Asymptomatic Coronary Artery Disease is Deadly in patients with Carotid Stenosis - whether CS is treated invasively or not

An RCT shows how CAD can be quantified and treated to reduce myocardial infarction and improve long-term survival

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VEITH symposium 2024, New York, NY

Disclosure

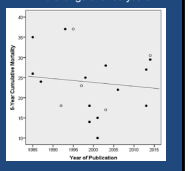
I have nothing to disclose

Coronary artery disease (CAD) in carotid stenosis patients

- Most carotid stenosis patients have co-existing CAD, which is often asymptomatic, and CAD is the primary cause of death
- Annual mortality of asymptomatic >50% carotid stenosis, treated medically or surgically, is **5%/yr**
  - Annual cardiac-related death is **3%/yr**
  - Annual stroke risk is 1%/yr
- Current PAD guidelines recommend NO cardiac testing of patients without cardiac symptoms due to lack of evidence that coronary revascularization improves survival (CARP trial, NEJM 2004)
- Undiagnosed CAD in carotid patients leaves them at high risk for adverse cardiac events and poor long-term outcome

CAD is deadly in patients with carotid stenosis

Annual mortality 5%/yr
No change over 30 years



Metaanalysis;17 studies, 11,391 pts 1985-2015 with 5-yr follow up

Giannopoulos, EJVES 2015

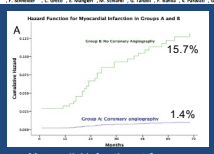
RCT shows benefit of diagnosis and treatment of Asx CAD

Systematic pre-op coronary angiography in CEA patients

- 426 carotid endarterectomy (CEA) pts
  - No known CAD, Normal EKG, normal ECHO
- **Randomized:** pre-op coronary angio vs no coronary angiography
- **32%** with pre-op angio-guided coronary revasc for >75% coronary stenosis
- **Primary end-point** – MI during follow up
  - Survival at 6 years

(Illuminati, EJVES 2015)

Long-term Results of a Randomized Controlled Trial Analyzing the Role of Systematic Pre-operative Coronary Angiography before Elective Carotid Endarterectomy in Patients with Asymptomatic Coronary Artery Disease



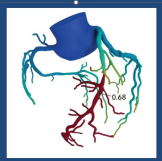
Myocardial infarction at 6 years

Selective coronary revascularization reduced risk of MI and improved long-term survival

Current Standard for Coronary Revascularization

- **Ischemia-guided, rather than angio-guided revascularization**
  - **Fractional Flow Reserve (FFR)** –measured in cath lab
  - Reduced death/MI at 5-years compared to medical therapy (Navarese)
- **Non-invasive FFR_{CT}** – computed from coronary CT scans
  - Identifies those who may benefit from coronary revascularization
  - 2021 AHA/ACC guidelines recommend coronary CTA + FFR_{CT} to guide selection of patients for coronary revascularization*
- **FFR_{CT} - guided strategy applied to carotid stenosis patients**

FFR_{CT} : coronary CT-derived fractional flow reserve



Color coded 3-D map of FFR values
FFR_{CT} ≤0.80 = coronary ischemia

*Gulati, et al. JACC 2021;78:e187

FFR_{CT}-guided coronary revascularization in CEA patients

From the Society for Vascular Surgery — J Vasc Surg 2022;76:750

Coronary revascularization of patients with silent coronary ischemia may reduce the risk of myocardial infarction and cardiovascular death after carotid endarterectomy

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Single-center, IRB-approved, open label study
200 pts with no cardiac Sx undergong elective CEA

Preop CTA+FFR_{CT}
Elective post-op coronary revasc, +BMT
(n-100)

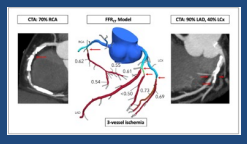
vs

Matched Controls
Standard care, BMT
No coronary revasc
(n-100)

Endpoints at 3 years
- **Primary: Cardiac death or MI**
- **Secondary: Cardiac death; MI**

