Neutrophil-Lymphocyte Ratio and Microvascular complications in Pakistani subjects with type 2 diabetes

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Objective

The aim of this study is to find association between diabetic microvascular complications and Neutrophil to Lymphocyte ratio (NLR) in subjects with type 2 diabetes.

Methodology

It was a retrospective study based on the hospital data records from January 2005 to May 2016 at Baqai Institute of Diabetology and Endocrinology (BIDE). The eligible criteria were subjects with type 2 diabetes with their latest complete blood count (CBC). Subjects were divided into two groups; one with any microvascular complication and other with no microvascular complication. Body mass index (BMI) and other anthropometric measurements, blood pressure were measured.

Results

Univariate analysis for association between risk factors with the presence of microvascular complications

Parameters	Without Microvascular Complication	With at least one Microvascular Complication	OR (95% C.I)	P-value
n	2246	3374	5620	
Age (years)	52.33±11.05	55.86±10.72	1.03(1.02-1.036)	<0.0001
Gender				
Female	1065(47.4%)	1353(40.1%)	0.742(0.667-0.827)	<0.0001
Male	1181(52.6%)	2021(59.9%)		
Duration of diabetes (years)	10.89±7.38	15.47±8.47	1.077(1.069-1.086)	<0.0001
Body mass index (kg/m ²)	28.96±5.37	27.57±5.46	0.960(0.949-0.970)	<0.0001
Systolic blood pressure (mmHg)	129.69±18.62	132.7±20.07	1.008(1.005-1.011)	<0.0001
Diastolic blood pressure (mmHg)	80.38±10.03	80.92±10.27	1.005(0.999-1.011)	0.075
High density lipoprotein (mg/dl)	37.3±9.95	34.47±10.56	0.974(0.966-0.982)	<0.0001
Low density lipoprotein (mg/dl)	102.55±37.57	100.08±39.9	0.998(0.996-1.000)	0.109
Triglyceride (mg/dl)	171.18±115.1	164.61±150.37	1.00(0.999-1.000)	0.248
Cholesterol (mg/dl)	172.07±47.68	165.85±52.35	0.998(0.996-0.999)	0.002
Serum Creatinine (mg/dl)	1.10±0.65	1.35±0.99	1.589(1.404-1.799)	<0.0001
HbA1c (%)	9.14±2.27	9.71±2.42	1.110(1.078-1.143)	<0.0001
Fasting blood sugar (mg/dl)	179.74±71.63	191.02±90.73	1.002(1.000-1.003)	0.008
Random blood sugar (mg/dl)	264.06±110.23	265.62±117.83	1.000(0.999-1.001)	0.784

Data presented as mean ± standard deviation

Here OR= Odds Ratio*, statistically significant at P-value<0.05

Comparison of NLR between micro vascular complications and without micro vascular complication

Factors related to microvascular complications according to multivariate logistics regression analysis

Variable	Regression coefficient (β)	OR (95% C.I)	P-value
Duration of diabetes	0.059	1.061(1.048-1.073)	<0.0001
Systolic Blood Pressure	0.006	1.006(1.001-1.010)	0.012
Serum creatinine	0.233	1.262(1.110-1.436)	<0.0001
HbA1c	0.97	1.102(1.062-1.142)	<0.0001
Neutrophil Lymphocyte ratio	0.569	1.766(1.789-2.093)	<0.0001

Here OR= Odds Ratio

P-value < 0.05 was considered statistically significant

Frequency of Complete Blood Count

Parameters	Without Microvascular Complication	With at least one Microvascular Complication	Overall	P-value
n	2465	3388	5853	
Platelet count	257.98±99.69	284.52±118.07	273.35±111.47	<0.0001
Neutrophil count	69.23±10	73.01±10.47	71.42±10.44	<0.0001
Lymphocytes count	26.8±9.96	23.09±10.31	24.65±10.32	<0.0001
Total leukocyte count	9.56±4.2	11.19±7.6	10.5±6.44	<0.0001
Red blood cell	4.59±0.69	4.38±0.77	4.49±0.74	<0.0001
Mean corpuscular hemoglobin	27.39±3.24	27.09±3.14	27.22±3.19	<0.0001
Mean corpuscular hemoglobin concentration	32.59±1.96	32.48±1.99	32.53±1.97	0.032
Mean corpuscular volume	83.86±8.24	83.1±7.89	83.42±8.05	<0.0001
Monocytes count	1.77±0.70	1.75±1.01	1.76±0.89	0.01
Hemoglobin	12.66±2.26	12.01±2.35	12.35±2.32	<0.0001
Eosinophils count	2.17±1.81	2.12±1.93	2.14±1.88	<0.0001

Data presented as mean ± standard deviation

P-value < 0.05 was considered statistically significant

Conclusion

According to the results, it is concluded that NLR is an efficient, cheaper and readily available marker of inflammation and it is known as an important predictor for the existence of microvascular complications in subjects with type 2 diabetes