



## Completion Imaging After CEA Is Unnecessary And Potentially Harmful

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## Speaker Disclosure

- Nothing to Disclose

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## Post-CEA Completion Imaging

- Despite numerous rpts. of post-CEA intraop lesion detection w/completion imaging (Duplex/angio) → sev. series rptd. favorable outcomes w/o use of routine imaging

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## Post-CEA Completion Imaging: Single Center

Investigator	CEAs (n)	CEA Revisions (%)	ICA Occlusions (%)	Restenosis at 2-3yrs (%)
Baker et al.	316	3	3 (1%)	3
Weaver et al.	86	11	2 (2%)	0
Hallett et al.	155	9	0	2
Bandyk et al.	390	8	1 (0.3%)	2
Ascher et al.	650	3	0	2
Schanzer et al.	407	8	0	2
<b>TOTAL</b>	<b>2004</b>	<b>7%</b>	<b>6 (0.6%)</b>	<b>1.8%</b>

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## Post-CEA Completion Imaging

- German study (2009-2014) of 142,074 CEAs rptd. independent risk reduction w/use of completion US or angio → finding has not been reproduced in other large series

(Knappich et al, Stroke, 2017)

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## Prospective Comparison of CDUS & Angio for Intraop. Completion Studies after CEA (con't)

- 150 pts, enrolled: Sig. more defects requiring intra-op. revision, detected by IDUS, but undetected by angio (15% vs 7%)
- Defects were judged to be more severe with IDUS vs. angio
- 8 pts. with suspicious lesions: intraop. revision was done in 6 ECEA and 2 patch angioplasty (p=.011)
- Periop. stroke occurred in 2 patients (1.3%)

(Knappich C, Eckstein HH, EJVES, 2020;59:881-889)

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### Intraoperative Completion Studies in CEA: Systemic Review and Meta-Analysis of Techniques and Outcomes

- 34 observational studies compared procedural risks in patients undergoing (vs not undergoing) completion imaging after CEA (angio=53,218; DUS=20,030; flowmetry=16,812; angiography=2,291).
- Completion angio and DUS significantly reduced stroke and (RR 0.83) and also death (RR 0.86)
- ESVS recommendations regarding monitoring are similar to German-Austrian guidelines.

(Knappich C, et al, Ann Transl Med, 2021)

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### Intraoperative Completion Studies and their Associations with CEA Outcomes

- Secondary data analysis/German statutory quality assurance database
- Hospitals were categorized as routine Intraop. Completion Study imaging, (ICSI) (>90%), selective ICSI (10-90%), or sporadic ICSI (<10%)
- Multivariable regression analyses were performed
- 119,800 pts underwent CEA
- In-hospital stroke/death rates were lower in routine ICSicenters(1.7%) compared to selective (2.1%) and sporadic (2.0%)
- They concluded lowest in-hospital stroke/death rates are achieved in routine ICSicenters

(Knappich C, Eckstein HH, Ann Surg, 2024)

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### Routine Post-CEA Completion Imaging/ Unnecessary

- Others reported favorable outcome without completion imaging (Rockman et al, Semin in Vasc Surg, 2007)
- 2013 VSGNNE rpt. (6,115 CEAs) w/variable use of completion imaging did not show risk-adjusted improvement in outcome → poss. deleterious effects on mortality & stroke w/re-exploration based on imaging findings

(Wallaert, JVS, 2021)

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### Practice Patterns for Completion Imaging after CEA

- VQI database (2003-2018)
- 1920 surgeons → 98,055 CEAs
- 70% never/rarely; 10% selectively; & 20% routinely perform completion imaging
- Completion imaging ↑ rates of immediate re-exploration, but didn't ↓ odds of major adverse events (stroke/death)

(Dakour-Aridi, et al, JVS, 2021)

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### Management of Postoperative Internal Carotid Artery Intimal Flap after CEA: A Cohort Study and Systemic Review

- 725 CEAs performed between 2008 – 2018
- Postop ICA-IF detected by routine DUs: 13 patients (1.8%)
- No associated intraluminal thrombi on the detected IF.
- 2 patients with IF experienced a TIA and rest asymptomatic.
- All cases managed conservatively and vanished spontaneously mean of 7 months.
- A systemic literature review revealed a postop ICA-IF incidence of 3.0%

(Rychen J, et al., J Neurosurg 2022)

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### Downside to Post-CEA Completion Imaging

- May ↑ unnecessary reoperations (RTOR)
- May ↑ cost
- ↑ timing

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### Our Own Experience

Using gen. anesth. & routine patching (with meticulous dissection with fine tuning) & no routine completion imaging from several randomized trials (1527CEAs):

- AbuRahma, et al, JVS, 1998
- AbuRahma, et al, Stroke, 1999
- AbuRahma, et al, JVS, 2002
- AbuRahma, et al, Ann Surg, 2003
- AbuRahma, et al, JVS, 2005
- AbuRahma, et al, JVS, 2007
- AbuRahma, et al, JVS, 2008
- AbuRahma, et al, JVS 2023

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### Our Own Experience (con't)

- All periop. strokes 10 1%
- All periop. strokes/death 12 1%

	<u>Ipsilat Stroke Free</u>	<u>&gt;70% Resten. Free</u>
1 yr	99%	98%
2 yrs	99%	97%
3 yrs	98%	97%

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### Conclusions/Recommendations

- Insufficient evidence to recomm. routine use of completion imaging after CEA

SVS Clinical Practice Guidelines for Management of Extracranial Cerebrovascular Disease/ Implementation Document  
 (AbuRahma et al, JVS, 2022)

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