Patients with coronary artery disease unsuitable for revascularization: Definition, general principles, and a classification

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Summary: In patients with refractory symptoms, the decision not to pursue further revascularization is difficult and varies depending on patient characteristics and clinician expertise. This review reports on phenotypes of CAD patients unsuitable for revascularization procedures and proposes a simple angiographic-based classification for these patients. A patient is deemed unsuitable for revascularization due to one or several significant epicardial stenoses and/or to microvascular dysfunction where PCI or bypass surgery cannot be reasonably attempted or is not expected to improve perfusion.

Summary of proposed phenotypes of patients unsuitable for revascularization

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<th>Phenotype</th>
<th>Specifications</th>
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| **A. Suspected CSX** | 1. Normal coronary angiogram with suspected CSX  
- Objective evidence of myocardial ischemia in absence of significant epicardial coronary stenosis.  
- Result from microvascular dysfunction or exceptionally from inborn errors of metabolism in association with infiltrative cardiomyopathy.  
- Natural history: prognosis not necessarily benign but absolute number of hard events such as mortality remains low.  
2. Suspected CSX with prior CABG  
- Objective evidence of myocardial ischemia despite adequately functioning graphs to all major epicardial territories.  
- Likely result from microvascular dysfunction.  
- Natural history: annualized mortality rates reported at 9.2% (over 3.2 years). |
| **B. Limited territory at risk** | 1. Limited Territory at risk with no prior CABG surgery  
- Significant epicardial coronary stenosis not amenable to PCI, sufficiently severe to cause angina, but not associated with high-risk features at non-invasive stratification.  
- Can result from non-LAD single vessel CTO or side branch stenosis or distal stenosis.  
- Natural history: annualized mortality rates ranged from 1.85 to 2.4% for 1 and 2 vessel disease treated medically (over 5 years).  
2. Limited territory at risk with prior CABG  
- Significant epicardial coronary stenosis not amenable to PCI, but not sufficiently severe to justify redo CABG.  
- Can result from single saphenous vein graft occlusion or incomplete revascularization at the time of index CABG surgery.  
- Natural history: annualized mortality rates reported at 2.4% (over 5 years). |
| **C. Diffuse thread-like atherosclerosis** |  
- Diffuse atherosclerosis from proximal to distal beds leading to a thread-like appearance with small (< 1mm) distal runoff.  
- Typically involves simultaneously the 3 coronary arteries. Focal plaques possible but usually part of a diffuse process. Frequently associated with diabetes mellitus, and South Indian origin  
- Distinction between prior vs. no prior CABG surgery not applicable (usually not considered an option).  
- Natural history: unknown |
| **D. End stage CAD** |  
- A state of coronaropenia that combines stenosis in proximal coronary segments and a diffuse atherosclerosis of the distal coronary beds. A furnished network of coronary collaterals is typically visible in viable territories.  
- Most frequently seen in with prior degenerated CABG.  
- Natural history: annualized mortality above 5% (ranging from 5.1% to 33%). |

CABG coronary artery bypass graft; CAD coronary artery disease; CSX coronary syndrome X; CTO chronic total occlusion; LAD left anterior descending; PCI percutaneous coronary intervention; redo CABG= coronary reoperation.

Implications: The proposed classification system may serve as a starting point for establishing more precise understanding of the natural history of refractory angina (RFA). In turn, this may translate into superior trial designs to test much needed therapeutic innovations for this burdened patient group.
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References