Carotid Atherosclerosis Is Associated with Deterioration of Kidney Disease in Patients with Diabetes Mellitus Type 2 (DM2)

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INTRODUCTION

Albuminuria and Chronic Kidney Disease (CKD) constitute traditional risk factors for cardiovascular disease (CVD) and all-cause mortality. A good predictor of CVD's incidence is carotid atherosclerosis, evaluated by the Intima-Media-Thickness of the carotid artery wall (cIMT).

AIM OF THE STUDY

To examine, in patients with DM2 and diabetic nephropathy, the relationship between:
✓ The cIMT and the stage of CKD based on the estimated Glomerular Filtration Rate (eGFR) &
✓ The cIMT and the presence of albuminuria.

METHOD

▪ 151 patients with DM2 and diabetic nephropathy were enrolled.
▪ BMI, arterial blood pressure, smoking, serum biochemical parameters and serum lipids, as classic risk factors for CVD, were evaluated.
▪ cIMT diameter and the presence of a carotid plaque, as newer risk factors, were also measured using B-Mode ultrasonography (image).
▪ The relationship between cIMT and albuminuria, cIMT and CKD stage based on eGFR, as well as the relationship between albuminuria and dyslipidemia using Spearman's non-parametric analysis were finally examined.

n=151 patients (79M & 72F)	Mean value ± SD
Age (years)	68±9
Diabetes duration (years)	15.5±13
BMI	31±5,15
SBP (mmHg)	138,2±19,5
DBP (mmHg)	77,64±10,2
Total Cholesterol (mg/dl)	175,8±51,3
Triglycerides (mg/dl)	157±77,2
HDL-cholesterol (mg/dl)	45,1±12,5
LDLcholesterol(mg/dl)	99,1±42,5
HbA1c (%)	7,46±1,1
Albuminuria (mg/gr creatinine)	109±196,2
eGFR (ml/min)	56,83±38,5
No of patients per stage of CKD (1st/2nd/3rd/4th/5th)	26/32/34/17/32

CKD STAGE	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	p
Mean cIMT (cm)	0.76 (0.55-1.61)	0.905 (0.63-1.61)	0.93 (0.66-1.78)	0.95 (0.66-1.66)	0.98 (0.60-1.60)	<0.0001

RESULTS

▪ 35% of DM2 patients were found to have a carotid plaque in at least one of the two carotid arteries.
▪ A statistically significant raise in cIMT diameter as the stage of CKD progressed was revealed (p<0.001, Kruskal-Wallis test).
▪ A statistically significant cIMT raise was also noted as albuminuria was raising (Spearman r=301, p=0.004) (figure 1).
▪ cIMT and eGFR were also statistically correlated (Spearman r=-258, p=0.002) (figure 2).
▪ Hypertriglyceridemia was also correlated to the progression of eGFR (Spearman r=-282, p=0.001) and to the raise of urine albumin levels (Spearman r=373, p<0.001).

