


Is CT fractional flow reserve (FFR_{CT})- guided coronary revascularization beneficial in patients requiring lower-extremity revascularization compared to standard care?

Is there randomized trial evidence showing benefit of coronary revascularization?

What is the best time for the coronary procedure – before or after the LE treatment?



Christopher K Zarins, MD
Stanford University, Stanford, CA

Dainis Krievins, MD PhD
University Latvia, Riga, Latvia

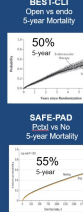
VEITHsymposium 2024, New York, NY

Disclosures

I have a financial interest in HeartFlow, Inc.

Introduction

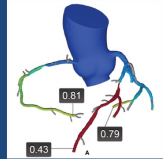
- Problem:** High mortality following lower-extremity revascularization (LER)
 - 50-55% 5-year mortality – BEST-CLI, BASIL-2, SAFE-PAD
 - Primary cause of death – co-existing CAD, often asymptomatic
- Question:** Can FFR_{CT}-guided coronary revascularization reduce the alarmingly high cardiac-related mortality - compared to standard care?
- Standard care** for managing co-existing CAD (as per guidelines)
 - Best medical therapy and atherosclerotic risk factor control
 - No cardiac testing of patients with no cardiac symptoms
 - No elective coronary revascularization
- Ineffective** in reducing high mortality following LER (no change of past 40 years)
 - Annual mortality 10-12%/year – 10x higher than for Sx CAD 1-2%/year



JAMA Int Med 2021; NEJM 2022; NEJM 2020; J Vasc Surg 2019; Lancet 2021; J Vasc Surg 2024; Circ 2024

New strategy for managing CAD in PAD patients*


- Diagnose and treat silent coronary ischemia**
 - Silent ischemia is a marker for high risk of death and MI
- Non-invasive cardiac testing with coronary CTA + FFR_{CT}**
 - Identifies patients with high-risk ischemia-producing coronary lesions who may benefit from coronary revascularization
- Elective ischemia-targeted coronary revascularization**
 - After LER to reduce the risk of adverse coronary events and improve long-term survival



2021 AHA/ACC guidelines recommend Coronary CTA+FFR_{CT} for suspected CAD to guide coronary revascularization (Class 1A,2a) – Guid. JACC 2021

*In addition to best medical therapy

FFR_{CT}-guided vs Standard Care following LER
Single center, prospective, IRB approved study*



Ischemia-Guided Coronary Revascularization Following Lower-Extremity Revascularization Improves 5-Year Survival of Patients With Chronic Limb-Threatening Ischemia

Prospective cohort study: 231 CLTI patients with no known CAD undergoing lower-extremity revascularization

- All patients admitted and cleared for elective LER
- Group I: Pre-op CTA+FFR_{CT}** to Dx coronary ischemia, selective post-op coronary revasc
- Prospective study
- Group II: Standard Care**-Standard pre-op eval, no post-op coronary revasc
- Current guideline directed care

Best medical therapy in both groups

Study endpoints at 5 years:

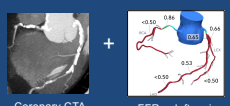
- All-cause death (Survival)
- Cardiac death
- Myocardial infarction (MI)

*5-year outcome: J EVT 2024

High prevalence of silent (asymptomatic) coronary ischemia

Pre-op cardiac evaluation

- 2 of 3 patients have silent ischemia
- FFR_{CT} group**
 - 69% Lesion-specific coronary ischemia
 - 58% Severe ischemia (FFR_{CT}≤0.75)
 - 8% Left main ischemia
 - 40% Multivessel ischemia

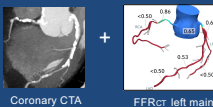


Standard care- Status of coronary ischemia unknown

High prevalence of silent (asymptomatic) coronary ischemia

Pre-op cardiac evaluation

- 2 of 3 patients have silent ischemia
- FFR_{CT} group
 - 69% Lesion-specific coronary ischemia
 - 58% Severe ischemia (FFR_{CT} ≤ 0.75)
 - 8% Left main ischemia
 - 40% Multivessel ischemia

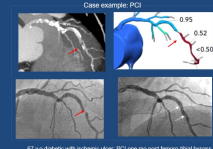


Coronary CTA
Calcium 2323

FFR_{CT} left main, 3-vessel ischemia

Post-op coronary revascularization

- Ischemia-targeted coronary revasc in 42%
 - Elective revasc. 1-3 months post LER
 - 42 PCI, 5 CABG



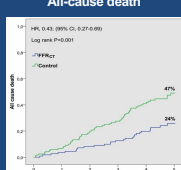
Case example PCI

FFR_{CT} with severe, ulcer, PCI one day post bypass that helps

Standard care- Status of coronary ischemia unknown Standard care: no coronary revasc

Five-year Outcome: FFR_{CT} vs Standard Care

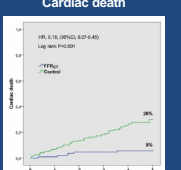
All-cause death



HR* 0.43, (95% CI: 0.27-0.69)
Log rank P<0.001

2x reduction in Death
47% Control vs 24% FFR_{CT}; p=.001
HR* 0.43, (95% CI: 0.27-.69)

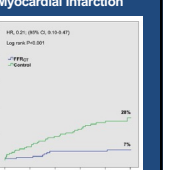
Cardiac death



HR* 0.18, (95% CI: 0.07-.45)
Log rank P<0.001

5x reduction, cardiac death
26% Control vs 5% FFR_{CT}; p=.001
HR* 0.18, (95% CI: 0.07-.45)

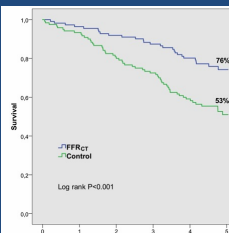
Myocardial Infarction



HR* 0.21, (95% CI: 0.10-.47)
Log rank P<0.001

4x reduction in MI
28% Control vs 7% FFR_{CT}; p=.001
HR* 0.21, (95% CI: 0.10-.47)

FFR_{CT}-guided improved five-year survival



76% FFR_{CT} vs 53% Standard Care

Shows long-term benefit of ischemia-targeted coronary revascularization following LER compared to current standard of care

Log rank P<0.001

Limitations:

- Single center, observational study; potential for selection bias
- Hypothesis generating

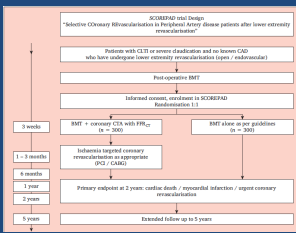
Randomized trial evidence needed

Laitkevskis, et al. JEVT 2024

Randomized SCOREPAD trial

Multi-center international trial

- Selective COronary REvascularization in PAD patients after LE revascularization (NCT 05250790)
 - PI –Dainis Krievins, Univ of Latvia
- Patients with no known CAD randomized after successful LER to
 - CTA and FFR_{CT}-guided coronary revasc (+BMT)
 - 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@stradiņi.lv>



*Krievins, et al. EJVES 2024

What is best time for ischemia-guided coronary revascularization Before or After LER ?

- For patients with symptomatic CAD
 - Before LER to reduce risk of peri-operative death and MI
- For patients with asymptomatic (silent) coronary ischemia
 - After LER to reduce the risk of cardiac death and MI and improve long-term survival

Thank you for your attention

