MSD

Original Article

Relationship between premature ventricular complexes and Neutrophil–Lymphocyte Ratio in asymptomatic healthy young men

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Abstract

Background: There is no clear mortality benefit from premature ventricular beat (PVC) suppression in asymptomatic patients. In addition, It has been showed that evidence for structural heart disease consistent with non-ischemic scarring possibly due to inflammation in patients with PVCs. This situation suggests that the mechanisms by which PVCs can be also generated with include clinical and subclinical inflammation. The neutrophil–lymphocyte ratio (NLR) is an easy, cheap, non-invasive, and universally available laboratory marker used to evaluate clinical and subclinical systemic inflammation. We investigated the NLR in asymptomatic healthy young men with PVC (structural heart disease excluded with cardiac magnetic resonance imaging) compared with controls.

Methods: 21 asymptomatic (or atypical complaint) healthy young men with PVCs were recruited into the study as they attended to Diyarbakır Military Hospital for screening from January 2013 to December 2014. The control group consisted of 922 male. Instead of Lown's grading of PVCs, we considered as endpoints > 153 PVC over 24 h (in Holter Electrocardiogram). Data were analysed with the SPSS software version 15.0 for Windows.

Results: There were no significant differences between the 2 groups with respect to age, gender, body mass index, smoking, as well as glucose, creatinine, total cholesterol, triglyceride, LDL-C, HDL-C, haemoglobin levels, white blood cell count, and red cell distribution width. The NLR was significantly higher among the men with PVC than that of the control group (2.6 ± 0.8 vs 2.1 ± 0.7, respectively; $P = 0.002$).

Conclusions: We found that the NLR is significantly elevated in asymptomatic healthy young men with PVC compared with control group. The increased NLR values might indicate subclinical and clinical inflammation in asymptomatic healthy young men with PVC, and we must consider that there can also be inflammation in the one of the mechanisms of PVCs in humans

Key words: Premature ventricular complexes, neutrophil–lymphocyte ratio, inflammation

Introduction

Premature ventricular complexes (PVC) are a relatively common electrocardiographic abnormality presenting in individuals without overt cardiovascular disease. PVC pathogenesis has traditionally been considered idiopathic and in the absence of severe clinical symptoms or structural cardiac abnormalities, their presence benign (1,2). Recent prospective studies evaluating the prognostic significance of PVC for sudden and total cardiac death in apparently healthy adults directly challenge this view. Among individuals without history of heart disease or stroke, PVC counts independently predicted future cardiac events or sudden cardiac death compared to those without PVC (3-7). But there is no clear mortality benefit from PVC suppression in asymptomatic patients. In addition, It has been showed that evidence for structural heart disease consistent with non-ischemic scarring possibly

due to inflammation in patients with PVCs (8). This situation suggests that the mechanisms by which PVCs can be also generated with include clinical and subclinical inflammation as well as re-entry, enhanced normal or abnormal automaticity, triggered activity resulting in after depolarizations and also mortality benefit can be related to inhibit clinical and subclinical inflammation rather than triggered activity.

The neutrophil–lymphocyte ratio (NLR) is an easy, cheap, non-invasive, and universally available laboratory marker used to evaluate clinical and subclinical systemic inflammation (9,10), and also the NLR is related to the severity of coronary heart disease(CHD) and clinical outcome in patients undergoing angiography and is also related to angiographic progression of coronary atherosclerosis, and it is an independent predictor of adverse outcomes

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among patients with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention (11,12).

To our knowledge, no study investigated the independent relationship between NLR and PVC in asymptomatic healthy young men. We investigated the NLR in healthy young men with PVC (structural heart disease excluded with cardiac magnetic resonance imaging) compared with controls