High prevalence of silent coronary ischemia

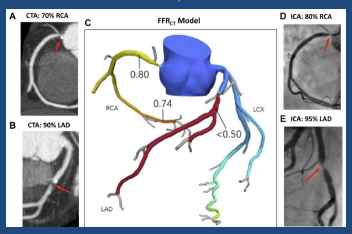
- **CTA + FFR_{CT} group**
  - **57%** **Silent coronary ischemia** (FFR_{CT}≤0.80)
  - **44%** Severe ischemia (FFR_{CT}≤0.75)
  - **7%** Left main ischemia
  - **28%** Multivessel ischemia



- **Control group** - Status of coronary ischemia unknown

Ischemia-guided coronary revascularization in 33% of pts

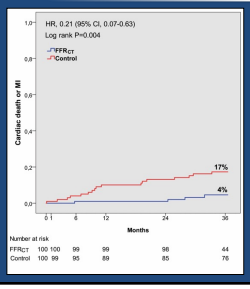
1-3 months post CEA in accord with ESC/EACTS guidelines
LM, Prox LAD, multivessel and severe ischemia
27 PCI, 6 CABG



Case example: Silent ischemia in RCA and LAD

- 70 y.o. female diabetic with Hx stroke;; uncomplicated CEA
- 2 mo later stenting of RCA and LAD; Well at 3 years

Primary endpoint – Cardiac Death or MI



79% reduction in cardiac death or MI in FFR$_{CT}$ group at 3-years

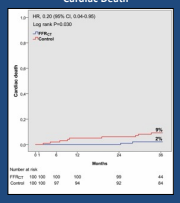
17% Control vs 4% FFR$_{CT}$ p=0.004
Hazard ratio 0.21 (95% CI 0.07-0.63)

Associated with elective coronary revascularization in **33%** of patients

Krievins, et al, J Vasc Surg 2022;76:750

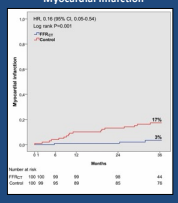
Secondary Endpoints

Cardiac Death



4-fold reduction in cardiac death
Control 9% vs FFRCT 2%, p=0.03
HR 0.20 (95% CI 0.04-0.95)

Myocardial Infarction



5-fold reduction in MI
Control 17% vs FFRCT 3%, p=0.001
HR 0.16 (95% CI 0.05-0.54)

All-cause death

- **16% in Control vs 7% in FFR$_{CT}$**, ns

Annual mortality
Control 5.3%/year

Limitations:
Single center, observational study, potential for selection bias

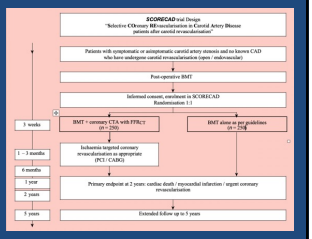
Krievins, et al, J Vasc Surg 2022;76:750

Conclusion

- Coronary CTA+FFRCT evaluation of patients with no known CAD undergoing carotid endarterectomy reveals a **high prevalence (57%) of asymptomatic (silent) coronary ischemia**
- Elective ischemia-guided coronary revascularization following CEA **reduced the 3-year risk of cardiac death and MI** by more than 50% compared to patients receiving standard cardiac evaluation and care
- Validation of these findings in multicenter randomized trials is needed

Randomized SCORECAD trial

- Selective **Co**ronary **R**evascularization in **C**arotid **A**rtery **D**isease patients after carotid revascularization (NCT 06546761)
- **PI** –Dainis Krievins, Univ of Latvia
- **Randomization after CEA to**
  - **CTA and FFRCT-guided coronary revasc vs**
  - **Usual care – BMT alone, no coronary revasc**
- **Primary endpoint at 2 years**
  - Cardiac death, myocardial infarction or urgent (unplanned) coronary revascularization
- **Currently enrolling -** open for additional sites
  - For information contact <dainis.krievins@stradini.lv>



*Trial funded by the Latvian Council of Science

Thank you for your attention