

**SCA 16
MILD TO MODERATE DISEASE OF THE THORACIC
AORTA AND NEW ISCHEMIC BRAIN LESIONS AFTER
CONVENTIONAL CORONARY ARTERY BYPASS GRAFT
SURGERY.**

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Introduction: Considerable number of elderly patients undergoing coronary artery bypass graft (CABG) surgery develop perioperative neurological complications ranging from subtle cognitive dysfunction to more evident postoperative confusion, delirium and less commonly clinically apparent stroke. The purpose of this study was to determine the role of atheromatous changes in the ascending aorta and the aortic arch in predicting cerebral embolic events with respect to new ischemic brain lesions in patients undergoing conventional CABG surgery.

Methods: After IRB approval, an informed consent was obtained from 110 elderly patients scheduled for elective CABG surgery with cardiopulmonary bypass (CPB). A comprehensive transesophageal echocardiography and epiaortic scanning was performed to assess thoracic aorta. Equal weighting was given to the atheromatous changes in the ascending aorta and the aortic arch. Patients with atheroma < 2mm were included in the Low Risk Group. Patients with > 2mm atheroma were allocated to the High Risk Group. Using transcranial Doppler (TCD) the middle cerebral artery was monitored continuously. Patients were evaluated for new ischemic brain lesions utilizing magnetic resonance imaging (MRI) 3-7 days after CABG surgery. Patients neurological assessment was performed utilizing the NEECHAM confusion scale.

Results: The mean height of atheroma was 1.4 ± 0.6mm and 4.8 ± 1.9mm in the low and high risk groups respectively (p < 0.00001). 12 patients in the high risk group presented with atheroma in the ascending aorta. The remainder of 26 patients had atheroma restricted to the aortic arch with normal ascending aorta. Mobile atheroma was present in 4 patients. Demographic data is shown in table 1. Based on echocardiographic findings the surgical procedure was changed in 4 patients from the high risk group (2 patients underwent beating heart surgery without CPB and 2 patients underwent distal arch cannulation with conventional CPB). Patients in the low risk group had considerably smaller number of embolic events during CPB. (Figure 1) The overall prevalence of new ischemic brain lesions was 16%. New ischemic lesions were identified in 8 patients in the high risk group and no patients in the low risk group. (p < 0.0001) Four patients with positive MRI findings had normal ascending aorta and the atheroma restricted to the aortic arch. In the high risk group, 3 patients had moderate to severe confusion and 3 patients had mild confusion for 2 days postoperatively. In the low risk group none of the patients had moderate to severe confusion, 5 patients had mild confusion. The NEECHAM scores were significantly worse in high risk group on postoperative day 1, p=0.01. (Figure 2) One patient in the high risk group had a stroke.

Discussion: The new ischemic brain lesions were present exclusively in patients with some degree of atheromatic disease irrespective of ascending aortic or the aortic arch presentation site. Patient stratification based on the aortic atheromatic burden should be addressed in future trials designed to tailor treatment strategies to improve long term outcomes of coronary heart disease and reduce the risks of perioperative neurological injury.

Figure 1. The box-plot displays the interquartile range representing the 25th (Q1) and 75th (Q3) percentiles. A line across the box is the median. The whiskers represent the lowest and highest observations still inside the region defined by the lower limit Q1 - 1.5 (Q3 - Q1) and the upper limit Q1 + 1.5 (Q3 - Q1). Outliers are plotted with asterisks (*). At all times during CPB the median emboli count was 223.5 and 70.0 in the high and low groups respectively (point estimate for ETA1-ETA2 was 129.5, 95% CI (60.9-219.1), W=1252.0, p=0.0003).

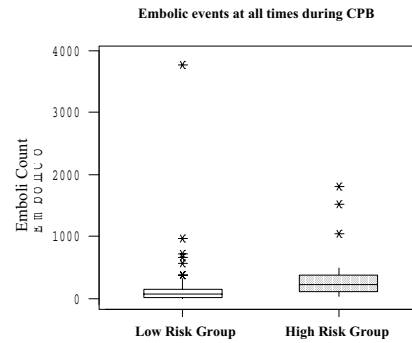


Figure 2. Comparison of NEECHAM scores between the Low and High Risk Groups. Total score indicates the different degrees of confusion and are weighted as follows: 0-19, moderate to severe confusion; 20-24, mild or early development of confusion; 25-26, "not confused" but at high risk; 27-30, normal function. There was significant difference between the two groups on POD 1. (p=0.01) Between the two groups POD 2, p=0.059; Between the two groups POD 3, = 0.056; Between the two groups POD 4, p=0.193; Between the two groups POD 5, p=0.80

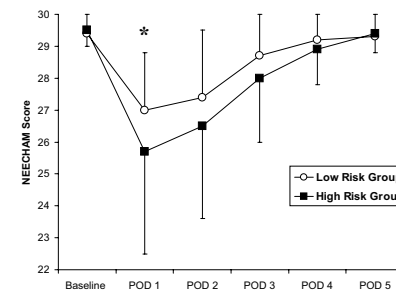


Table 1. Description of Patient Demographic Data and Surgical Characteristics.

	Low Risk Group (n = 72)	High Risk Group (n = 38)	P value
Demographics			
Age (yr)	67 ± 6	71 ± 6	0.004
Male, n (%)	64 (88)	34 (89)	0.92
Height (cm)	167 ± 10	168 ± 11	0.88
Weight (kg)	84 ± 19	81 ± 16	0.34
Co-morbidities			
Myocardial infarction, n (%)	25 (35)	16 (42)	0.44
Congestive heart failure, n (%)	8 (11)	5 (13)	0.75
Left ventricular ejection fraction < 40%, n (%)	8 (11)	10 (26)	0.041
Hypertension, n (%)	40 (55)	23 (60)	0.61
Peripheral vascular disease, n (%)	7 (10)	3 (8)	0.75
Obstructive pulmonary disease, n (%)	5 (7)	4 (10)	0.51
Diabetes mellitus, n (%)	24 (33)	9 (24)	0.29
Preoperative Medication			
ACE inhibitors, n (%)	39 (54)	18 (47)	0.49
β-blockers, n (%)	56 (78)	27 (71)	0.43
Calcium channel blockers, n (%)	29 (40)	16 (42)	0.85
Nitrates, n (%)	42 (58)	25 (66)	0.44
Aspirin, n (%)	64 (88)	34 (90)	0.92
Lipid lowering drugs, n (%)	54 (75)	28 (74)	0.88
Coronary Artery Bypass Surgery			
Distal anastomoses, n	3.6 ± 0.9	3.6 ± 1	0.96
Duration of cardiopulmonary bypass (min)	79 ± 20	80 ± 26	0.87
Duration surgery (h)	3.5 ± 0.7	3.6 ± 0.8	0.5