OPTIMAL TIMING OF CAROTID ENDARTERECTOMY AFTER AN ACUTE EVENT

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Presenter Disclosure

- I have no current relationships with commercial entities

INTRODUCTION

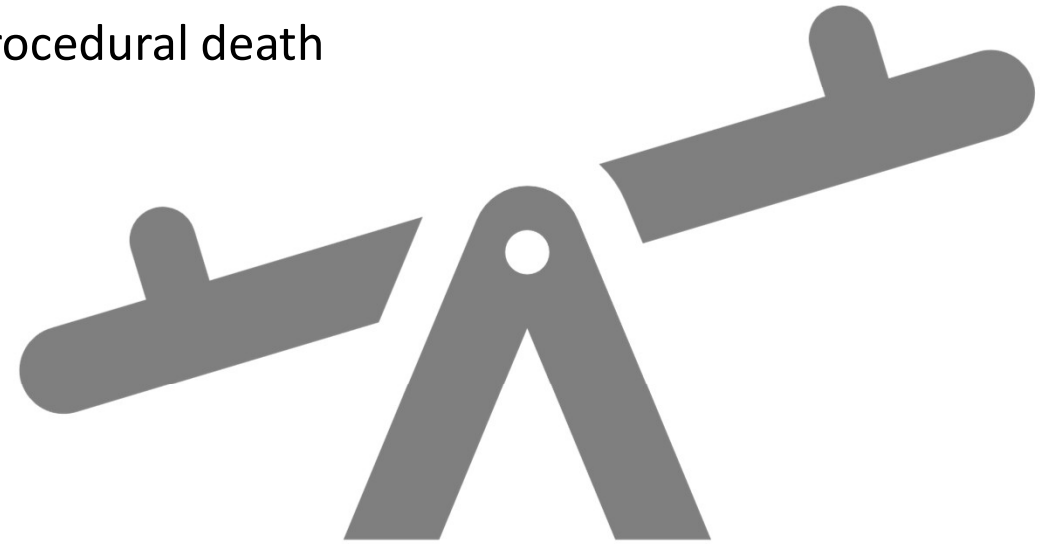
- Carotid endarterectomy (CEA) best treatment for stroke prevention in symptomatic carotid artery stenosis
  - > 50 % ICA stenosis
  - TIA or mild-moderate stroke
- Risk of recurrent stroke is highest early phase
- Heparinization & clamping not benign in setting of new stroke

