Diabetic Retinopathy and Carotid Artery Disease

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Introduction. Diabetes mellitus (DM) is the most frequent endocrine disorder and one of the most common non-communicable chronic diseases. In the Republic of Moldova, there are approximately 90.392 persons with DM according to the National DM prevention and control program for the years 2017-2021.

Keywords: diabetes mellitus, diabetic retinopathy, echographic markers.

Purpose. To evaluate the ultrasound markers in a group of subjects with diabetic retinopathy and to identify the associations between these ultrasound parameters and the degree of diabetic retinopathy.

Material and methods. There were examined 85 patients with different degrees of DR admitted consecutively into the Ophthalmology department, Institute of Emergency Medicine. Patients underwent laboratory, ophthalmological and ultrasound examination of the extracranial carotid segment.

Results. The study included 85 patients (170 eyes) with a mean age of 60.4±9.4 years. Depending on the degree of diabetic retinopathy, 56.5% (n=96) eyes with proliferative DR, 10% (n=17) with severe non-proliferative DR, 14.7% (n=25) moderate non-proliferative DR and 18.8% (n=32) mild non-proliferative DR were detected. Proliferative DR associates atherosclerotic plaques at the level of carotid arteries in 82% cases, severe non-proliferative DR in 70%, moderate non-proliferative DR in 40%, and mild non-proliferative DR in 38%. It is evident that the intima-media thickness values and the frequency of atheromatous plaques correlate with the degree of retinal damage in diabetic patients.
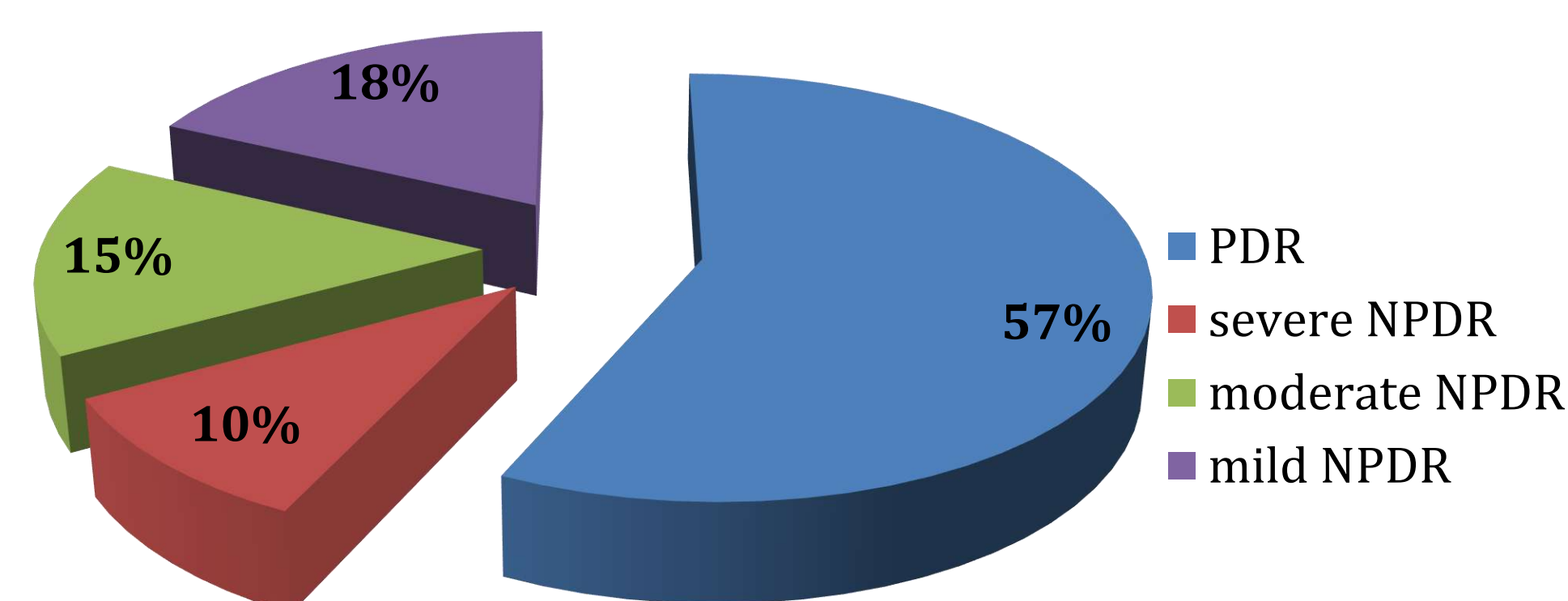
Tab. 1 The anthropometric characteristics of the study groups

