

The Usefulness of Brain Damage Markers in Non-valvular Atrial Fibrillation

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Introduction: We sought to determine the possible association of stroke risk prediction models (CHA2DS2-VASc, CHADS2) and the new R2CHADS2 (The inclusion of creatinine clearance (CrCL) <60 mL/min to CHADS2) to the markers of brain ischemia and inflammation such as hsCRP and Neutrophil to Lymphocyte Ratio (NLR) in patients with non-valvular atrial fibrillation (NVAF). We tested the hypothesis that markers of subclinical brain ischemia (NSE and S100b) are higher in patients with NVAF having higher stroke risk as determined by risk prediction models.

Methods: The study population included 92 patients who were seen in our outpatient clinic. End-stage hepatic or renal disease, malignancy, any prior blood transfusions, carotid artery disease, prior transient ischemic attack and ischemic or hemorrhagic stroke and oral anticoagulant usage were excluded from study. Serum levels of S100B, NSE, hs-CRP were measured by using a commercial enzyme-linked immunoassay kits and each assay was carried out in duplicate. S100B, neuron specific enolase, NSE and Hs-CRP levels were determined by using sandwich ELISA kits (Human S100B ELISA kit, BioVendor Research and Diagnostic Products; DRG,NSE ELISA: DRG, HS-CRP).The minimal measurable concentrations for these detection systems were 50 pg/ml for S100B, 1 ng/ml for NSE, and 0.1 mg/L for Hs-CRP. Intra and inter assay variabilities for each marker were 4.4% and 11.2% for NSE, 7.5% and 4.1% for Hs-CRP and 3.8% and 10.1% for S100b.

Results: The patients were divided into three group according to their CHA2DS2Vasc score as follows; score under <2, score 3-4,and score >4. There were no significant differences among the groups in terms of Hs-Crp and NLR. We showed outstanding findings in NSE and S100b values that patients with CHA2DS2VAsc scores higher than 4 had significantly higher values of brain damage marker than patients with the scores of below 2 (23.2 ± 15.8 ng/ml vs. 32.6 ± 28.9 ng/ml vs. 44.4 ng/ml ± 35.4 p=0.022 and 161 ± 62 pg/ml vs.186 ± 37 pg/ml vs.189 ± 25 pg/ml p=0.037,respectively). Serum levels of NSE and S100b were correlated with CHA2DS2Vasc scores (p=0.04 r=0.218 for NSE and p=0.03 r=0.229 for s100b).

Conclusion: Measurement of these markers may have an additive effect when evaluating patients' individual risk of stroke in the setting of NVAF.

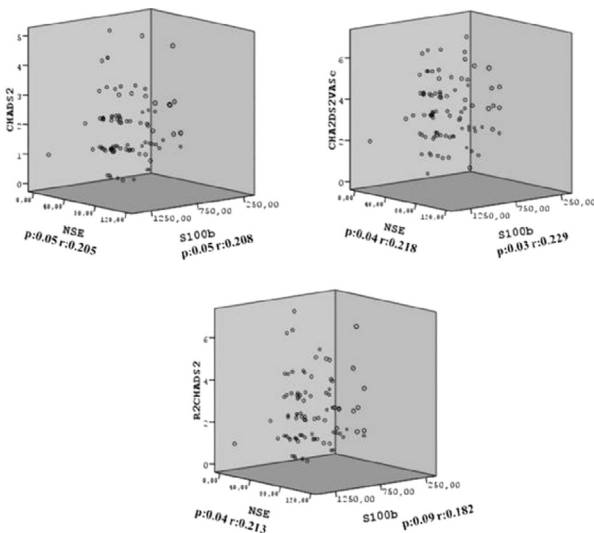


Table 1: Mean values of inflammatory and brain damage markers in CHA2DS2Vasc score group

Variable	Group 0-2 (n:34)	Group 3-4 (n:36)	Group >4 (n:22)	P-value
NLR	2.6 ± 3.1	2.7 ± 3.2	2.8 ± 3.0	0.878
Hs-CRP mg/L	5.8 ± 4.7	5.4 ± 3.0	7.7 ± 5.4	0.257
NSE ng/ml	23.2 ± 15.8	32.6 ± 28.9	44.4 ± 35.4	0.026*
S100b pg/ml	161 ± 62	186 ± 37	189 ± 25	0.037*
				0.07*

NLR: Neutrophil to Lymphocyte Ratio, NSE:Neuron Specific Enolase,Hs-CRP High Sensitive C reactive protein. Results are expressed as mean ±SD

*Anova test was used, **Bonferroni post-hoc test

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Relationship between Left Atrial Functions, P-terminal Force and Interatrial Block in Chronic Haemodialysis Patients

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Aim: Interatrial block (IAB) connotes a P wave duration ≥110 msec on electrocardiography (ECG). P-terminal force corresponds to a biphasic P wave with its terminal negative phase ≥40 msec x mm in V1 derivation on ECG. IAB and P-terminal force are closely related parameters and they are accepted as predictors for left atrial dysfunction, left atrial dilatation, atrial fibrillation and strokes. Left atrial functions in chronic haemodialysis patients becomes worse in the course of time because of long standing pressure and volume overload. The aim of this study is to evaluate the relationship between IAB, P-terminal force and left atrial functions.

Patients and Methods: 68 chronic haemodialysis patients and 60 control subjects were included in the study. Haemodialysis group had 42±13.5 months dialysis period. Conventional echocardiography and left atrial dynamic functions were measured in all cases. The subjects with IAB and P-terminal force on ECG were identified.

Results: Demographic, electrocardiographic and echocardiographic data of study and control groups is presented in Table 1. Left ventricular size, wall thickness and left atrial diameters were significantly greater in haemodialysis patients than the control group (p<0.001). 42 (62%) patients had IAB (≥110 msec) and 45 (66%) patients had P-terminal force (≥40 msecxmm) in the haemodialysis group. Left atrial reservoir, conduit and pump functions were significantly lower in the haemodialysis group than the control group (p<0.001) (Table 2).

Conclusions: This study showed that decreased left atrial functions in chronic haemodialysis patients are closely correlated with IAB and P-terminal force.

Table 1. Demographic, electrocardiographic and echocardiographic data of haemodialysis patients and the control group.

	Haemodialysis group (n=68)	Control group (n=60)	P-value
Age	37±6.1	38.3±6.5	0.69
Gender(F/M)	38/30	35/25	0.59
SBP (mm Hg)	135±15	125±15	0.11
DBP (mm Hg)	82±12	74±11	0.25
LVEDd (mm)	51.5±4.0	45±3.9	<0.001
LVESd (mm)	35.4±4.7	30±2.6	<0.001
IVSd (mm)	12.2±1.5	10.1±1.5	<0.001
LVEF Simpson's (%)	59.9±9.5	62.1±8.4	0.12
LA (mm)	42.5±4.6	32.2±2.9	<0.001
Interatrial block (≥110 msec)(n, %)	42(62)	0	<0.001
P-terminal force (n, %)	45 (66)	8 (13)	<0.001
Reservoir function (%)	42.8±7.8	54.8±4.3	<0.001
Conduit function (%)	17.7±4.5	33.4±3.9	<0.001
Pump function (%)	35.8±6.5	46.6±6.4	<0.001

SBP: Systolic blood pressure, DBP: Diastolic blood pressure, LVEDd: Left ventricular end diastolic diameter, LVESd: Left ventricular end systolic diameter, IVSd: Interventricular septum diastolic diameter, LVEF: Left ventricular ejection fraction, LA: Left atrial diameter