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Relationships between extent of ischemic burden and changes in absolute myocardial perfusion after chronic total occlusion percutaneous coronary intervention

S.P. Schumacher¹, M. Kockx¹, W.J. Stuijzand¹, R.S. Driessen¹, P.A. Van Diemen¹, M.J. Bom¹, H. Everaars¹, P.G. Raijmakers², R. Boellaard², A.C. Van Rossum¹, M.P. Opolski³, A. Nap¹, P. Knaapen¹

¹Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam Cardiovascular Sciences, Cardiology, Amsterdam, Netherlands (The); ²Amsterdam UMC, Vrije Universiteit Amsterdam, Amsterdam Cardiovascular Sciences, Radiology and Nuclear Medicine, Amsterdam, Netherlands (The);

³Institute of Cardiology, Interventional Cardiology and Angiology, Warsaw, Poland

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Background: The patient benefits after chronic coronary total occlusion (CTO) percutaneous coronary intervention (PCI) are being questioned.

Purpose: The present study explored the relationships between baseline ischemic burden findings and subsequent changes in absolute myocardial perfusion after CTO PCI.

Methods: Consecutive patients underwent serial [15O]H₂O positron emission tomography perfusion imaging prior and 3 months after successful CTO PCI. Change in perfusion defect size (in myocardial segments), quantitative (hyperemic) myocardial blood flow (MBF) and coronary flow reserve (CFR) in the CTO area were compared between patients with a limited (0–1 segment), moderate (2–3 segments) and large perfusion defect (≥4 segments).

Results: 193 patients were included, with 15, 61 and 117 patients having a limited, moderate and large perfusion defect at baseline. Hyperemic MBF and CFR were lower in a large perfusion defect compared to smaller de-

fects (all comparisons $p < 0.01$). The median decrease in defect size was 1 [0–1] vs 2 [1–3] vs 4 [2–5] in patients with a limited, moderate and large defect (all comparisons $p < 0.01$), whereas hyperemic MBF and CFR improved significantly regardless of baseline defect size (between groups $p = 0.45$ and $p = 0.55$, respectively). Furthermore, when all 193 patients were divided in a low, median and high tertile based on hyperemic MBF and CFR at baseline, changes in hyperemic MBF and CFR after CTO PCI were comparable between patients in different tertiles (between groups $p = 0.75$ and $p = 0.79$, respectively)

Conclusions: Patients with a CTO and a larger perfusion defect have more severe hyperemic MBF and CFR levels. Major reductions in ischemic burden can be achieved by CTO PCI, with more defect size reduction in patients with a larger perfusion defect, whereas hyperemic MBF and CFR significantly improve irrespective of starting values before PCI.