

E-107 CAROTID ARTERY STENTING IN PATIENTS WITH SYMPTOMATIC NON-STENOTIC CAROTID ARTERY DISEASE – A CASE SERIES

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Introduction Symptomatic non-stenotic carotid (SyNC) disease accounts for about 20-30% of the unilateral anterior circulation embolic appearing strokes of undetermined source. SyNC classification includes: luminal stenosis <50% and atherosclerotic plaque with at least one high-risk feature (diameter >3.0 mm, presence of ulceration or intra-plaque hemorrhage). While randomized control trials have not supported revascularization of patients with stenosis of <50% by carotid endarterectomy (CES) or carotid stenting (CAS), recent guidelines have brought attention to high-risk plaque characteristics which play a major influence in predicting the risk of plaque rupture and may be more important than the degree of narrowing. In this case series we analyzed the safety and outcomes of patients treated with CAS who present with acute anterior circulation stroke symptoms and ipsilateral SyNC with high-risk plaque features.

Material and Methods This is a single center retrospective case series. We screened 5677 consecutive patients who presented with acute stroke symptoms to our stroke center between 2013 and 2022. 954 patients underwent emergent endovascular intervention. 137 patients underwent carotid stenting. 5 patients underwent carotid stenting for SyNC. Diagnosis of SyNC was made by a vascular neurologist based on non-invasive imaging techniques, after ruling out other sources of embolization. Plaque characteristics and degree of stenosis were analyzed on pre-procedure CTA, as well as on subsequent cerebral angiogram. Patient demographics, vascular risk factors, as well as outcomes of the procedure, complications, 90-day mRS and recurrent strokes were recorded.

Results 5 patients were included in the analysis. Average age was 76. Patients presented with NIHSS ranging from 1 to 6. All patients had high risk features on pre-procedure CTA: irregular plaque with concern for ulceration, and two had concern for adjacent floating thrombus. Average stenosis based on cerebral angiogram was 36%. 80% patients were on aspirin and statin prior to their acute presentation. Procedures were performed under general anesthesia or monitored anesthesia care, and all involved the use of a cerebral protection device. Procedural success was 100%. There were no peri-procedural complications. One patient died at 3 months due to underlying metastatic ovarian cancer, but remained neurologically at baseline. All other patients had mRS 0-1 at 3 months. No patients had recurrent stroke events in the revascularized carotid territory at 3 months.

Conclusions In this case series performed over a 10-year period at a high-volume stroke center we show that CAS is safe and efficient in patients with SyNC. Previous studies have established safety and effectiveness of CES in patients presenting with SyNC, however there is a paucity of reports in the literature regarding the effect of CAS in this patient population. Recent guidelines have brought specific attention to high-risk plaque characteristics which suggest that plaque instability plays a major role in the onset of ischemic events, regardless of lumen narrowing. Advanced imaging techniques, such as Optical Coherence Tomography, could help further characterize plaque vulnerability. Despite the small number of

included patients, this case series could serve as preliminary data for further clinical studies necessary to determine the role of CAS in SyNC patients.

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E-108 ENDOVASCULAR TREATMENT OF PATIENTS WITH ACUTE ISCHEMIC STROKE DUE TO UNDERLYING ARTERIAL DISSECTION: A NATIONWIDE ANALYSIS

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Introduction Cervical arterial dissections are important causes of ischemic stroke. However, the outcomes of carotid artery (CA) versus vertebral artery (VA) dissections have not been previously compared, nor has the impact of endovascular intervention been studied, on a nationwide level.

Methods Ischemic stroke admissions in the National Inpatient Sample (NIS) from 2016-2019 were retrospectively analyzed. Patient characteristics, presence and site of cervical arterial

Abstract E-108 Table 1 Comparison of clinical characteristics and outcomes among patients presenting with acute ischemic stroke due to carotid or vertebral artery dissections

Characteristic	Vertebral Artery Dissection, N = 2,562	Carotid Artery Dissection, N = 2,789	p-value ¹
Age (years), Mean (SD)	53 (17)	57 (17)	<0.001
Female, n (%)	1,027 (40%)	1,151 (41%)	0.4
Traumatic Brain Injury, n (%)	39 (1.5%)	89 (3.2%)	<0.001
APR-DRG Mortality Risk Score, Mean (SD)	2 (1)	2 (1)	0.2
APR-DRG Illness Severity Score, Mean (SD)	2 (1)	2 (1)	0.6
Treatment			
Thrombolytic Treatment, n (%)	169 (6.6%)	349 (13%)	<0.001
Mechanical Thrombectomy, n (%)	126 (4.9%)	539 (19%)	<0.001
Stent placement, n (%)	57 (2.2%)	353 (13%)	<0.001
Comorbidities			
Hypertension, n (%)	1,364 (53%)	1,439 (52%)	0.2
Diabetes Mellitus, n (%)	563 (22%)	594 (21%)	0.5
Chronic Kidney Disease, n (%)	160 (6.2%)	236 (8.5%)	0.002
Congestive Heart Failure, n (%)	128 (5.0%)	205 (7.4%)	<0.001
Inpatient Complications and Outcomes			
Intracerebral/Subarachnoid Hemorrhage, n (%)	145 (5.7%)	313 (11%)	<0.001
Length of Stay (Days), Median (IQR)	4 (2, 8)	5 (3, 10)	<0.001
Total Charges (\$), Median (IQR)	54,110 (30,297, 110,062)	93,485 (43,406, 199,121)	<0.001
Adverse Discharge, n (%)	1,402 (55%)	1,842 (66%)	<0.001

