MAYO CLINIC

INTERNAL CAROTID ARTERY STENOSIS AND CIRCLE OF WILLIS

DOES COMPLETENESS AFFECT INTERVENTION SELECTION AND OUTCOMES?

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LEARNING OBJECTIVES

- Describe the importance of ICA Stenosis
- Describe the importance of the Circle of Willis as it relates to stroke risk
- Assess outcomes amongst patients undergoing treatment for ICA stenosis with a complete vs. incomplete Circle of Willis

DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIP(S) WITH INELIGIBLE COMPANIES

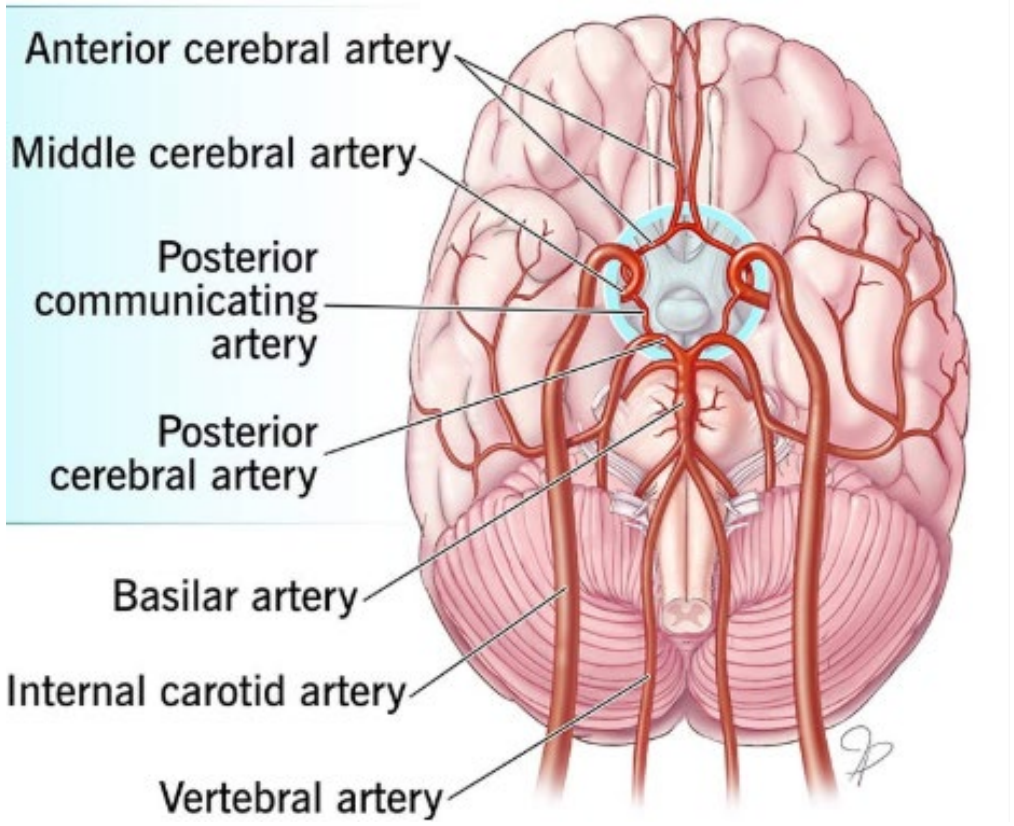
- Nothing to disclose

REFERENCES TO OFF-LABEL USAGE(S) OF PHARMACEUTICALS OR INSTRUMENTS

- Nothing to disclose

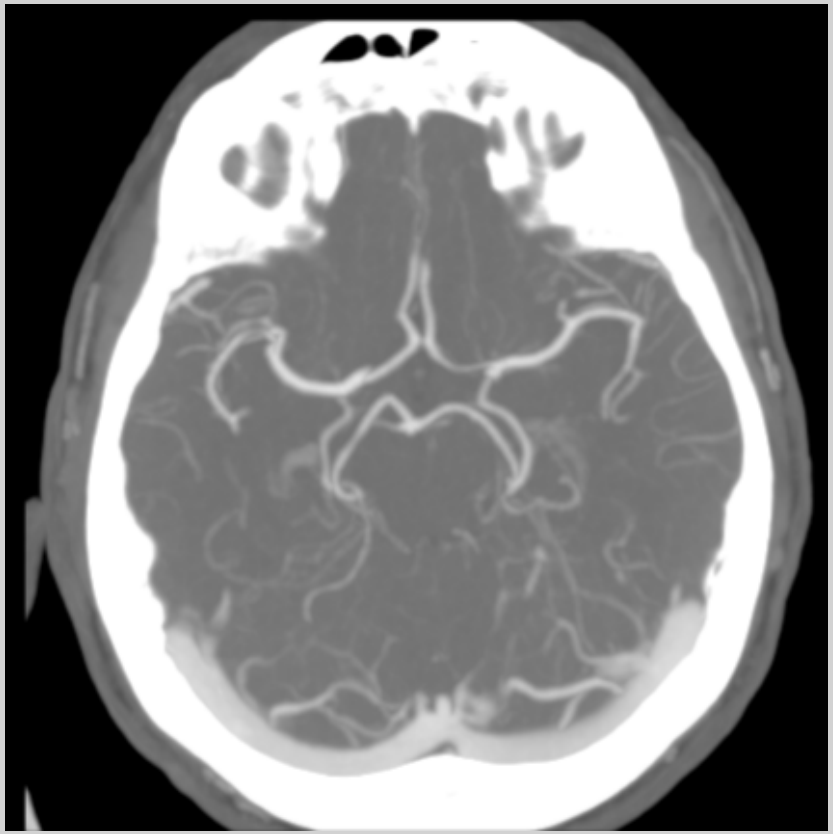
BACKGROUND

- Internal carotid artery (ICA) stenosis is responsible for approximately 20% of ischemic strokes
  - Embolic
  - Hypoperfusion
- Circle of Willis (CoW) is a network of arteries at the base of the brain responsible for connecting anterior and posterior circulation
- CoW can provide collateral flow to areas of the brain and help reduce risk of TIA and/or stroke during hypoperfusion