Parameter	1st group	2nd group	P
Systolic pressure (mmHg)	142.5 ± 23	161.7 ± 23.1	p<0.001
Diastolicpressure (mmHg)	74.9 ± 10.7	83.5 ± 11.9	p<0.001
Glucoselevel (mmol/L)	9.78 ± 2.64	9.23 ± 2.98	0.38
Total cholesterol (mmol/L)	5.71 ± 1.4	5.79 ± 1.4	0.95
HDL-cholesterol (mmol/L)	1.01 ± 1.4	1.09 ± 0.28	0.1
LDL-cholesterol (mmol/L)	2.61 ± 0.88	3.17 ± 1.15	0.03
Triglycerides (mmol/L)	1.8 ± 0.84	1.98 ± 1.4	0.32
Beta-lipoprotein (U/l)	44.5 ± 6.35	56.31 ± 4.25	0.025
Glycated haemoglobin (%)	6.65 ± 1.55	9.02 ± 1.62	0.008
Creatinine (mkmol/L)	62.59 ± 18.3	77.02 ± 28.33	0.24
Urea (mmol/L)	7.41 ± 4.94	10.23 ± 7.88	0.44

Fig. 5. Ultrasound examination of extracranial arteries in a patient with mild RDNP. At the level of internal carotid artery there are small atherosclerotic plaques
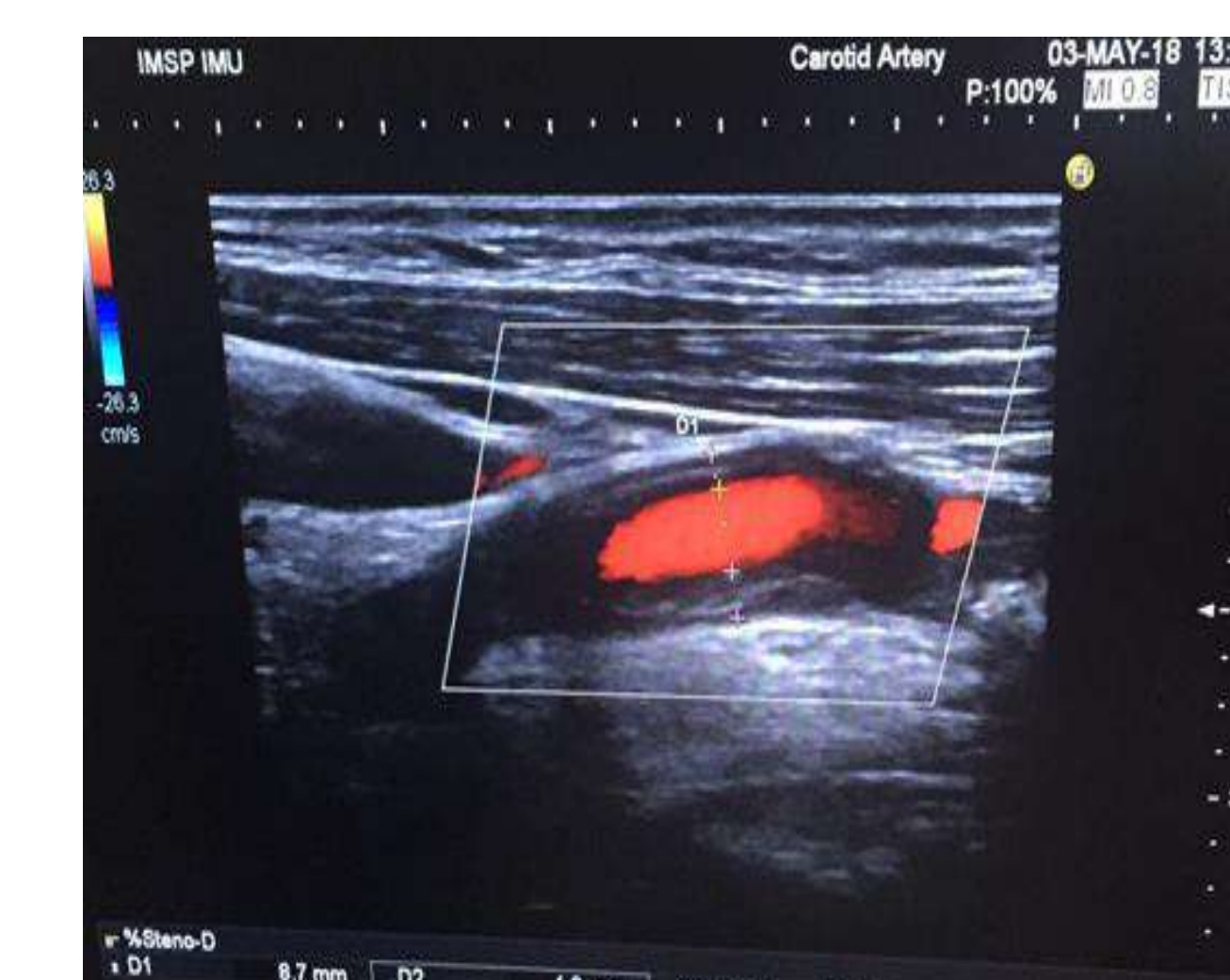

Fig. 6. Ultrasound examination of extracranial arteries in a patient with PDR. At the level of the left CCA bifurcation, there is atherosclerotic plaque with stenosis – 50 %

Fig. 7.Ultrasound examination of extracranial arteries in a patient with PDR. At the level of the left ICA, there is atherosclerotic plaque with stenosis – 90 %

Fig. 1. Distribution of patients according to the degree of diabetic retinopathy.

