RED BLOOD CELL DISTRIBUTION WIDTH IS AN INDEPENDENT PREDICTOR OF ALL CAUSE MORTALITY AND CARDIOVASCULAR MORBIDITY IN DIABETIC NEPHROPATHY

Stefanos Roumeliotis[1], Aikaterini Stamou[2], Stylianos Panagoutsos[1], Athanasios Roumeliotis[1], Theodora Gkioka[2], Ploumis Passadakis[1],
[1]Medical School, Department of Nephrology, Democritus University of Thrace, Alexandroupoli, GREECE,
[2]Medical School, Laboratory of Hematology, Democritus University of Thrace, Alexandroupoli, GREECE.

INTRODUCTION AND AIMS:

Red Blood Cell Distribution Width (RDW) is a measure of size variation in erythrocytes (anisocytosis) which is used for the differential diagnosis of anemias. Anisocytosis seems to be a novel strong predictor of mortality and cardiovascular events in various populations. The aim of this study was to investigate the association between RDW and mortality/cardiovascular events in patients with Diabetic Nephropathy (DN).

METHODS:

We included 142 patients with DN in our study (77 males, 65 females) of mean age 68±9.01 years and mean duration of Diabetes Mellitus Type2 (DMT2) 15.3±7.8 years. At baseline, biochemical and demographic characteristics, RDW and the presence of cardiovascular events in the patients' history were recorded. Carotid Intima Media Thickness (cIMT) was determined by Doppler ultrasound as a marker of subclinical atherosclerosis. The RDW was determined using the Sysmex XE-5000 Hematology Analyzer as part of the routine histogram. The reference value of RDW in our laboratory is 12% to 14%. Patients were divided into two groups according to RDW value: high RDW>14% (56 patients) and low RDW<14% (86 patients). All-cause mortality and cardiovascular events were assessed during a 7-year follow-up.

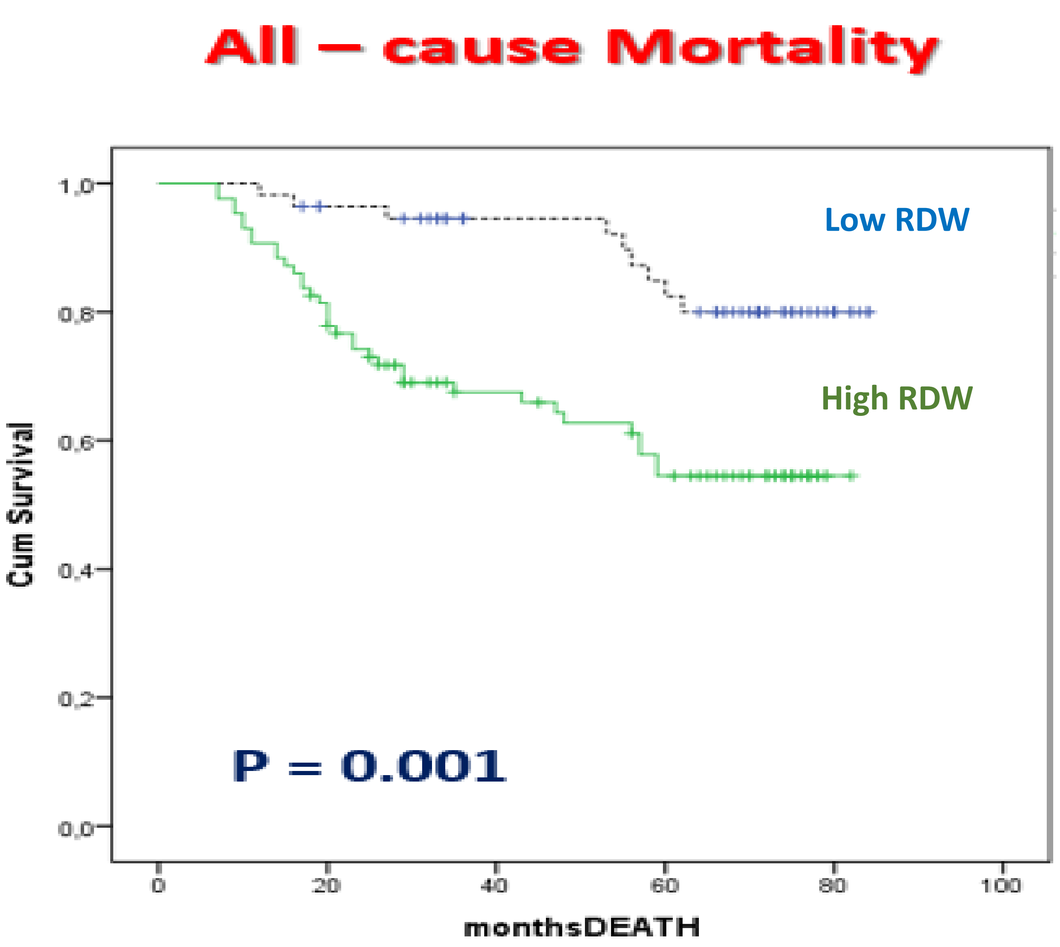
Table 1: Anthropometric, biochemical characteristics of diabetic patients according to high/low RDW group