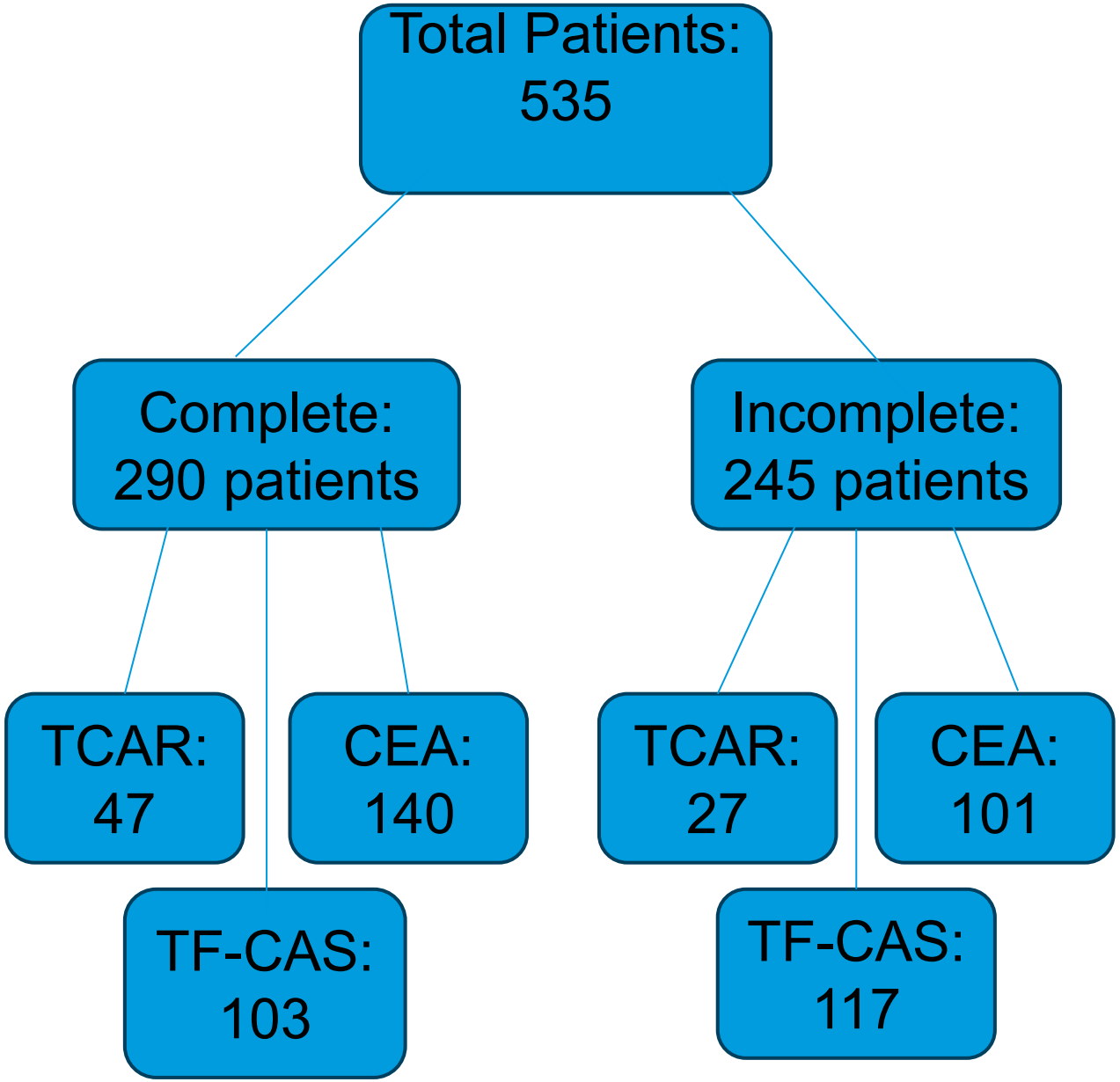
METHODS

- Single center retrospective cohort study
- All patients undergoing intervention for ICA disease between February 2015 and June 2025
- All patients had preoperative imaging of the head (either CTA or MRA)
- Patients were classified as incomplete if there was disruption to the CoW, severe stenosis, or a hypoplastic segment within the Circle



RESULTS

- 535 patients were divided into two groups according to the completeness of their CoW
- Were then grouped by intervention
- Majority of patients underwent CEA (45%) followed by TF-CAS (41.1%) and then TCAR (13.8%)
- Main outcome was the composite of ipsilateral stroke, TIA, myocardial infarction (MI), and death at 30 days



DEMOGRAPHICS

	CEA			TCAR			TF-CAS		
	Complete (n=140)	Incomplete (n=101)	p-value	Complete (n=47)	Incomplete (n=27)	p-value	Complete (n=103)	Incomplete (n=117)	p-value