Material and method

Subjects: Our study is cross-sectional, retrospective, observational analysis (Military personnal screening). 21 asymptomatic (or atypical complaint) healthy young men with PVCs were recruited into the study as they attended to Diyarbakır Military Hospital for screening from January 2013 to December 2014. Insead of Lown's grading of PVCs ,we considered as endpoints > 153 PVC over 24 h (in Holter Electrocardiogram) ,in that elevated risk for sudden cardiac death was reported for high-risk participants in the Cardiovascular Health Study with > 153 PVC over 24 h, or about 6 events/hr (13). Because Lown's grading of PVCs has become clear over the years that this pertains only to acute myocardial infarction and ischemia and bears no prognostic relevance in other situations. The control group consisted of 922 male . Exclusion criteria were , non-sustained ventricular tachycardia(NSVT), sustain ventricular tachycardia (SVT), structural heart disease(with cardiac magnetic resonance imaging, - Philips,3.0T), CHD, valvular heart disease, heart failure, hypertension , peripheral arterial disease, diabetes mellitus, renal or hepatic dysfunction, hematological disorders, history of malignancy, acute or chronic infection, and drug use affecting (e.g alcohol) PVC and NLR.

Blood Sampling: Blood samples were drawn from an antecubital vein by careful after a fasting period of 12 hours. Glucose, creatinine, and lipid profiles were determined by the composition of the sample was calculated in relation to the internal standard using a modification of a commercially available computer program and the results were expressed as mg or mole % and characteristic molar ratios of classes. Hematologic indices were measured within 30 minutes of collecting the blood samples in tubes containing dipotassium EDTA. An automatic blood counter was used for with a Coulter analyser equipped with ZBI counter (Coulter Electronics, Hialeah, Fla).

Echocardiography: All patients were studied by standard Doppler, tissue Doppler, and 2-D echocardiography. All echocardiographic measurements were performed using a commercially available ultrasound system (Philips hd7xe) equipped with a harmonic 4.0-2.5 MHz variable –frequency phased-array transducer. Transthoracic 2-dimensional

echocardiography (TTE) was performed in all study subjects according to the published protocol adopted form the recommendations of the American Society of Echocardiography.

Statistical Analysis:

Data were analyzed with the SPSS software version 15.0 for Windows. Continuous variables from the study groups were reported as mean± standard deviation and categorical variables as percentages. To compare continuous variables, the Student t test. Categorical variables were compared using the chi-square test. A two-tailed $P < 0.05$ was considered statistically significant

Results

Clinical and laboratory characteristics of the asymptomatic healthy young men with PVC(structural heart disease excluded with cardiac magnetic resonance imaging) and control group are shown in Table 1. There were no significant differences between the 2 groups with respect to age, gender, body mass index, smoking, as well as glucose, creatinine, total cholesterol, triglyceride, LDL-C, HDL-C, haemoglobin levels, white blood cell count, and red cell distribution width. Neutrophil count was significantly higher among the asymptomatic healthy young men with PVC than that of the control group (4.1 ±0.6 vs 3.7 ±1.1 x 1000/mm3, respectively; P =0.004). Lymphocyte count was significantly lower among the asymptomatic healthy young men with PVC than that of the control group (1.6 ±0.45 vs 1.8 ±0.51 x 1000/mm3, respectively; P =0.009).

The NLR was significantly higher among the men with PVC than that of the control group (2.6 ±0.8 vs 2.1 ± 0.7, respectively; P = 0.002) (Fig.1).
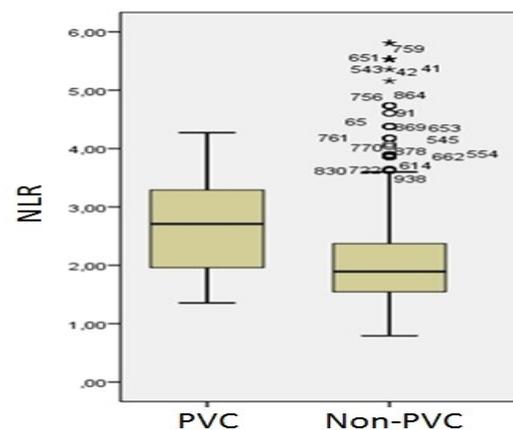

Figure 1: Comparison of the neutrophil-lymphocyte ratio (NLR) of the Asymptomatic Healthy Young Men with PVC and Control group. The NLR was significantly higher among the men with PVC than that of the control group (2.6±0.8 vs 2.1±0.7, respectively, P=0.002).

