgical communities as an alternative treatment option for saccular intracranial aneurysms.[1-13] Similarly, they have also shown benefit in previously difficult to treat diseases such as posterior circulation non-saccular aneurysms.[14] Most studies have focused on the occlusion rate of the treated aneurysms alongside complications.[15] However, there is little literature on the fate of side branches that have been covered by the FDS secondary to the treatment of an aneurysm. Although small studies have looked at the fate of individual branches such as the anterior choroidal artery (AChoA)[16] or the ophthalmic artery,[17] we are aware of only a single study that has reviewed the fate of all the major branches of the distal internal carotid artery (ICA).[18]

We sought to determine the fate of covered branches in our institution.

## METHODS

### Study Design and Patients

This is a single-center retrospective case series analysis of consecutive patients with aneurysms arising from the clinoid ($C_5$), ophthalmic (C6), or communicating ($C_7$) segments of the ICA and treated with at least 1 FDS at our institution between September

**Key words**
- Aneurysm
- Flow diverter
- Patency

**Abbreviations and Acronyms**
**ACA**: Anterior cerebral artery
**AChoA**: Anterior choroidal artery
**AComA**: Anterior communicating artery
**FDS**: Flow diverter stent
**ICA**: Internal carotid artery
**MRI**: Magnetic resonance imaging
**mRS**: Modified Rankin Scale
**PCA**: Posterior cerebral artery
**PComA**: Posterior communicating artery
**PED**: Pipeline Embolization Device

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