FIGURE 1

ALBUMIN / CREATININE

IMAGE

FIGURE 2

GFR
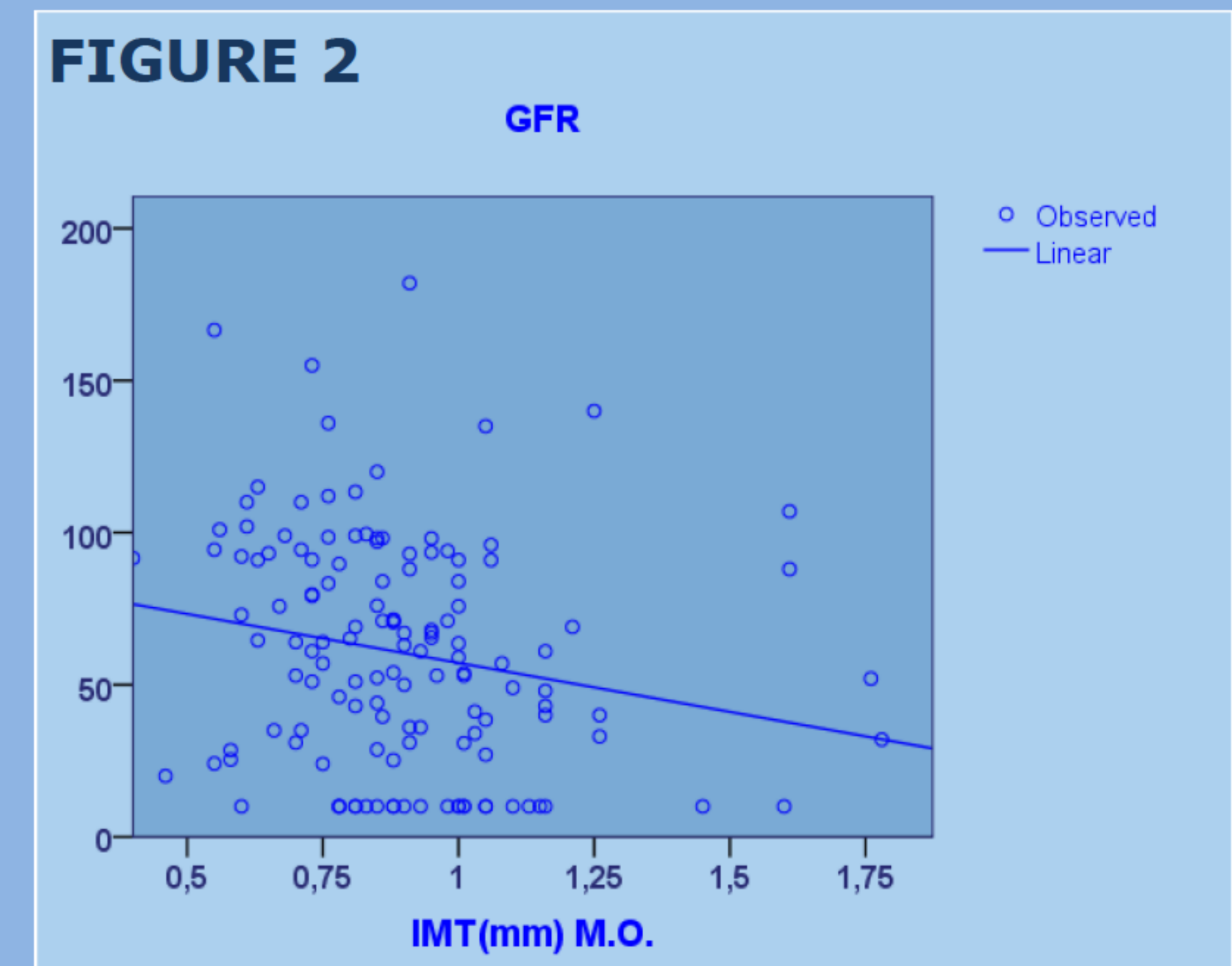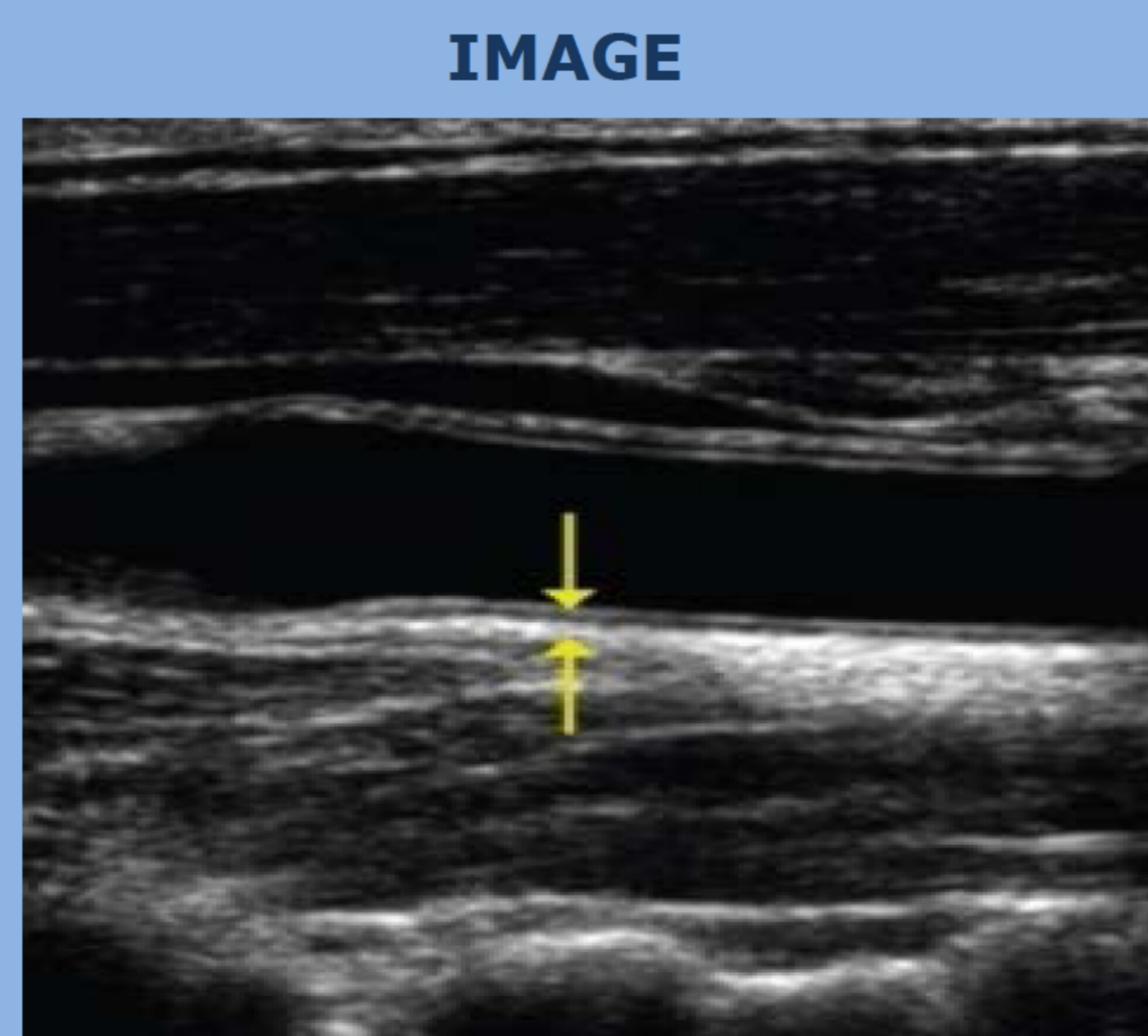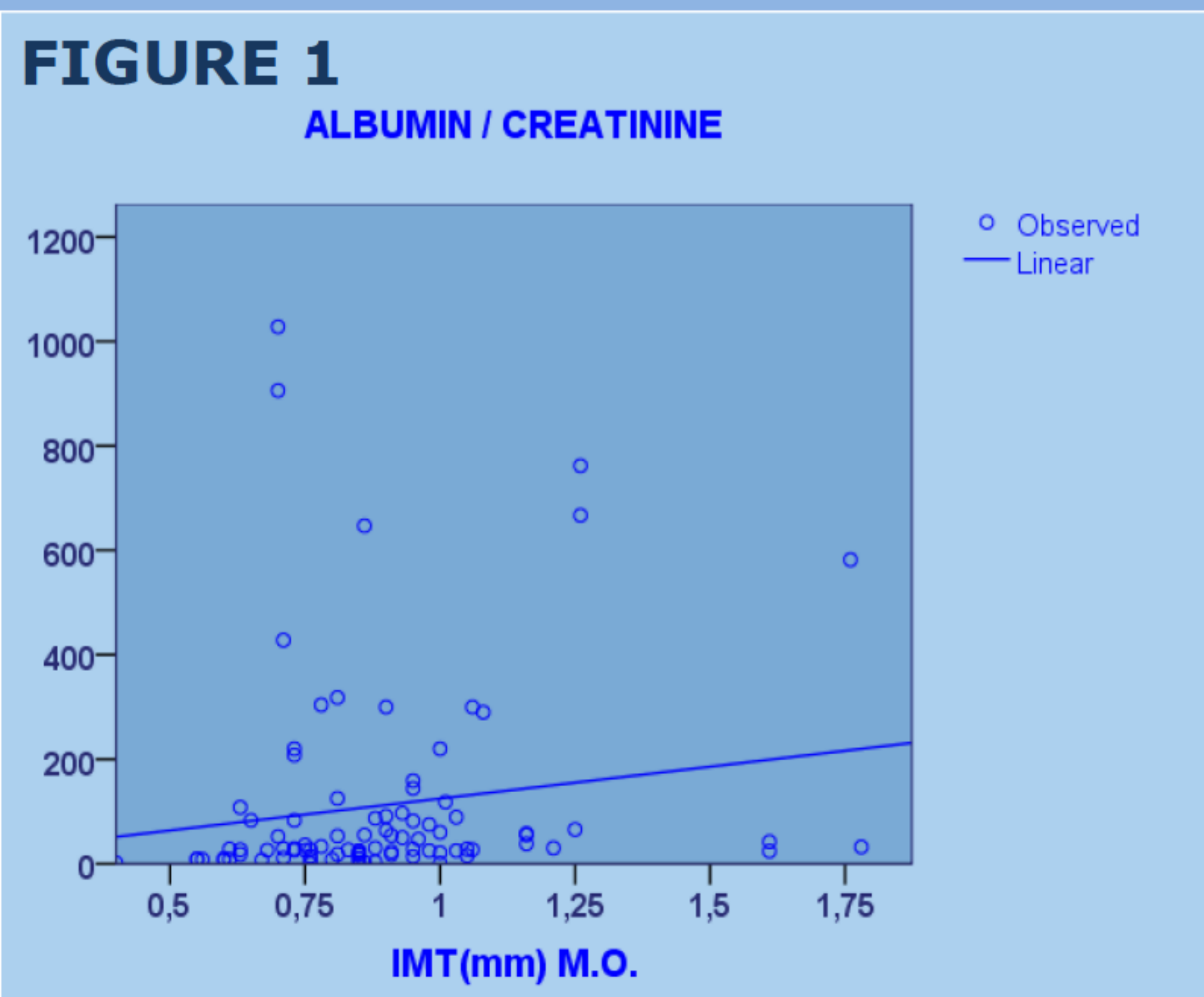
CONCLUSIONS

Carotid artery atherosclerosis is correlated to the raise of albuminuria, as well as to the deterioration of eGFR and progression of CKD. Based on this finding, cIMT should be measured regularly, as it can constitute, besides a classic vascular calcification indicator, an early marker for CKD progression in patients with DM2 and nephropathy.