

Stent-assisted coiling of cerebral aneurysms: A single-center clinical and angiographic analysis

Jun Wang, Jan Vargas, Alejandro Spiotta, Imran Chaudry, Raymond D Turner, Jonathan Lena, Aquilla Turk

Study Purpose:

This study retrospectively compared the clinical and angiographic outcomes of treating cerebral aneurysms with Neuroform (NEU), Enterprise (EP), and Low-profile Visualized Intraluminal Support (LVIS/LVIS Jr) stents.

Study Design:

A retrospective analysis was done between March 2009 and February 2016 of a procedural database on all aneurysm procedures using any of the three types of self-expanding nitinol stents: Neuroform (NEU), Enterprise (EP) and LVIS/LVIS Jr. Intra-procedure complications, post-procedure complications, and angiographic results (Raymond–Roy grade scale, RRGs) were analyzed retrospectively. An analysis was conducted to identify predictors of intra-procedure and post-procedure complications.

Key Talking Points

Key Study Points:

- 243 aneurysms (229 patients) treated with Stent-Assisted Coiling (SAC) were included in the study with a device breakdown of:
 - Neuroform = 109 aneurysms
 - Enterprise = 61 aneurysms
 - LVIS/LVIS Jr = 73 aneurysms
- The LVIS/LVIS Jr group showed the **highest rate of progression to complete occlusion at follow-up** measured by Raymond-Roy Grade Scale (RRGS)

Raymond-Roy Grade Scale		LVIS/LVIS Jr	Neuroform	Enterprise	Total
Complete Occlusion (RRGS I)	Baseline	47.9%	65.1%	57.4%	58.0%
	Follow-up	81.7%	82.0%	72.9%	79.8%

- The LVIS/LVIS Jr group reported a **higher proportion of intra-procedural complications**, however reported **fewer post-procedural complications** than Neuroform and Enterprise
- There was **no statistical difference** found for intra-procedural complications and post-procedural complications (7.4% and 7.6% respectively) **between ALL STENT groups**
- Thromboembolic events were the most common device/procedure-related complication (13/229, 5.7%) **between ALL STENT groups** (10 were minor and 3 were major)
- Wang et al. reported a high rate of stent-related thrombosis events in the LVIS/LVIS Jr group (10.1%, 7/69) but **all cases were successfully treated with IV abciximab (Reopro)**

Wang et al. writes the following in the discussion section with regards to LVIS/LVIS Jr:

“The delayed thrombosis rate of aneurysm occlusion in our LVIS/LVIS Jr group was superior to that in the Neuroform and Enterprise groups and the recurrence rate with LVIS/LVIS Jr was lower than with the other two stents; however, this is an association only.”

Study Information

Study Analysis Endpoints:

- Intra-procedure complications comparison
- Post-procedure complications comparison
- Angiographic results comparison (post-procedure and follow-up)

Study Population:

Type	LVIS/LVIS Jr	Neuroform	Enterprise	Total
Anterior Circ.	82.2%	74.3%	63.9%	74.1%
Posterior Circ.	17.8%	25.7%	36.1%	25.9%
Ruptured	6.8%	12.1%	19.7%	12.3%
Small	42.5%	44.0%	45.9%	44.0%
Medium	54.8%	50.5%	52.5%	52.3%
Large	1.6%	3.7%	1.6%	2.9%
Giant	0.0%	1.8%	0.0%	0.8%
Wide-neck	83.6%	83.5%	83.6%	83.5%
Single stent	94.5%	90.8%	82.0%	89.7%
Y-stent	2.7%	5.5%	4.9%	4.5%
Telescope	2.7%	3.7%	13.1%	5.8%

Deployment Technique:

Technique	LVIS/LVIS Jr	Neuroform	Enterprise	Total
Jailing	28.8%	5.5%	19.7%	16%
Coil-through	43.8%	50.5%	47.5%	48%
Coil-stent	16.4%	12.8%	16.4%	15%
Balloon-stent	11.0%	31.2%	16.4%	22%

Results:

Angiographic (Raymond-Roy Grade Scale - RRGs)

RRGS		LVIS/LVIS Jr	Neuroform	Enterprise	Total
I	Baseline	47.9%	65.1%	57.4%	58.0%
	Follow-up	81.7%	82.0%	72.9%	79.8%
II	Baseline	27.4%	18.3%	19.7%	21.8%
	Follow-up	10.0%	7.0%	4.2%	7.2%
III	Baseline	24.7%	16.5%	22.9%	21.0%
	Follow-up	8.3%	11.0%	22.9%	13.0%

- Angiographic follow-up was available in 189/229 (82.5%) patients with 208/243 aneurysms (85.6%)
- Mean follow-up time = 15.9 months (6 months to 6 years)

MV Publications Article Review

Clinical Marketing



Complications

Type	LVIS/LVIS Jr	Neuroform	Enterprise	Total
Recurrence	5.0%	9.0%	14.6%	9.1%
Retreatment	NR	NR	NR	1.9%
Intra-procedural complications	13.0%	5.9%	3.4%	7.4% <i>not significant</i>
Post-procedural complications	3.8%	5.3%	17.8%	7.6% <i>not significant</i>
Thrombosis	10.1%	4.0%	3.4%	5.7%
In-stent stenosis	0.0%	3.2%	8.8%	3.5%

NR = Not Reported

Author's Conclusion:

All three types of stent were safe, feasible, effective, and reliable options for stent-assisted coiling of wide-necked or complex intracranial aneurysms. LVIS/LVIS Jr can achieve better progressive aneurysm complete occlusion but the rate of intra-procedure thrombosis was not negligible. The long-term efficacy and safety of the LVIS/LVIS Jr need to be evaluated in future studies.

Reference:

Wang J, Vargas J, Spiotta A, et al. J NeuroIntervent Surg Published Online First: [November 16th, 2017]. doi:10.1136/ neurintsurg-2017-013272