

# FACTORS INFLUENCING SERUM CARDIAC TROPONIN T (cTnT) IN STABLE EXTRACORPOREAL DIALYSIS (ED) PATIENTS

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## Objectives:

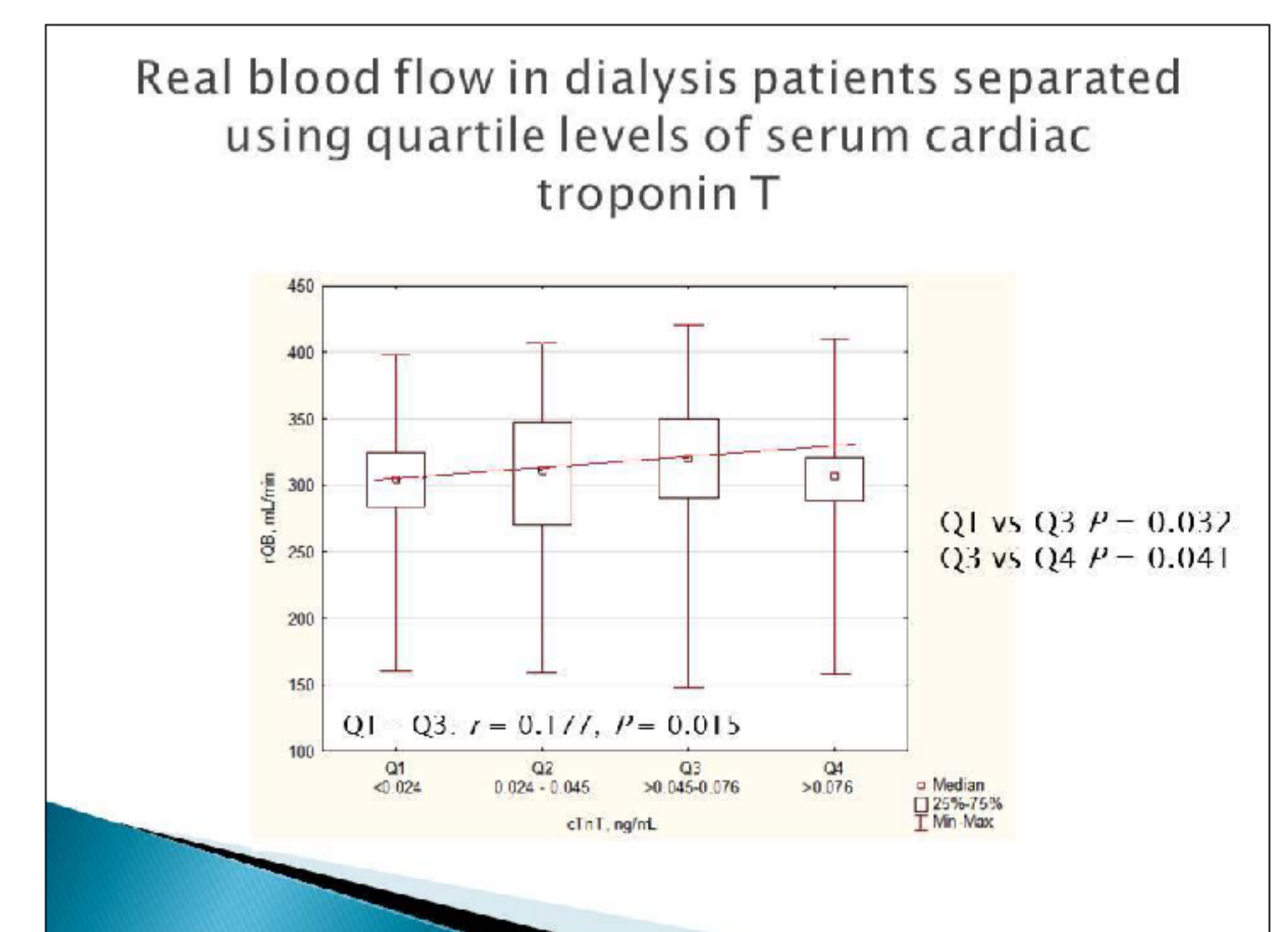
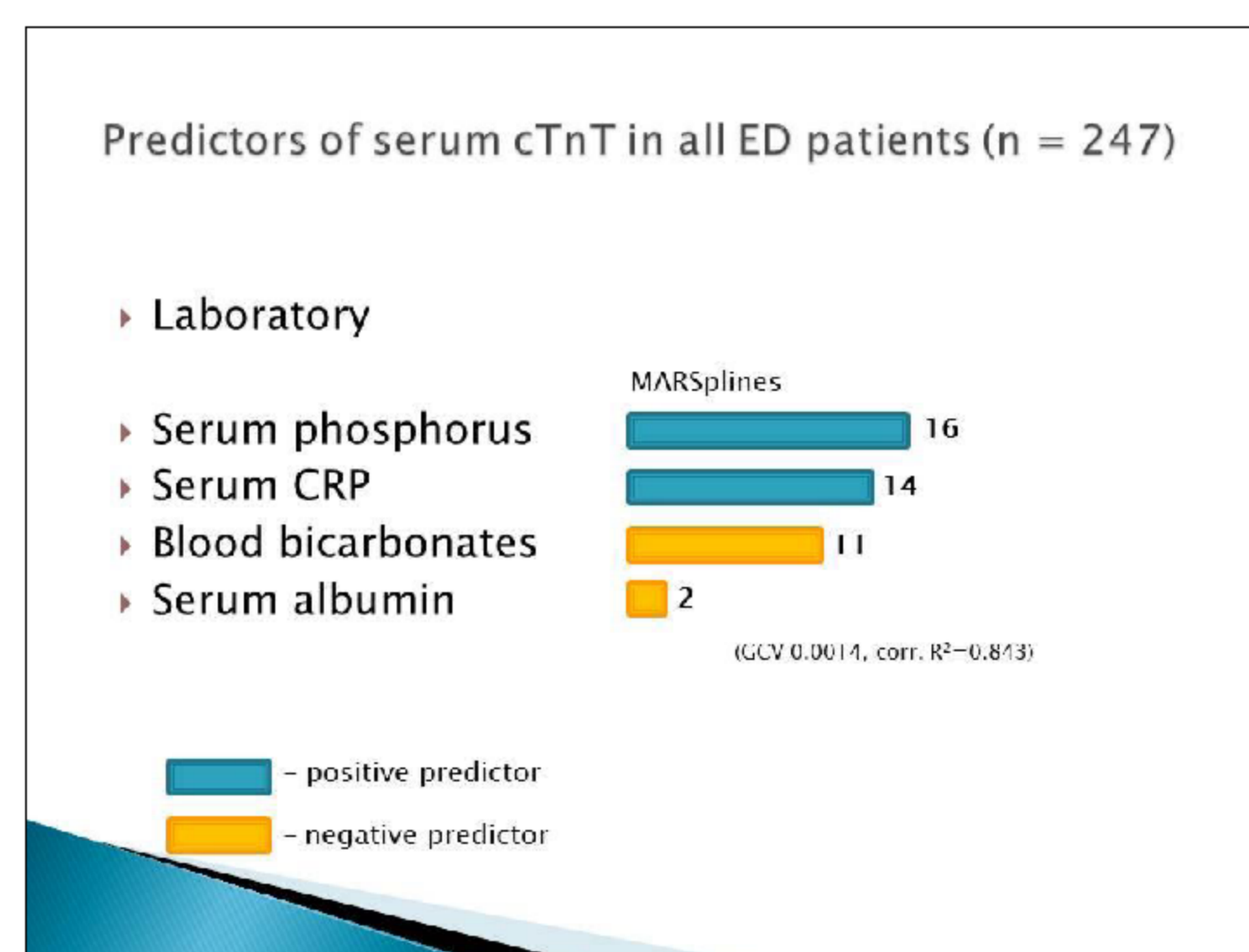
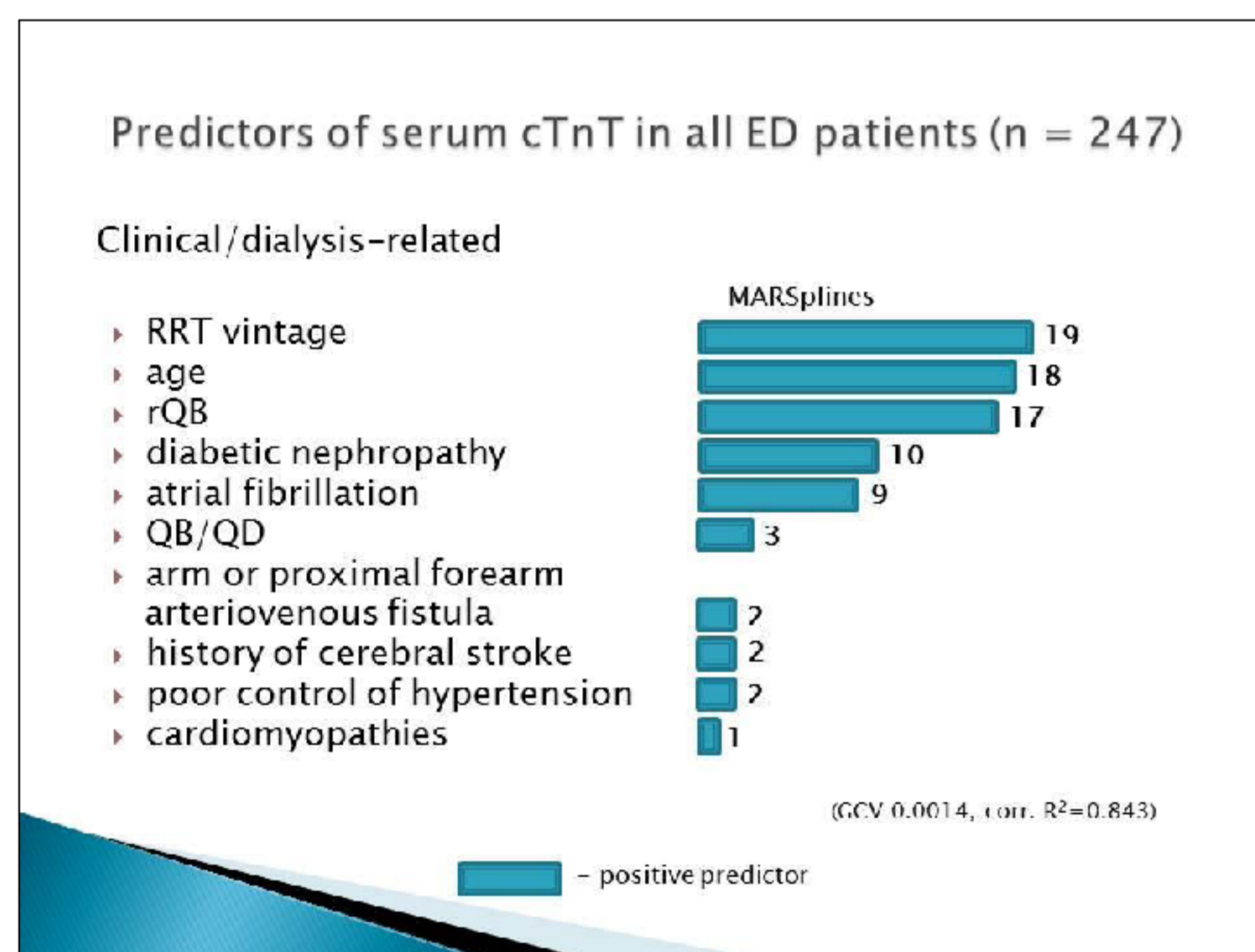
Increased cardiac troponins in ED patients may indicate myocardial damage associated with uremic state and ED procedure. We aimed to check which factors are associated with serum cTnT in ED patients.