TOO EARLY

↑ hemorrhagic transformation

↑ periprocedural stroke

↑ periprocedural death



TOO LATE

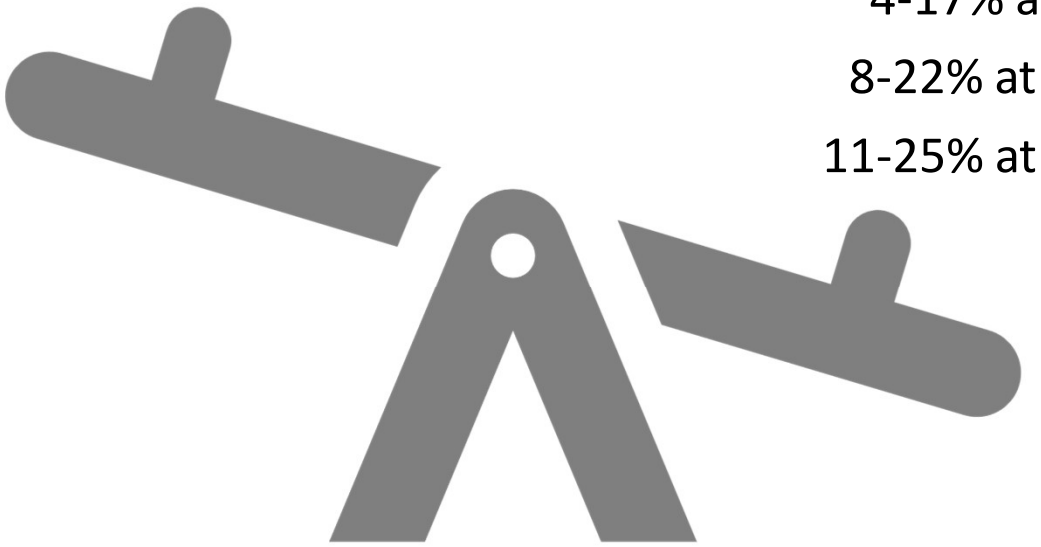
↑ recurrent or primary stroke

5-8% at 48 h

4-17% at 72 h

8-22% at 7 days

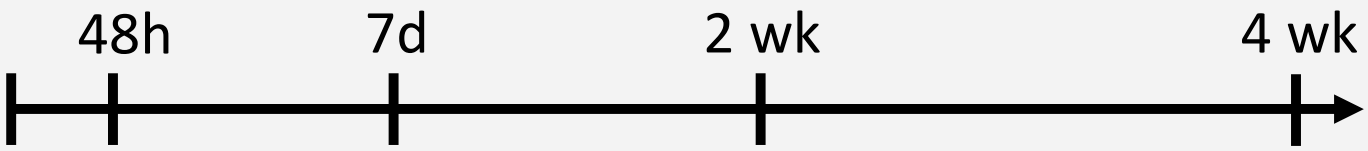
11-25% at 14 days



What is the optimal timing for CEA after

TIA?

STROKE?



BACKGROUND

- 1960s-70s: Delay CEA by at least 6 weeks to avoid postop cerebral hemorrhage
  - Poor perioperative outcomes when done earlier
  - Neurocritical care much improved since

- 20th century: High risk (~20%) of recurrent stroke if wait 6 weeks

BACKGROUND

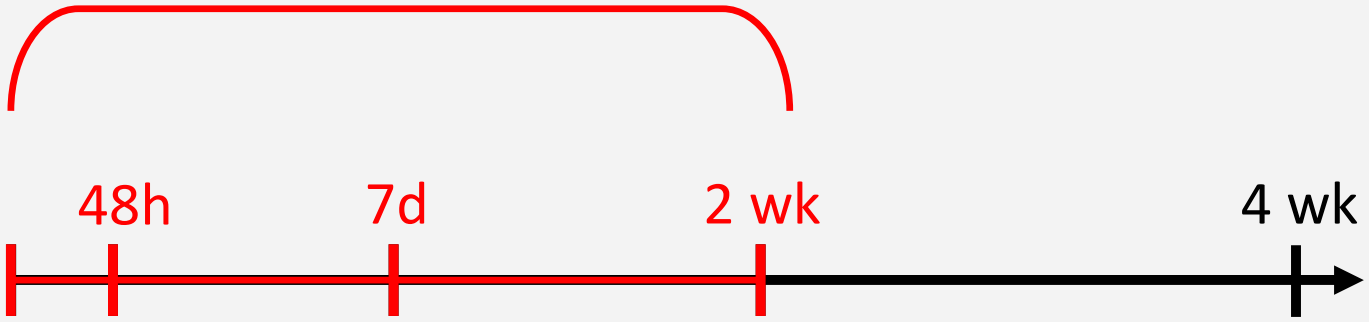
- 2004: Rothwell *et al. p*ooled analysis of ECST & NASCET data (33,000 ptyrs)
  - Far greater benefit (↓5yr risk ischemic stroke) if CEA within 2 weeks
    - ARR 24.7%, NNT 5
  - 2-4 weeks:
    - ARR 4.4%, NNT 23
  - 4-12 weeks
    - ARR 4.1%, NNT 24
  - >12 weeks

BACKGROUND

- AHA : “within 2 weeks”
- ESVS: “asap, preferably within 14 days”
- UK national guidelines: within 48 h (2007), “asap and within 1 week” (2012)
- SVS: “as soon as neurologically stable, > 48 h, but definitely before 14 days”
- Canadian Stroke Best Practices: “as early as possible, ideally within 14

OPTIMAL TIMING FOR CEA

ASAP… but how soon is *too soon*?



FIRST 48H - ”URGENT CEA”

Highest risk recurrent stroke in first 48-72h:

5-8% at 48 h

4-17% at 72 h

>15 studies show favorable outcomes

- Prospective & retrospective observational studies

>9 studies show unfavorable outcomes

- Retrospective, database
- 2 SR&MA…

De Rango et al. Summary of Evidence on Early Carotid Intervention for Recently Symptomatic Stenosis Based on Meta-Analysis of Current Risks

SVS benchmark sCAS stroke rate < 6%

Timing of CEA	0-48h	0-7d	0-15d
Pooled 30-day stroke	5.3%	3.3%	3.4%
Pooled 30-day stroke/mortality	5.7%	3.6%	3.8%

