

Tips and Tricks For Successful TCAR and When to Avoid a Carotid Stent Procedure



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Disclosures


- Silk Road Medical (TCAR)
 - National PI: ROADSTER-3
 - Site PI: ROADSTER and ROADSTER-2
 - Physician Education/Training/Certification
- Medtronic
 - Physician/Trainee Education
- Adiant/CyndRx/Endospan/Endoron/Nectero
 - Clinical Events Committee/Data Safety Monitoring Board
- UpToDate (royalties for topics)
 - Author, carotid and aortic aneurysm
- Intersocietal Accreditation Commission (IAC)
 - Member, Carotid Stenting Board
- No discussion of "off label" devices/techniques
- Opinions are my own and do not represent official societal/committee endorsements

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TCAR: Tips and Tricks

Anatomic Considerations

- Patient Selection
- Carotid Lesion



Technical Tips for Success

- Medications
- Procedural Technique
- Postoperative Care

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Medications: Dual Antiplatelet Therapy (DAPT)

TCAR without DAPT is **NOT** a SAFE procedure!

Early Outcomes in the ROADSTER 2 Study of Transcarotid Artery Revascularization in Patients With Significant Carotid Artery Disease

Stroke. 2020;51:2620–2629.

0.6%

ROADSTER 2


High Surgical Risk

- Intention-To-Treat (**1.9%** stroke rate)
 - 60 "protocol violations"
 - 11 inclusion/exclusion criteria
 - remainder had **medication noncompliance**
 - 9 more strokes; 11 stroke/death; no change in MI

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Anatomic Requirements: "Follow the IFU"

- Anatomical requirements (per IFU)
 - >5 cm: distance from "access site" to "lesion"
 - >6 mm: CCA diameter
 - CCA free of significant disease for sheath insertion/vessel occlusion
 - lesion "amendable" to stent placement





Adjuvant use of "**off-label**" technology in carotid artery is likely to lead to worse outcomes

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Procedural Technique and Postoperative Care

- More "**generous**" **pre-dilatation** for luminal gain
 - Agitate the lesion during early part of procedure to allow the most flow reversal time to "wash out" debris
 - Sized to normal distal internal carotid artery
- **Oversize stent by 1-2 mm** to close down the stent cells
 - Sized to common carotid artery
- Post-dilatation if there is significant residual stenosis
 - Mandatory **two-view completion imaging**
- Routine use of **protamine**
 - Decrease bleeding complications
- Be prepared to manage **post-TCAR hypotension**

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TCAR Improves Carotid Program Outcomes

Original Investigation | Surgery JAMA Network Open. 2021;4(2):e2037885. doi:10.1001/jamanetworkopen.2020.37885

Association of Adoption of Transcarotid Artery Revascularization With Center-Level Perioperative Outcomes

Figure 2. Rate of Perioperative Major Adverse Cardiovascular Events (MACE)

Availability of TCAR associated with **10% decrease in MACE at 12 months** after **ALL** carotid revascularization

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“High Risk” for CEA

<p>ANATOMIC FACTORS</p> <ul style="list-style-type: none"> • Prior head/neck surgery or irradiation • Spinal immobility • Restenosis post CEA • Surgically inaccessible lesion • Laryngeal palsy; Laryngectomy • Permanent contralateral cranial nerve injury • Contralateral occlusion • Severe tandem lesions • Bilateral stenosis requiring treatment 	<p>PHYSIOLOGIC FACTORS</p> <ul style="list-style-type: none"> • Age ≥75 • Congestive Heart Failure • Left Ventricular Ejection Fraction <35% • ≥2 diseased coronaries with ≥70% stenosis • Unstable angina • Myocardial infarction within 6 weeks • Abnormal stress test • Need for open heart surgery • Need for major surgery (including vascular) • Uncontrolled diabetes • Severe pulmonary disease 	<p>LIFE EXPECTANCY</p> <ul style="list-style-type: none"> • <3-5 years (asymptomatic)
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“High Risk” for TF-CAS

