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Abstract 25: Impact of Sublingual Nitroglycerin Dosage on FFR_{CT} Assessment and Coronary Luminal Volume to Myocardial Mass Ratio

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Introduction: Accurate evaluation of the coronary arteries by fractional flow reserve computed tomography (FFR_{CT}) is dependent upon nitroglycerin (GTN) to induce maximal hyperemia. However, the impact of differing GTN dosages on FFR_{CT} analysis has not been studied.

Methods: Retrospective analysis was performed on 80 patients that had repeat coronary CT angiograms (CCTAs) with different sublingual spray GTN doses (0.4mg and 0.8mg) given 4-5min prior to CCTA. One patient was excluded for aortic valve disease and 44 patients were excluded for plaque progression at repeat CCTA (change in segment involvement score (SIS) > 2 or change in CAD-RADS score) or image quality disparity (> 1 point on a 5 point Likert scale). Nadir FFR_{CT} values (lowest value), post-stenosis FFR_{CT} (2cm distal to the greatest stenosis), cumulative 3 vessel FFR_{CT} values, and coronary lumen volume to myocardial mass ratio (V/M) were assessed. **Results:** 35 patients (59.9 ± 10.0 years, 45.7% male at initial CCTA) were included with a mean time to repeat CCTA of 3.9 ± 1.6 years and CAD-RADS score of 1.1 ± 1.0. At initial CCTA (0.4 mg GTN), patients had a SIS of 2.4 ± 3.3 and 2.8 ± 3.4 at repeat CCTA (0.8mg GTN) ($p = 0.0002$), with similar image quality scores (4.1 ± 0.7 vs 4.1 ± 0.8, $p = 0.52$). Nadir FFR_{CT} values at 0.4mg and 0.8mg of GTN did not differ in left coronary artery (0.4mg: 0.80 ± 0.08 vs 0.8mg: 0.80 ± 0.03, $p = 0.66$), right coronary artery (0.4mg: 0.90 ± 0.04 vs 0.8mg: 0.90 ± 0.06, $p = 0.25$), or circumflex coronary artery (0.4mg: 0.87 ± 0.06 vs 0.8mg: 0.88 ± 0.06, $p = 0.34$). FFR_{CT} distal to the greatest stenosis and 3-vessel FFR_{CT} values did not differ significantly ($p = 0.52$ and $p = 0.69$ respectively). Total coronary luminal volume increased significantly with increasing GTN (0.4mg: 2639 ± 753mm^3 vs 0.8mg: 2844.8 ± 827mm^3, $p = 0.009$) but did not result in a significant difference in V/M ratio (0.4mg: 26.0 ± 5.6mm^3/g vs $_{0.8mg:\ 27.4 \pm 5.9 mm^3/g,\ p = 0.20)}$.

Conclusions: Comparison of FFR_{CT} in patients undergoing repeat CCTAs with different GTN dosages shows that use of 0.8mg versus 0.4mg results in a significant increase in coronary luminal volume suggesting 0.8mg of GTN has greater vasodilator capacity to induce maximal hyperemia. Change in GTN dose but does not change FFR_{CT} values or V/M ratio. This underscores the role for sublingual spray GTN to increase coronary luminal volume for evaluation on CCTA, but suggests that FFR_{CT} analysis is robust to these changes.

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