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TCT-628

Stability Of Non Culprit Vessel Fractional Flow Reserve In Patients With ST-Segment Elevation Myocardial Infarction

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Background: Limited data suggest that the hemodynamic severity of non-culprit vessel (NCV) stenoses in the setting of STEMI can reliably be assessed by FFR. However, there is uncertainty about the stability of this measurement over time, resulting from difficulties in achieving maximal hyperemia in non infarct territories. We evaluated the stability of FFR of NCV stenoses over a period of 45 days following STEMI.
Methods: At 2 centres, 47 STEMI patients who had percutaneous revascularization of the infarct-related artery were prospectively enrolled in the FFR STABILITY study. FFR was performed in 55 NCV stenoses with at least a 50% diameter stenosis by visual angiographic assessment and minimum luminal diameter of 2.5 mm. Baseline FFR was obtained immediately after successful revascularization of the culprit stenosis and was repeated at 41.8 ± 10.2 days. LVEF and quantitative coronary angiography (QCA) were assessed by the angiographic core lab on baseline and follow up angiograms.
Results: Mean FFR values for the NCV stenoses decreased between the acute presentation and follow-up (0.84 ± 0.08 vs. 0.82 ± 0.08, respectively, p = 0.025). However, baseline FFR was highly correlated with follow-up (Pearsons coefficient R=0.85, p<0.001) and in only 3 patients the FFR value was higher than 0.8 during the index STEMI and lower than 0.8 at follow-up (see Figure).
Conclusions: FFR of NCV stenoses assessed during acute angiography for STEMI remain relatively stable over the subsequent 45 days. An FFR obtained in the setting of STEMI is likely a valid measurement to guide delayed revascularization decisions in patients with MVD.

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Long-term clinical outcomes after real world use of fractional flow reserve

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Background: Recent randomized trials showed that FFR-guided revascularization is safe and effective. However, long-term clinical outcomes of real world use of FFR, including the decisions against FFR, have not been fully evaluated.
Methods: 1294 patients who underwent FFR measurement for de novo coronary lesions were included. FFR measured lesions (n=1628) were divided into FFR-defer or FFR-stent lesions according to the treatment strategy selected after FFR measurement.
Results: Mean FFR was 0.80±0.12 and FFR was ≤0.8 in 728 lesions (44.7%). Five-year cumulative rate of all death was 6.3%, myocardial infarction, 1.5% and any revascularization, 12.5%. Among 902 lesions with FFR>0.8, 208 lesions were stented and there was no difference in 5-year target lesion related outcomes between deferred and stented lesions (HR 1.783 95% CI 0.677-4.697, p=0.242). Among 797 deferred lesions, the determinant for the 1-year target lesion related events was the presence of diabetes (HR 3.74, 95% CI: 1.45-9.67, p=0.006) while the determinant for delayed events (1-5years) was FFR<0.8 (HR 4.50, 95% CI: 1.65-12.28, p=0.003). Angiographic lesion severity was not an independent predictor for clinical events during follow-up among deferred lesions.
Conclusions: Real world use of FFR in the DES era was associated with favorable long-term patient- and lesion-related outcomes. Stenting or medical treatment against FFR-guidance could not improve the outcomes.

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Vascular Response to Biolimus-eluting and Sirolimus-Eluting Stents in Patients with ST-segment Elevation Myocardial Infarction

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Background: Patients with ST-segment elevation myocardial infarction (STEMI) have an increased risk of incomplete stent apposition after drug-eluting stent implantation. The vascular response was assessed after treatment with the third generation biolimus-eluting Nobori stent with biodegradable polymer compared to the first generation permanent polymer sirolimus-eluting Cypher stent in patients with STEMI treated with primary percutaneous coronary intervention.
Methods: In the Randomized Comparison of Biolimus-Eluting Biodegradable Polymer Coated Stent and Durable Polymer Sirolimus-Eluting Stent in Unselected Patients (SORT OUT V) trial, a formal intravascular ultrasound (IVUS) study enrolled 116 STEMI patients (57 biolimus-eluting stents and 59 sirolimus-eluting stents) treated with primary percutaneous coronary intervention where post-procedure and 12-month follow-up imaging data were available. The IVUS endpoint included in-stent percent volume obstruction and incomplete stent apposition.
Results: Median stent length measured 18.7 mm (interquartile range 16.7 mm to 27.5 mm). In-stent percent volume obstruction did not differ between biolimus-eluting stents and sirolimus-eluting stents [median (interquartile range): 1.8% (0.0% to 4.5%) vs. 1.4% (0.0% to 7.2%) p=ns]. Biolimus-eluting stent compared to sirolimus-eluting stent did not reduce the frequency of acute incomplete stent apposition (15.8% vs. 22.0%, p=ns), late incomplete stent apposition (26.3 vs. 27.1%, p=ns) or late acquired incomplete stent apposition (14.0% vs. 18.6%, p=ns). One aneurysm occurred at follow-up in a biolimus-eluting stent treated patient.
Conclusions: Compared to a sirolimus-eluting stents the biolimus-eluting Nobori stents with a biodegradable polymer did not reduce neointimal hyperplasia or the frequency of acute or late acquired incomplete stent apposition in STEMI patients.

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Low coronary microcirculatory resistance associated to profound hypotension during intravenous adenosine infusion. Implications for the functional assessment of coronary stenoses.

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Background: Intravenous adenosine infusion (IV-Ado) produces coronary and systemic vasodilatation generally leading to systemic hypotension. However, Ado-induced hypotension during maximal coronary hyperemia is heterogeneous, and its relevance for coronary stenoses assessment with fractional flow reserve (FFR) remains largely unknown.
Methods: FFR, coronary flow reserve (CFR) and microcirculatory resistance (IMR) were measured in 93 stenosed arteries (79 patients). Clinical and intracoronary measurements were analyzed among tertiles of the percentage degree of Ado-induced hypotension, defined as: %ΔPa= -[100 - (hyperemic aortic BP x 100 /rest aortic BP)] .
Results: Overall, %ΔPa was -13.6 ± 12.0%. Body mass index was associated with %ΔPa (r=0.258, p=0.025) and obesity an independent predictor of profound Ado-induced hypotension (tertile 3 of %ΔPa) [OR 3.95 (95% CI: 1.48, 10.54), p=0.006]. %ΔPa was associated with IMR (r= 0.311, p=0.002), CFR (r= -0.246, p=0.017) and marginally with FFR (r= 0.203, p=0.051). However, IMR (beta=0.003, p<0.001) and not %ΔPa (beta=-0.001, p=0.564) was independently associated with FFR. When compared with tertiles 1 and 2 of %ΔPa [n=62 (66.6%)], stenoses assessed during profound Ado-induced hypotension [n=31 (33.3%)] had lower IMR [12.4 (8.6-22.7) vs 20 (15.8-35.5); p=0.001] and FFR values (0.77 ± 0.13 vs 0.83 ± 0.12, p=0.021) as well as a non-significant increase in CFR (2.5 ± 1.1 vs 2.2 ± 0.87, p=0.170).
Conclusions: The modification of systemic BP during IV-Ado is related to the hyperemic microcirculatory resistance in the heart. Profound ado-induced hypotension is associated with obesity, lower coronary microcirculatory resistance, and lower FFR values.

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