Age (years)	73.49 ± 7.61	72.76 ± 7.97	0.48	74.10 ± 9.00	72.40 ± 8.82	0.43	72.40 ± 9.52	69.99 ± 9.22	0.06
Male sex	82 (58.6%)	71 (70.3%)	0.08	34 (72.3%)	20 (74.1%)	1.00	68 (66.0%)	72 (61.5%)	0.57
Hypertension	115 (82.1%)	87 (86.1%)	0.48	41 (87.2%)	23 (85.2%)	1.00	93 (90.3%)	101 (86.3%)	0.41
Diabetes Mellitus	40 (28.6%)	33 (32.7%)	0.57	12 (25.5%)	10 (37.0%)	0.31	27 (26.2%)	48 (41.0%)	0.02
Coronary Artery Disease	50 (35.7%)	49 (48.5%)	0.05	19 (40.4%)	14 (51.9%)	0.47	40 (38.8%)	40 (34.2%)	0.49
Chronic Kidney Disease	41 (29.3%)	49 (48.5%)	1.00	14 (29.8%)	12 (44.4%)	0.22	46 (44.7%)	45 (38.5%)	0.41
Atrial Fibrillation	25 (17.9%)	22 (21.8%)	0.51	8 (17.0%)	7 (25.9%)	0.38	15 (14.6%)	17 (14.5%)	1.00
Current Smoker	17 (12.1%)	12 (11.9%)	1.00	4 (8.5%)	2 (7.4%)	1.00	10 (9.7%)	13 (11.1%)	0.83

