Impact of carotid IMT (Intima-Media Thickness) on the incidence of Major Adverse Cardiac and Cerebrovascular Event (MACCE) after off-pump coronary artery bypass

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Background

- Off-pump coronary artery bypass (OPCAB)
 - Old age, co-morbidities, coronary artery disease
 - High risk of cardiovascular complication
- Importance of prediction of major adverse cardiac and cerebrovascular event (MACCE) after OPCAB
- Carotid intima-media thickness (IMT)
 - Reflection of cardiovascular risk and atherosclerotic burden
 - Well-known predictor for MACCE in cardiac patients
 - Limited evidence in patients undergoing OPCAB
- Hypothesis
 - Carotid IMT could be used for predicting MACCE after OPCAB

Methods

- Retrospective study
- 391 patients who underwent OPCAB in a university hospital between April 2013 and February 2016
- Anesthetic protocols
 - Monitoring: EKG, SpO₂, invasive arterial BP monitoring, pulmonary artery catheter, TEE, cerebral oximetry, Bispectral index
 - Induction: midazolam, sufentanil, rocuronium bromide
 - Maintenance: sevoflurane in 40% oxygen/air mixture, continuous infusion of sufentanil, vecuronium
- MACCE
 - Presence of cardiac arrest, acute myocardial infarction, congestive heart failure, angina, stroke, cardiovascular death, or cerebrovascular death in the follow-up period
- Increased IMT
 - Carotid IMT ≥0.9mm on one or both sides
- Statistics
 - intergroup comparisons: t-test, Fisher’s exact test or chi-square test
 - multivariate logistic regression analysis
 - statistical significance: $p < 0.05$

Results

Table 1. Demographic and clinical data

	Normal IMT (n=211)	Increased IMT (n=180)	P-value
Sex (M/F)	168/43	146/33	0.629
Age (years)	62.88±9.76	66.52±8.662	<0.001*
Height (cm)	164.80±8.01	164.14±8.70	0.439
Weight (kg)	66.63±11.18	65.85±11.52	0.495
Operative time (min)	231.29±38.08	238.94±46.89	0.076
Anesthesia time (min)	303.93±38.47	311.03±37.59	0.067
Preoperative EF (%)	55.53±14.26	52.92±15.25	0.082
Katz grade	3.38±0.78	3.67±0.75	<0.001*
Katz grade 5	10 (4.7%)	18 (10.0%)	0.044*
Katz grade ≥ 4	97 (46.0%)	109 (60.6%)	0.004*
MACCE	15 (7.1%)	26 (14.4%)	0.018*
Mortality	2 (0.9%)	7 (3.9%)	0.087
Arrhythmia	58 (27.5%)	62 (51.7%)	0.137

Table 2. Logistic regression analysis for predictors of MACCE following OPCAB

	Univariate		Multivariate	
	OR (95% CI)	P-value	OR (95% CI)	P-value
Age	1.014 (0.973-1.056)	0.516		
Female Sex	1.737 (0.750-4.023)	0.197		
BMI > 30	1.787 (0.446-7.163)	0.413		
HTN	1.070 (0.464-2.471)	0.874		
DM	0.502 (0.244-1.032)	0.061		
CVA	3.835 (1.606-9.154)	0.002*	3.756 (1.675-8.420)	0.001*
CKD	0.759 (0.259-2.224)	0.615		
Lt main disease	0.995 (0.426-2.137)	0.910		
Unstable angina	1.020 (0.480-2.169)	0.959		
Recent MI	1.539 (0.601-3.940)	0.368		
LVEF < 50%	0.631 (0.272-1.462)	0.283		
Number of graft	0.517 (0.320-0.836)	0.007*	0.510 (0.317-0.821)	0.006*
IMT ≥0.9	2.258 (1.088-4.685)	0.029*	2.252 (1.130-4.487)	0.021*

Conclusions

In patients undergoing OPCAB, routine assessment of carotid IMT may allow a more comprehensive risk stratification in terms of predicting the development of postoperative MACCE.