- PDR
- severe NPDR
- moderate NPDR
- mild NPDR

57%, 18%, 15%, 10%

PDR	82%
severe NPDR	70%
moderate NPDR	40%
mild NPDR	38%
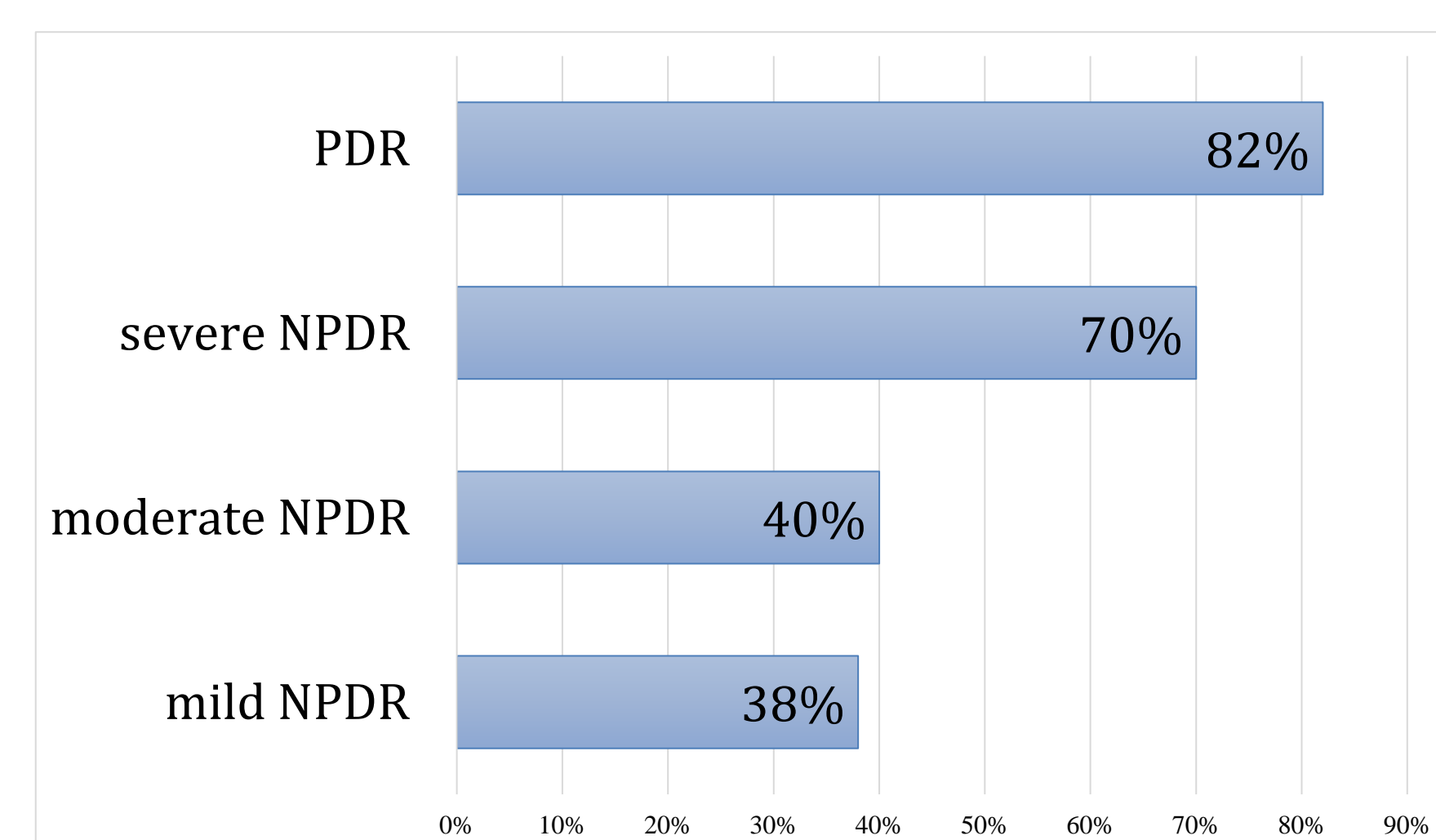
Fig. 2. The frequency of atheromatous plaques depending on the degree of diabetic retinopathy

Conclusions. The obtained results suggests that there is a relationship between the damage degree of small and large artery in diabetic patients. It is recommended for diabetic patients: ophthalmological examination for DR screening, ultrasound examination of carotids in order to prevent vascular events.