RESULTS

	CEA			TCAR			TF-CAS		
	Complete (n=140)	Incomplete (n=101)	p-value	Complete (n=47)	Incomplete (n=27)	p-value	Complete (n=103)	Incomplete (n=117)	p-value
Symptomatic Presentation	46 (32.9%)	27 (26.7%)	0.32	7 (14.9%)	1 (3.7%)	0.24	56 (54.4%)	71 (60.7%)	0.41
Ipsilateral Stroke	1 (0.7%)	1 (1.0%)	1.00	0 (0.0%)	0 (0.0%)	1.00	1 (1.0%)	5 (4.3%)	0.22
Myocardial Infarction	-	-		-	-		-	-	
Mortality	3 (2.1%)	1 (1.0%)	0.64	1 (2.1%)	0 (0.0%)	1.00	0 (0.0%)	1 (0.9%)	1.00
TIA	1 (0.7%)	1 (1.0%)	1.00	0 (0.0%)	0 (0.0%)	1.00	1 (1.0%)	1 (0.9%)	1.00
30 Day Composite (MI/Stroke/TIA/death)	5 (3.6%)	3 (3.0%)	1.00	1 (2.1%)	0 (0.0%)	1.00	2 (1.9%)	6 (5.1%)	0.29
Midterm Composite (MI/stroke/TIA/death)	33 (23.6%)	18 (17.8%)	0.34	15 (31.9%)	3 (11.1%)	0.05	17 (16.5%)	27 (23.1%)	0.24

MID TERM RESULTS

	CEA			TCAR			TF-CAS		
	Complete (n=140)	Incomplete (n=101)	p-value	Complete (n=47)	Incomplete (n=27)	p-value	Complete (n=103)	Incomplete (n=117)	p-value
Length of Follow up	3.6 + 2.6	2.8 + 2.7	**0.02**	2.9 + 1.8	3.2 + 2.0	0.51	2.2 + 1.7	2.5 + 2.1	0.25
Midterm Ipsilateral Stroke	4 (2.9%)	5 (5.0%)	0.50	0 (0.0%)	0 (0.0%)	1.00	3 (2.9%)	9 (7.7%)	0.14
Midterm Myocardial Infarction	2 (1.4%)	1 (1.0%)	1.00	3 (6.4%)	0 (0.0%)	0.30	1 (1.0%)	3 (2.6%)	0.62
Midterm Mortality	20 (14.3%)	11 (10.9%)	0.56	13 (27.7%)	3 (11.1%)	0.14	10 (9.7%)	13 (11.1%)	0.83
Midterm TIA	8 (5.7%)	3 (3.0%)	0.37	2 (4.3%)	0 (0.0%)	0.53	5 (4.9%)	6 (5.1%)	1.00
Midterm Composite (MI/stroke/TIA/death)	33 (23.6%)	18 (17.8%)	0.34	15 (31.9%)	3 (11.1%)	0.05	17 (16.5%)	27 (23.1%)	0.24

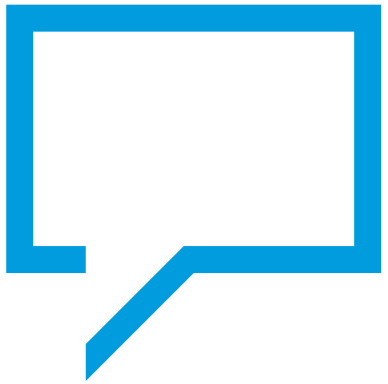
CONCLUSIONS

- The completeness of the CoW did not seem to influence risk of ipsilateral stroke, MI, or death at 30 days
- Symptomatic patients were most likely to undergo TF-CAS followed by CEA
- The completeness of the CoW also did not increase risk of stroke/TIA, MI, or death at midterm follow up regardless of symptomatic versus asymptomatic presentation
- Practitioners can safely offer any intervention (CEA, TCAR, and TF-CAS) to patients with complete and incomplete CoW

LIMITATIONS

- Single center retrospective study
- Length of follow up was variable

QUESTIONS & ANSWERS



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