Discussion

Previously it has been showed that evidence for structural heart disease consistent with non-ischemic scarring possibly due to inflammation in patients with premature ventricular beats (PVCs). We found that the NLR, an indicator of inflammation, is significantly elevated in asymptomatic healthy young men with PVC (structural heart disease excluded with cardiac magnetic resonance imaging) when compared with control group.

Since invasive testing is rarely performed in patients with only simple PVCs, there is little information about the mechanisms of PVCs in humans. Information derived from experiments in animals suggests that the mechanisms by which PVCs are generated include: re-entry, enhanced normal or abnormal automaticity, triggered activity resulting in after depolarisations.

Table 1. Comparison of the clinical and Laboratory characteristics of the asymptomatic healthy Young men with PVC and Control group

	PVC Group n=21	Control Group n=962	P
Age	22.7±2.0	22.6±3.1	0.16
BMI, kg/m2	22.6±1.8	22.7±1.7	0.91
Echocardiography	normal rng	normal rng	
Smoking	%14	19%	0.34
Glucose, mg/dl	97±5	90±5	0.18
Creatinine, mg/dl	1.03 ± 0.10	1.00±0.22	0.06
Total cholesterol, mg/dl	156±35	157 ±24	0.28
Triglycerides, mg/dl	124±69	122±36	0.19
LDL-C, mg/dl	102±17	101±15	0.16
HDL-C, mg/dl	34±3	35±3	0.15
WBC, 1000/mm3	6.57±0.92	6.58±1.28	0.22
Hemoglobin, g/dl	14.5±1.2	14.5±1.1	0.15
RDW, %	14.2±1.2	14.3±1.6	0.14
Neutrophils,	4.1±0.6	3.7±1.1	0.004
Lymphocytes,	1.6±0.45	1.8±0.51	0.009
NLR	2.6±0.8	2.1±0.7	0.002

BMI; body mass index, LDL-C; low-density lipoprotein cholesterol; HDL-C; high-density lipoprotein cholesterol, WBC; white blood cells, RDW; red cell distribution view, NLR; neutrophil–lymphocyte ratio

It has been showed that evidence for structural heart disease consistent with non-ischemic scarring possibly due to inflammation in patients with PVCs (8). However, prophylactic treatment of asymptomatic PVCs in patients without cardiomyopathy has not been shown to improve mortality. This situation suggests that the mechanisms by which PVCs can be also generated with include clinical and subclinical inflammation as well as re-entry, enhanced normal or abnormal automaticity, triggered activity resulting in after depolarisations and also mortality benefit can be related to inhibit clinical and subclinical inflammation rather than triggered activity.

The NLR is easy, cheap, non-invasive, and widely available laboratory marker of systemic clinical and subclinical inflammation. Recently, it gained increased interest due to its role as an independent prognostic factor for many conditions such as uncontrolled hypertension, diabetes mellitus, acute coronary syndromes, valvular heart disease, congenital heart disease, renal or hepatic dysfunction, malignancy, local or systemic infection, and some other inflammatory diseases (14,15).

In our study, the patients with PVC (structural heart disease excluded with cardiac magnetic resonance imaging) and controls were free of CHD. We also excluded non-sustained ventricular tachycardia(NSVT), sustain ventricular tachycardia(SVT), structural heart disease(with cardiac magnetic resonance imaging, - Philips,3.0T), CHD, valvular heart disease, heart failure, hypertension , peripheral arterial disease, diabetes mellitus, renal or hepatic dysfunction, haematological disorders, history of malignancy, acute or chronic infection, and drug use affecting(e.g. alcohol) PVC and NLR.

Limitation

Our study has some limitations. First of it, the number of patients with PVC was small. The second one, our analysis was based on a simple baseline determination at a single time point that may not reflect patient status over long periods.

Conclusion

We found that the NLR is significantly elevated in asymptomatic healthy young men with PVC compared with control group. The increased NLR values might indicate subclinical and clinical inflammation in asymptomatic healthy young men with PVC, and we must consider that there can also be inflammation in the one of the mechanisms of PVCs in humans

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Acknowledgements

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