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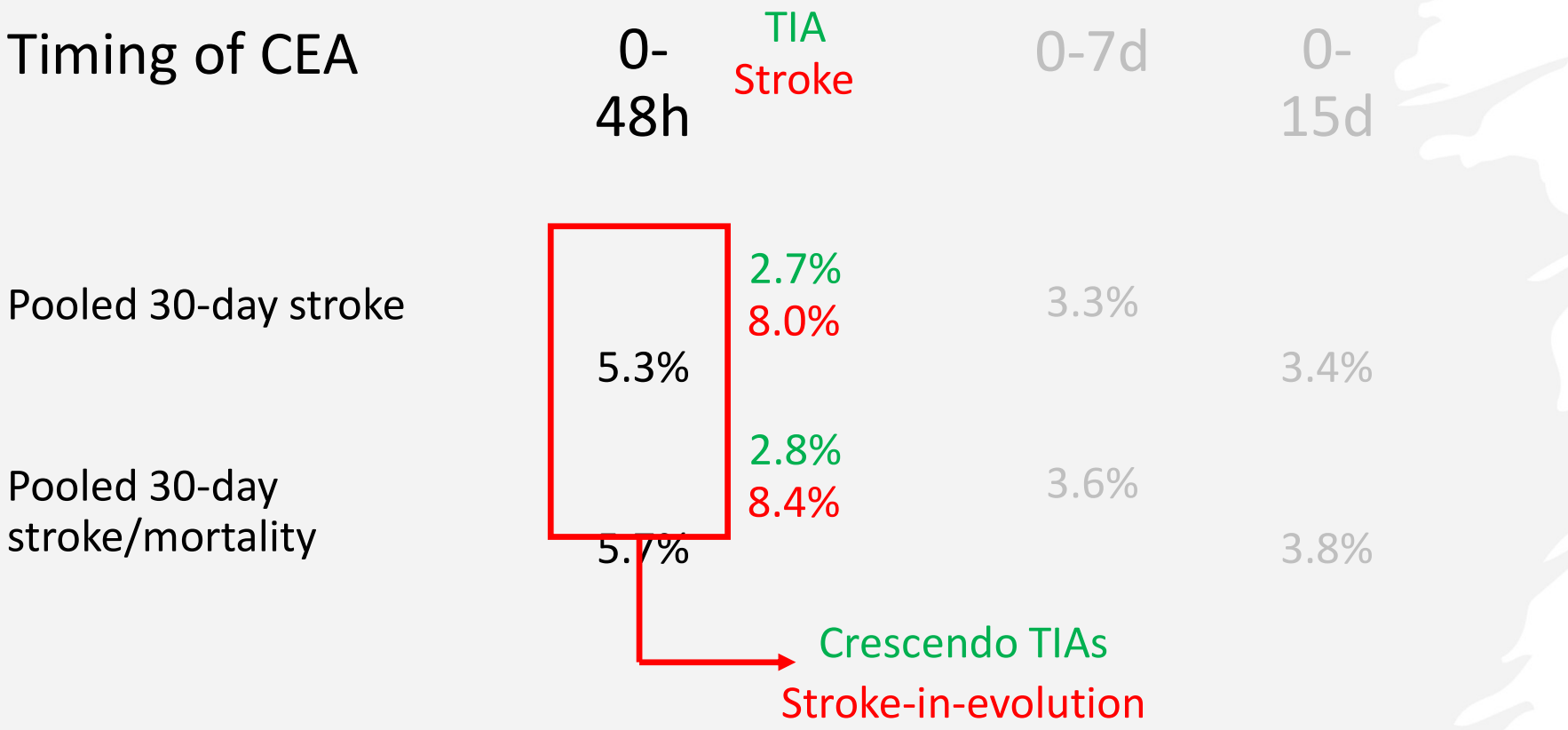
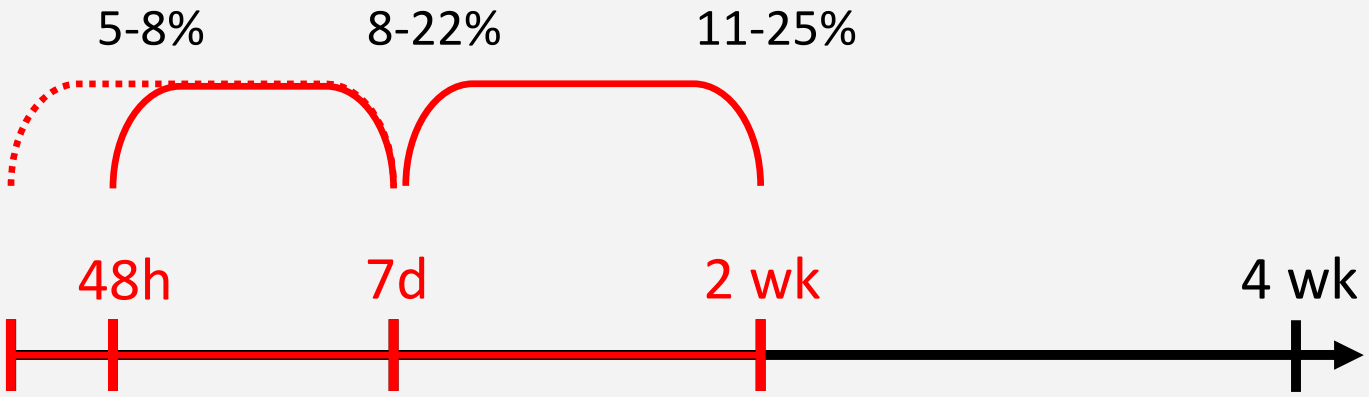


FIRST WEEK VS 2ND WEEK?

