New Developments in Coronary Evaluation by Non-invasive FFR\textsubscript{CT}

Incidence of unexpected coronary ischemia in vascular patients
Detection may lower MI and mortality rates

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Non-invasive Fractional Flow Reserve
Derived from coronary CTA (FFR\textsubscript{CT})

- Non-invasive anatomic-functional assessment of patients with CAD
- Reliably differentiates ischemia producing coronary stenoses from non-functional lesions
- FDA cleared; Medicare and private insurance reimbursed
- Used in >25,000 chest pain patients in US, Europe, Canada and Japan
- Coronary CTA-FFR\textsubscript{CT} assessment of patients at high risk for CAD but with no chest pain is uncertain

Peripheral Vascular Disease (PVD) patients have high risk of Coronary Artery Disease (CAD)

- CAD is primary cause of death in patients with PVD
  - 55% of patients with PVD requiring surgery have severe CAD
- CAD is often unrecognized, undiagnosed and untreated
  - Patients are sedentary, have no chest pain or cardiac Sx
  - Low use of statins, antiplatelet agents, smoking cessation
- Increased risk of death/MI at time of PVD surgery
  - Guidelines recommend no pre-op testing for patients without cardiac symptoms or signs of coronary ischemia
  - Thus, prevalence of silent coronary ischemia is unknown
- Highest risk patients – Critical Limb Ischemia
  - 20% mortality within 1 year
  - 50% mortality within 4 years

Objectives

- To determine the prevalence of unsuspected, ischemia-producing coronary stenosis in PVD patients with no cardiac history who are undergoing elective peripheral vascular surgery
- To determine the potential benefit of identifying silent coronary ischemia in the management of PVD patients

Data from ongoing prospective study of pre-op coronary CTA and FFR\textsubscript{CT} in vascular surgery patients in Latvia, PI: Prof. Dainis Krievins

Disclosure

I have a financial interest in HeartFlow, Inc
**Coronary CTA Results**

- **Coronary CTA in 62 CLI patients**
  - Age 66 ± 8 years, 81% male
- **Extensive coronary calcification**
  - Mean Agatston score 1199 ± 1163
  - Range 16-4810
  - Poor CT image quality in 8, no FFR CT
- **Coronary CTA stenosis**
  - 9% with Left Main
  - 65% with ≥50%
  - 30% with ≥70%

*CTA not recommended for Agatston>400*

**Management of CLI patients**

- **Vascular surgery performed as planned in 49/54 with FFR<0.70 (91%)**
  - As per guidelines (no cardiac history, normal EKG)
  - 32 (59%) with silent ischemia. No post-op death or MI
  - Vascular surgery postponed in 5
  - 2 for angiogram + revascularization (1 PCI, 1 CABG), 3 for medical therapy
- **Primary outcome: 30 day MACE - 0/54 (0%)**
- **Elective post-op coronary angiography (1-3 months)**
  - 24 patients with FFR<0.70 or multi-vessel ischemia
  - 16 coronary revascularization (PCI in 12; CABG in 4)
- **180 day MACE events - 0/54 (0%)**
  - Ongoing follow-up

30% of CLI patients had elective post-op coronary revascularization

**Ischemia-producing coronary stenosis**

- **FFR<0.70 in 37/54 patients (69%)**
  - 63 y.o., diabetic man for femoro-tibial bypass
  - Agatston score 127

**Case 1**

- **59 yo man with SFA occlusion and rest pain**
  - ABI 0.45, for femoro-popliteal bypass
  - RCA stenosis
  - FFR<0.70

**Case 2**

- **75 yo man with ischemic ulcer and rest pain, SFA/popliteal occlusion, ABI 0.36; for femoro-tibial saphenous vein bypass**

**Conclusion**

- **Patients with no cardiac history who undergo elective peripheral vascular surgery have a high prevalence of unsuspected, ischemia-producing coronary stenosis**
  - As detected by pre-op CTA-FFR<0.70 analysis

- **Needed limb salvage surgery can be performed safely in most patients despite the presence of silent coronary ischemia**

- **Longer term follow-up is needed to determine whether elective post-op coronary revascularization of patients with silent ischemia improves long-term survival**
Thank you