Evaluating the efficacy and safety of the carotid CASPER-RX stent in mechanical thrombectomy for acute ischemic stroke

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Introduction:

A new generation of carotid artery stents that uses a dual micromesh layer to reduce embolic events during carotid artery stenting has recently been introduced. We aim to analyze the efficacy and safety of the new CASPER-RX stent in patients experiencing acute ischemic stroke with large vessel intracranial occlusion associated with a tandem lesion (i.e. also a carotid occlusion or severe stenosis).

Methods:

All consecutive patients treated with carotid CASPER-RX stents were retrospectively analyzed from our stroke registry. Clinical, angiographic and neuroimaging data were analyzed. Endpoints included acute intra-stent thrombus formation, stent occlusion prior to hospital discharge, 3-month modified Rankin score (mRs) and symptomatic intracranial hemorrhage.

Results:

Twenty-one patients were included. Ten patients (47,6%) had tandem carotid occlusions and eleven patients had severe carotid stenosis (52,4%), eight of whom had a haemodynamically significant stenosis. Fifteen patients had M1 (71,4%) intracranial occlusion and six patients had M2 (18,6%) intracranial occlusion. All 21 patients were loaded with 250-500mg aspirin intravenously. Additionally, 18 of these patients received intravenous r-tPA and four patients were already taking 75mg clopidogrel daily. Seven patients received a bolus of heparin intravenously (range 3000-6000 units). No stent occlusion occurred prior to hospital discharge. Symptomatic intracranial hemorrhage was reported in two patients. No stroke recurrence was reported.

Baseline Characteristic and Medical History

Age (mean±SD)	71,3±9,8
Female, %	38,1
Smoking, %	38,1
Hypertension, %	71,4
Dislipidemia, %	90,5
Atrial Fibrillation, %	9,5
Diabetes Mellitus, %	14,3
Baseline NIHSS (median, [IQR])	15 [9,5-19]
IV-tPA, %	85,7

Post stent findings

Stent length, mean±SD, mm	30,2±2,2
Stent diameter, mean±SD, mm	7,2±1,4
Acute intra-stent thrombus formation, n(%)	11 (52,4)
Incomplete vessel wall apposition, n(%)	1 (4,8)
Residual stenosis, mean±SD, %	16,5±11,2
Single Stent n(%)	18 (86)
Multiple Stents n(%)	3 (14)

90-days MRs

MRs 0-2: 71,4%

■ MRs 0 ■ MRs 1 ■ MRs 2 ■ MRs 3 ■ MRs 4 ■ MRs 6

A: subtracted DSA: pre-stent carotid stenosis
B: subtracted DSA: immediate post-stent control
C: subtracted DSA: delayed post-stent control, acute intra-stent thrombus
D: unsubtracted DSA: delayed post-stent control, acute intra-stent thrombus

Discussion and Conclusions:

A recent article found a significantly higher rate of acute stent occlusions of dual-layer carotid artery stents compared with single-layer stents in the setting of acute stroke with an intracranial occlusion and an additional occlusion at the origin of the ICA (tandem occlusions).*

In the present series, clot formation during the procedure was frequently observed in Casper-RX stents, which required repeated balloon angioplasty, peri-procedural intravenous infusion of anticoagulant and antiplatelet treatment in addition to r-tPA. In the absence of a prospective randomized controlled study demonstrating the non-inferiority of micromesh dual-layer stent compared to single-layer design, we decided to no longer use this stent in acute stroke when carotid angioplasty was also required.

* Yilmaz, U., Körner, H., Mühl-Benninghaus, R., Simgen, A., Kraus, C., Walter, S., et al. (2017). Acute Occlusions of Dual-Layer Carotid Stents After Endovascular Emergency Treatment of Tandem Lesions. Stroke; a Journal of Cerebral Circulation, 48(8), 2171–2175. <http://doi.org/10.1161/STROKEAHA.116.015965>