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Quantification of Lipid Burden in Heart Transplant (HT) Patients by Near-Infrared Spectroscopy (NIRS)

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Purpose: The presence of coronary lipid early post-HT is evidence of donor atherosclerosis.

Methods and Materials: 30 HT patients underwent coronary angiography and intravascular ultrasound (IVUS) for TCAD screening from a single institution. They received NIRS as part of the COLOR registry after informed consent. NIRS was analyzed for lipid core burden index (LCBI). Linear regression was used to correlate clinical parameters with LCBI. LCBI was subsequently divided into four groups: ≤10, 10-49, 50-100, and >100 and re-analyzed using ordinal regression.

Results: Of the 30 patients, 8 were undergoing routine early screening 30-60 days post-HT (median 40.0, IQR 34.0-47.3 days) and 22 were in the intermediate time range > 60 days (median 406.5, IQR 359.3-732.3 days). 70.6% were male and mean age was 52.5 ± 12.8 years. Total cholesterol was 172.7 ± 38.0, LDL was 93.3 ± 39.5, and HDL was 48.0 ± 14.2 mg/dL. 16.7% had angiographic TCAD, with 3 mild (< 20%), 1 moderate (20-70%), and 1 severe (>70%) disease. 73.1% had intimal thickening by IVUS and 83.3% had lipid plaque by NIRS. For patients with angiographic TCAD, mean LCBI was 47.6 ± 42.2 vs. 26.2 ± 37.9 (p=0.268). For patients with atherosclerosis by IVUS, mean LCBI was 31.6 ± 42.1 vs. 14.9 ± 17.4 (p=0.321). In both unadjusted and multivariate regression, there was no correlation of LCBI with recipient age, gender, hypertension, dyslipidemia, tobacco use, diabetes mellitus, white cell count, LDL, HDL, or cylex level. After dividing LCBI into categories, there was also no correlation to any of these factors.

Conclusions: The majority of early post-HT patients had lipid burden by NIRS. NIRS appears to be more sensitive than angiography and IVUS in detecting lipid plaque in post-HT patients. The implications of early lipid burden remain unclear post-HT. Longitudinal follow-up is needed to determine if lipid plaque predisposes to development of TCAD.