<p>ANATOMIC FACTORS</p> <ul style="list-style-type: none"> • Prior head/neck surgery or irradiation • Spinal immobility • Restenosis post CEA • Surgically inaccessible lesion • Laryngeal palsy; Laryngectomy • Permanent contralateral cranial nerve injury • Contralateral occlusion • Severe tandem lesions • Bilateral stenosis requiring treatment 	<p>PHYSIOLOGIC FACTORS</p> <ul style="list-style-type: none"> • Age ≥75 • Congestive Heart Failure • Left Ventricular Ejection Fraction <35% • ≥2 diseased coronaries with ≥70% stenosis • Unstable angina • Myocardial infarction within 6 weeks • Abnormal stress test • Need for open heart surgery • Need for major surgery (including vascular) • Uncontrolled diabetes • Severe pulmonary disease 	<p>LIFE EXPECTANCY</p> <ul style="list-style-type: none"> • <3-5 years (asymptomatic) <p>LESION CHARACTERISTICS</p> <ul style="list-style-type: none"> • Aortic arch disease • Aortic arch tortuosity • Carotid tortuosity • Intraluminal thrombus • Lesion calcification <p>PATIENT COMPLIANCE</p> <ul style="list-style-type: none"> • DAPT utilization
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“High Risk” for TCAR

<p>ANATOMIC FACTORS</p> <ul style="list-style-type: none"> • Prior head/neck surgery or irradiation • Spinal immobility • Restenosis post CEA • Surgically inaccessible lesion • Laryngeal palsy; Laryngectomy • Permanent contralateral cranial nerve injury • Contralateral occlusion • Severe tandem lesions • Bilateral stenosis requiring treatment 	<p>PHYSIOLOGIC FACTORS</p> <ul style="list-style-type: none"> • Age ≥75 • Congestive Heart Failure • Left Ventricular Ejection Fraction <35% • ≥2 diseased coronaries with ≥70% stenosis • Unstable angina • Myocardial infarction within 6 weeks • Abnormal stress test • Need for open heart surgery • Need for major surgery (including vascular) • Uncontrolled diabetes • Severe pulmonary disease 	<p>LIFE EXPECTANCY</p> <ul style="list-style-type: none"> • <3-5 years (asymptomatic) <p>LESION CHARACTERISTICS</p> <ul style="list-style-type: none"> • Aortic arch disease • Aortic arch tortuosity • Carotid tortuosity • Intraluminal thrombus • Lesion calcification <p>PATIENT COMPLIANCE</p> <ul style="list-style-type: none"> • DAPT utilization
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Carotid Lesion Characteristics

Assessing the suitability of the carotid bifurcation for stenting: Anatomic and morphologic considerations J Vasc Surg 2021;74:2087-95 | Angela A. Kokkosis, MD,¹ Sumaira Macdonald, MD, PhD,¹ Jeffrey Jim, MD, MPH,² Rasesh Shah, MD,³ and Peter A. Schneider, MD,⁴ Stony Brook, NY; Sunnyside and San Francisco, Calif; Minneapolis, Minn; and Chesapeake, Va

- TCAR is a novel technique with “transecrotid” stent delivery and robust distal embolic protection with “flow reversal”
- Leverage experience with decades of transfemoral carotid stent placement
 - Thrombus (intraluminal defect)
 - Long segment disease (is there a “healthy” endpoint in the ICA?)
 - Severe tortuosity
 - Severe calcification

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Stay Away from Severe Calcification

“A CAUTIONARY Tale!”

Calcium always wins!!!

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“Appropriate” TCAR Patients

- Anatomic Requirements (per IFU) and Lesion Characteristics


Anatomic eligibility for transcrotid artery revascularization and transfemoral carotid artery stenting (J Vasc Surg 2019;69:1452-60)

Anatomic criteria in the selection of treatment modality for atherosclerotic carotid artery disease (J Vasc Surg 2020;72:1395-404)

~70-85% of revascularization patients have anatomy “optimal” for TCAR

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“TCAR First” Approach



- Anatomic Considerations
- Technical Tips for Success
- October 2023: Shared Decision Making

Conservative “TCAR First” Adoption

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Thank you!

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