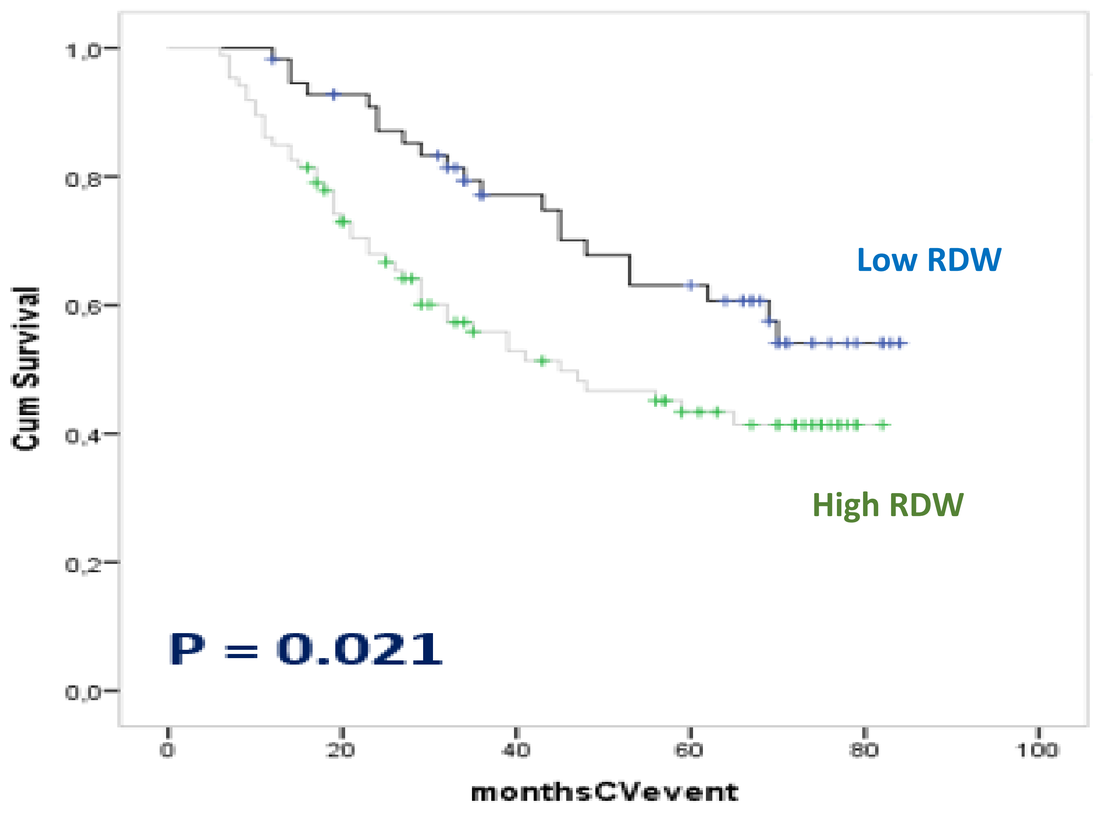
	High RDW >14% (N=56)	Low RDW <14% (N=86)	P
Age (years)	68.6 ± 9.5	67.7 ± 8.8	0.65
Sex (M/F)	29/27	48/38	0.38
Hb (g/dl)	11.8 ± 1.8	13.3 ± 1.6	<0.0001
eGFR (ml/min)	40.9 ± 30.1	57.9 ± 31.8	0.003
Albuminuria	999.1 ± 2.200.0	140.1 ± 328.0	0.002
cIMT (mm)	0.93 ± 0.27	0.83 ± 0.19	0.036
Cardiovascular event (Y/N)	34/56	59/86	0.22

RESULTS:

Patients in the high RDW group had lower hemoglobin, lower eGFR, higher albuminuria levels and higher cIMT compared to patients in the low group (p<0.0001, p=0.003, p=0.002 and p=0.036 respectively, Kruskal-Wallis test). There were no differences in the presence of cardiovascular event (CVE) between the two groups at baseline. During the 7-year follow-up 44/142 patients died and 66/142 presented a new CVE. Overall mortality and presence of new CVE were significantly higher in patients with increased RDW (p=0.001, p=0.021 respectively, log-rank test). In a multiple regression model, RDW appeared to be an independent predictor of mortality [p=0.002, CI=5.9 (1.3 - 26.3)] and CVE [p<0.0001, CI=1.4 (1.2-1.7)] even when adjusted for various risk factors, Cox regression analysis.

Figure 1: Kaplan-Meier curves for all-cause mortality (A) and cardiovascular events (B) in patients with high and low RDW levels (according to median value 14%)





CONCLUSIONS:

RDW has been found to be an independent and significant prognostic factor of all-cause mortality and cardiovascular morbidity in patients with DN.

References:

1. Hsieh, Yao-Peng, et al. "The Predictive Role of Red Cell Distribution Width in Mortality among Chronic Kidney Disease Patients." *PloS one* 11.12 (2016): e0162025.
2. Hsieh, Yao-Peng, et al. "Association between red cell distribution width and mortality in patients undergoing continuous ambulatory peritoneal dialysis." Scientific Reports 7 (2017

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