Risk of recurrent stroke:



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Timing of CEA	0-48h	0-7d	TIA	Stroke	0-15d	TIA	Stroke
Pooled 30-day stroke	5.3%	3.3%	1.5%	5.3%	3.4%	1.6%	5.0%
Pooled 30-day stroke/mortality	5.7%	3.6%	1.9%	5.6%	3.8%	1.9%	4.9%

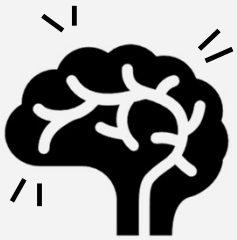
Coelho A, et al. Editor's Choice - Timing of Carotid Intervention in Symptomatic Carotid Artery Stenosis: A Systematic Review and Meta-Analysis.

CEA < 7 days ↓ 30-day stroke risk (OR 0.67) vs 8-14 days

DISABLING STROKE

- NIHSS ≥ 15 or
- mRS ≥3 or
- > 1/3 MCA territory infarcted or
- Altered LOC

- CEA not recommended unless/until neuro function improves



NEURO UNSTABLE

CRESCENDO TIA
STROKE-IN-EVOLUTION

- Urgent CEA (<48h) recommended
  - unless contraindicated
- Untreated cTIA: up to 60% 7-day stroke risk
- Higher periprocedural risk
  - SIE: 2-8% periop death/stroke
  - cTIA: 0-2% periop death/stroke

CEA POST THROMBOLYSIS

- ↑ neck hematoma
- ↑ intracranial hemorrhage
- ↑ 30-day stroke/death
  - Highest in first 24h,
  - 3 days post: 13%
  - 6 days post: < 6%

SUMMARY

TIA + MILD-MODERATE STROKE

- < 48h: acceptable for TIA, not for stroke
- 1st week ≥ 2nd week
- > 2 weeks rapid loss of benefit

DISABLING STROKE

- CEA not recommended unless recovered

NEURO UNSTABLE (SIE, C-TIA)