¹ Wilcoxon rank sum test; Pearson's Chi-squared test

Abstract E-108 Table 2 Multivariable regression analyses of short-term outcomes. ICH/SAH = Intracerebral hemorrhage/subarachnoid hemorrhage; CI = Confidence Interval; OR = Odds Ratio

Characteristic	Length of Stay (days)			Total Charge (\$)			Adverse Discharge			ICH/SAH		
	Beta	95% CI	p	Beta	95% CI	p-value	OR	95% CI	p	OR	95% CI	p
Dissection												
Vertebral Artery	—	—	—	—	—	—	—	—	—	—	—	—
Carotid Artery	1.7	1.0, 2.3	<0.001	34,115	22,102, 46,129	<0.001	1.26	1.12, 1.43	<0.001	1.53	1.24, 1.90	<0.001
Traumatic Brain Injury	11	7.6, 14	<0.001	231,769	179,838, 283,700	<0.001	5.64	3.43, 9.28	<0.001	1	1.00, 1.01	0.12
APR-DRG Mortality Risk Score	0.51	0.05, 0.98	0.03	11,804	3,751, 19,857	0.004	1.17	1.06, 1.29	0.002	0.88	0.72, 1.08	0.2
APR-DRG Illness Severity Score	-0.05	-0.49, 0.39	0.8	-8,078	-16,287, 132	0.054	1	0.90, 1.10	>0.9	0.58	0.25, 1.33	0.2
Thrombolytic Treatment	-0.43	-1.3, 0.40	0.3	29,240	12,264, 46,216	<0.001	1.2	0.97, 1.49	0.086	1.25	1.05, 1.49	0.013
Mechanical Thrombectomy	1.8	0.55, 3.1	0.005	78,461	55,617, 101,305	<0.001	2.32	1.86, 2.90	<0.001	0.86	0.71, 1.03	0.1
Stent placement	-0.32	-1.3, 0.68	0.5	62,713	35,665, 89,761	<0.001	0.83	0.64, 1.08	0.2	1.34	1.00, 1.81	0.053
Age (years)	-0.04	-0.06, -0.03	<0.001	-623	-929, -316	<0.001	1.03	1.03, 1.04	<0.001	3.63	2.83, 4.67	<0.001
Female	-0.7	-1.3, -0.11	0.02	-10,332	-21,369, 705	0.067	1.26	1.12, 1.43	<0.001	1.17	0.85, 1.61	0.3
Hypertension	-0.27	-0.88, 0.35	0.4	-5,234	-18,222, 7,754	0.4	1.08	0.95, 1.23	0.3	0.98	0.78, 1.23	0.9
Diabetes Mellitus	0.85	0.12, 1.6	0.023	-4,860	-16,440, 6,721	0.4	1.29	1.11, 1.51	0.001	0.93	0.72, 1.21	0.6
Chronic Kidney Disease	1.8	0.11, 3.4	0.036	15,297	-11,257, 41,850	0.3	1.44	1.09, 1.90	0.011	0.6	0.36, 0.98	0.041
Congestive Heart Failure	2.7	1.3, 4.0	<0.001	49,620	22,855, 76,385	<0.001	1.5	1.13, 1.99	0.005	1.28	0.87, 1.88	0.2

dissection, and outcomes were collected. Multivariable linear and logistic regression analyses adjusting for patient characteristics, endovascular and thrombolytic therapy, and complex sampling methodology were performed.

Results Of 536,540 patients with acute ischemic stroke (AIS) were identified, 5,351 (1%) had dissections; 2,789 (52%) with CA and 2,562 (48%) with VA dissection. CA dissection patients had significantly higher rates of concurrent traumatic brain injury (3.2% vs 1.5%; $p<0.001$) and were more likely to be treated with thrombolytic therapy (13% vs 6.6%; $p<0.001$), mechanical thrombectomy (19% vs 4.9%; $p<0.001$), or intraluminal stent placement (13% vs 2.2%; $p<0.001$). Multivariable analysis found that CA dissections were associated with greater odds of intracerebral/subarachnoid hemorrhage (OR=1.53; $p<0.001$) relative to VA dissections. Thrombolytic therapy (OR=1.34; $p=0.053$) and thrombectomy (OR=3.63; $p<0.001$) were associated with greater odds of intracerebral/subarachnoid hemorrhage. CA dissections were associated with longer length of stay (LOS; beta=1.7; $p<0.001$), charges (beta=34,115; $p<0.001$), and nonroutine discharge (OR=1.26; $p<0.001$). Thrombectomy was associated with greater LOS (beta=1.8; $p=0.005$), charges (beta=78,461; $p<0.001$), and odds of nonroutine discharge (OR=2.32; $p<0.001$). Diabetes (beta=0.85; $p=0.023$), chronic kidney disease (beta=1.8; $p=0.036$), and congestive heart failure (beta=2.7; $p<0.001$) were associated with longer LOS.

Conclusions Despite a similar prevalence among patients admitted for AIS, CA dissections are associated with a higher rate of endovascular intervention and poorer short-term outcomes compared to VA dissections. This study provides essential epidemiologic and outcome data for the cerebrovascular neurosurgeon.

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E-109

USE OF INTRAVASCULAR LITHOTRIPSY PRIOR TO STENTING OF SEVERELY CALCIFIED CAROTID ARTERY STENOSES

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Introduction/Purpose Large, calcified plaques that narrow the vessel lumen and involve more than half of the carotid artery circumference pose an endovascular treatment challenge. Such lesions are prone to technical failure. Some patients may not be surgical candidates and may benefit from intravascular lithotripsy. Intravascular lithotripsy (IVL) is currently approved for treatment of severely calcified coronary lesions but may be