- urgent (<48h) CEA with increased periprocedural risks

POST-THROMBOLYSIS

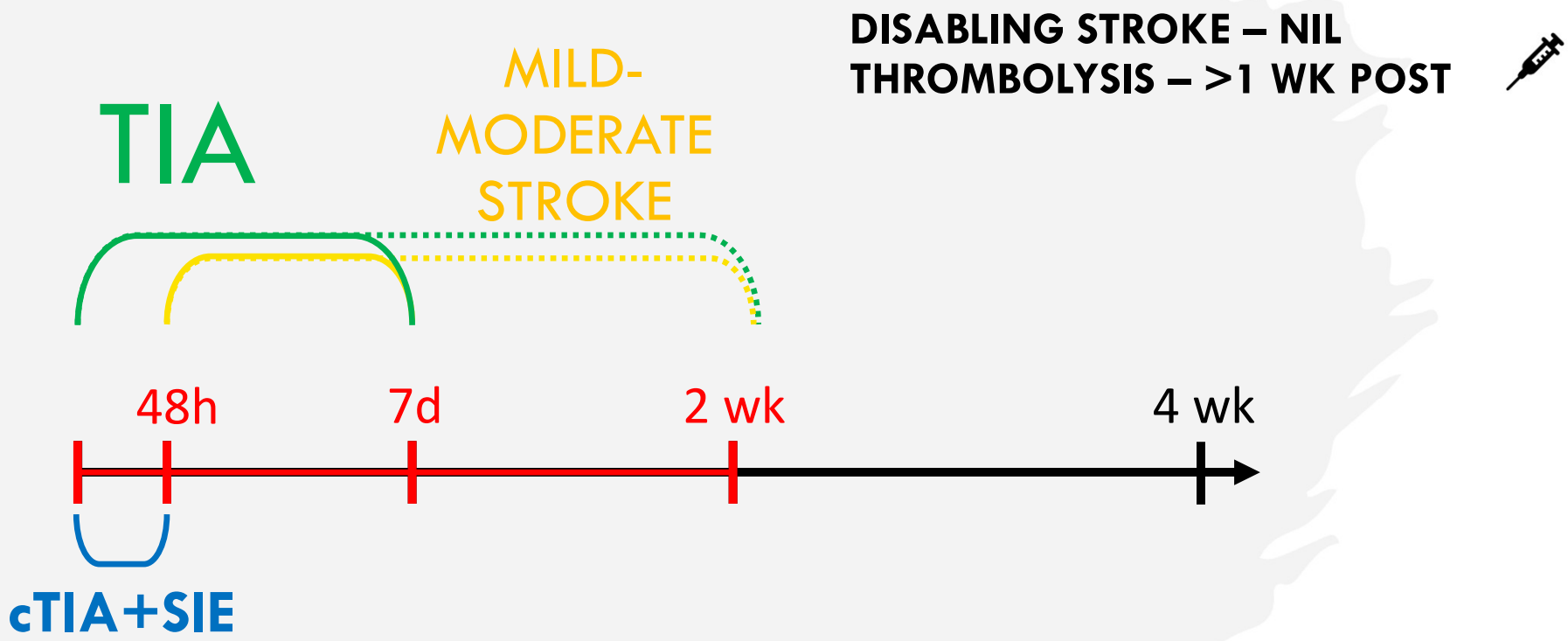
- wait 1 week post lysis

KEY REFERENCES

- **De Rango P, Brown MM, Chaturvedi S, et al. Summary of Evidence on Early Carotid Intervention for Recently Symptomatic Stenosis Based on Meta-Analysis of Current Risks. *Stroke*. 2015;46(12):3423-3436. doi:10.1161/STROKEAHA.115.010764**
- **Coelho A, Peixoto J, Mansilha A, Naylor AR, de Borst GJ. Editor's Choice - Timing of Carotid Intervention in Symptomatic Carotid Artery Stenosis: A Systematic Review and Meta-Analysis. *Eur J Vasc Endovasc Surg*. 2022;63(1):3-23. doi:10.1016/j.ejvs.2021.08.021**
- **Savardekar AR, Narayan V, Patra DP, Spetzler RF, Sun H. Timing of Carotid Endarterectomy for Symptomatic Carotid Stenosis: A Snapshot of Current Trends and Systematic Review of Literature on Changing Paradigm towards Early Surgery. *Neurosurgery*. 2019;85(2):E214-E225. doi:10.1093/neuros/nyy557**
- **Rothwell PM, Eliasziw M, Gutnikov SA, Warlow CP, Barnett HJ; Carotid Endarterectomy Trialists Collaboration. Endarterectomy for symptomatic carotid stenosis in relation to clinical subgroups and timing of surgery. *Lancet*. 2004;363(9413):915-924. doi:10.1016/S0140-6736(04)15785-1**

- AbuRahma AF, Avgerinos ED, Chang RW, et al. Society for Vascular Surgery clinical practice guidelines for management of extracranial cerebrovascular disease. *J Vasc Surg*. 2022;75(1S):4S-22S. doi:10.1016/j.jvs.2021.04.073
- Naylor R, Rantner B, Ancetti S, et al. Editor's Choice - European Society for Vascular Surgery (ESVS) 2023 Clinical Practice Guidelines on the Management of Atherosclerotic Carotid and Vertebral Artery Disease. *Eur J Vasc Endovasc Surg*. 2023;65(1):7-111. doi:10.1016/j.ejvs.2022.04.011
- Piotrowski JJ, Bernhard VM, Rubin JR, et al. Timing of carotid endarterectomy after acute stroke. *J Vasc Surg*. 1990;11(1):45-52.
- Ferguson GG, Eliasziw M, Barr HW, et al. The North American Symptomatic Carotid Endarterectomy Trial : surgical results in 1415 patients. *Stroke*. 1999;30(9):1751-1758. doi:10.1161/01.str.30.9.1751
- Ijäs P, Aro E, Eriksson H, Vikatmaa P, Soinne L, Venermo M. Prior Intravenous Stroke Thrombolysis Does Not Increase Complications of Carotid Endarterectomy. *Stroke*. 2018;49(8):1843-1849. doi:10.1161/STROKEAHA.118.021517
- Avgerinos ED, Farber A, Abou Ali AN, et al. Early carotid endarterectomy performed 2 to 5 days after the onset of neurologic symptoms leads to comparable results to carotid endarterectomy performed at later time points. *J Vasc Surg*. 2017;66(6):1719-1726. doi:10.1016/j.jvs.2017.05.101

OPTIMAL TIMING FOR CEA



DISABLING STROKE – NIL
THROMBOLYSIS – >1 WK POST