## Methods:

In a cross-sectional study, serum high sensitivity cTnT were measured in 247 asymptomatic patients (54 HDF, 35 HF-HD, 158 LF-HD) dialyzed using stable ED parameters. Out of LF-HD patients, 156 were enrolled into a 53 week prospective observational study: 91 switched to HF-HD and their real blood flow (rQB) increased from 289±49 to 355±45 mL/min, whereas dialysate flow (QD) decreased from 497±26 to 310±45 mL/min; 65 patients continued LF-HD with stable both rQB (291±49 at the start, 293±43 mL/min at the end) and QD of 500 mL/min. QB/QD increased during HF-HD from 59±12 to 115±17%, whereas it was stable during LF-HD (58±10 vs 58±9%). Clinical/laboratory evaluations were performed at 0-15-36-53 weeks from the start. Since patients presenting cardiac episodes or other severe instability and those who received renal graft were excluded, the analysis was done on 44 LF-HD and 58 HF-HD patients. MARSplines model with generalized cross validation (GCV) was used to show predictors of serum cTnT.

## Results:

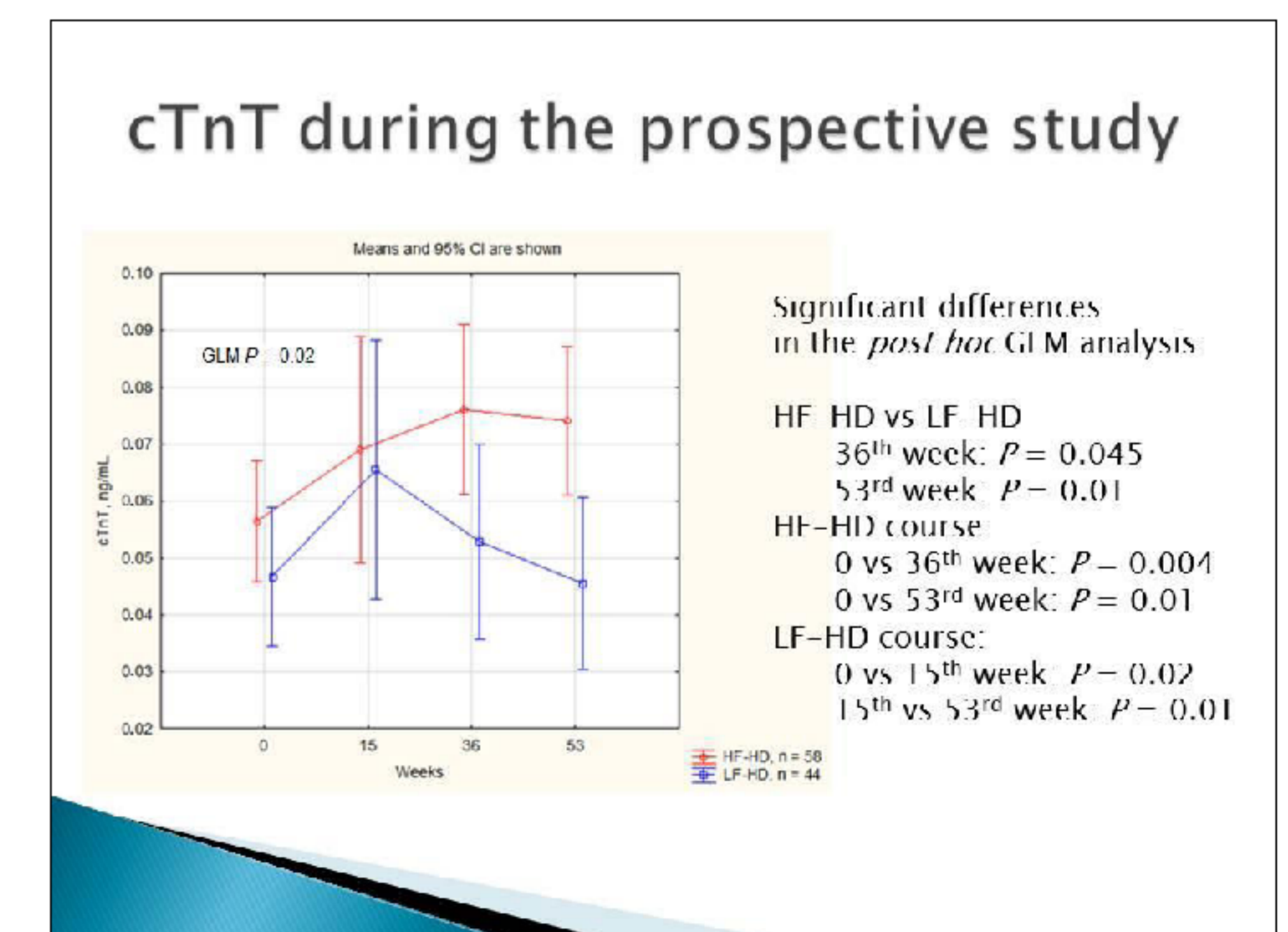
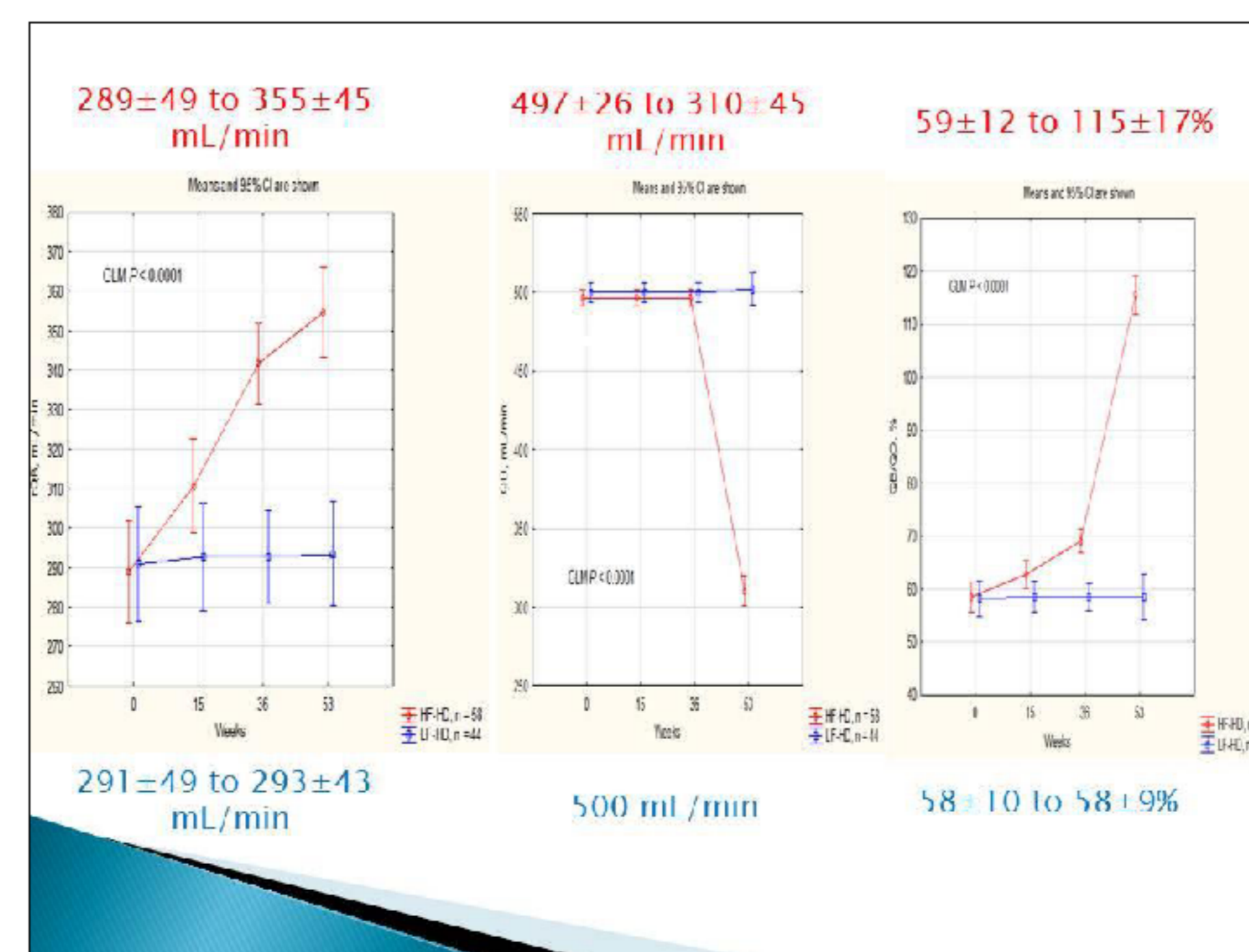
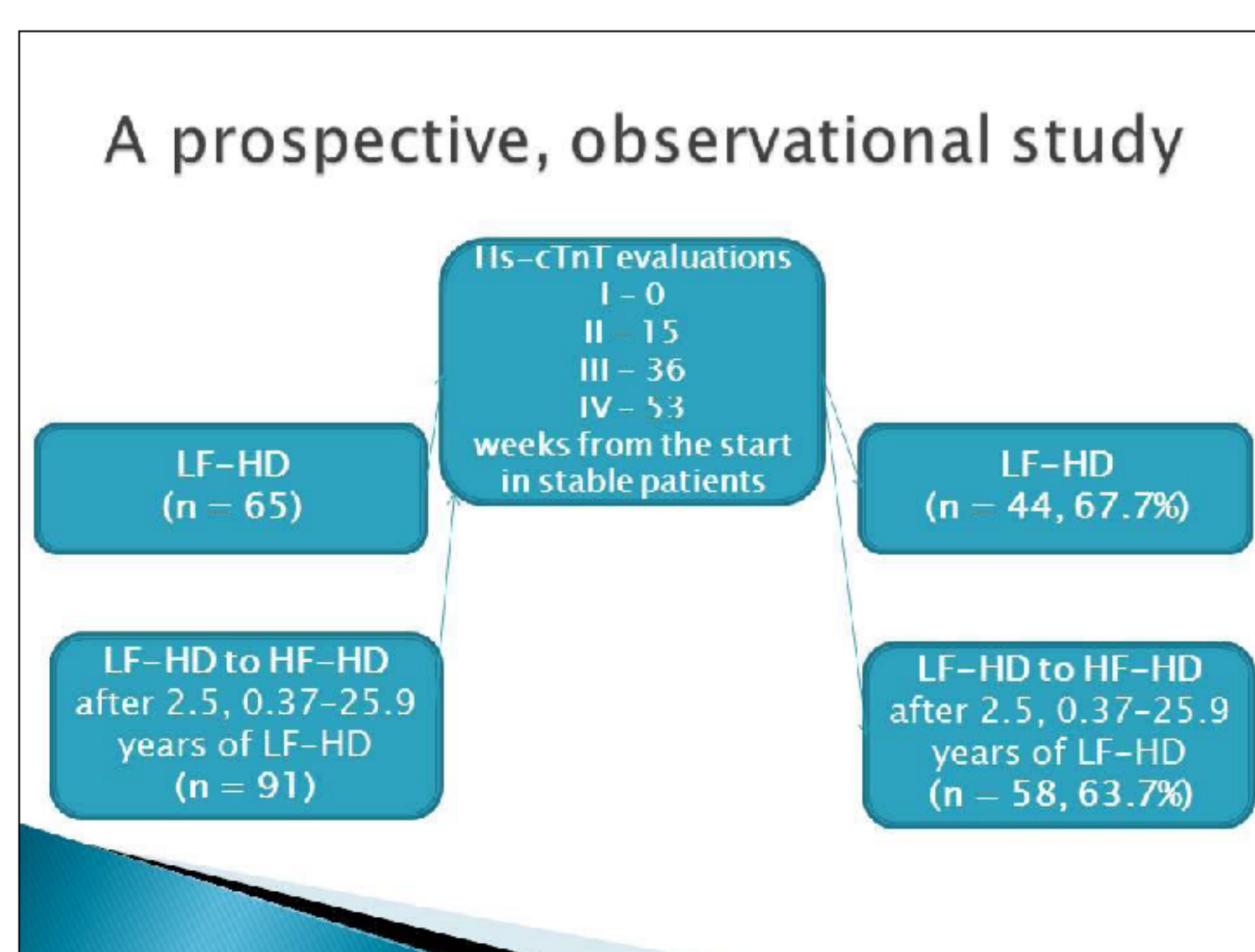
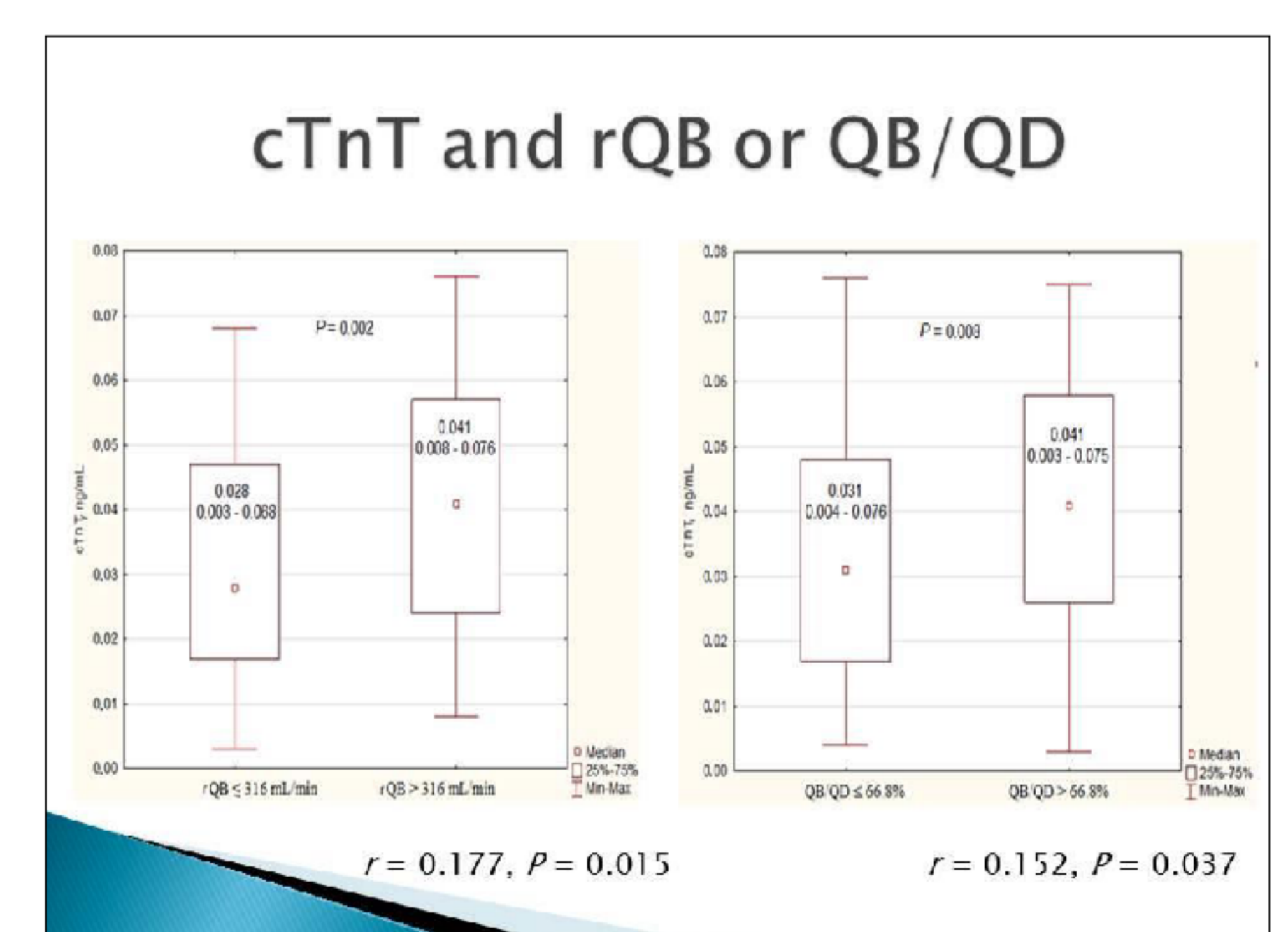
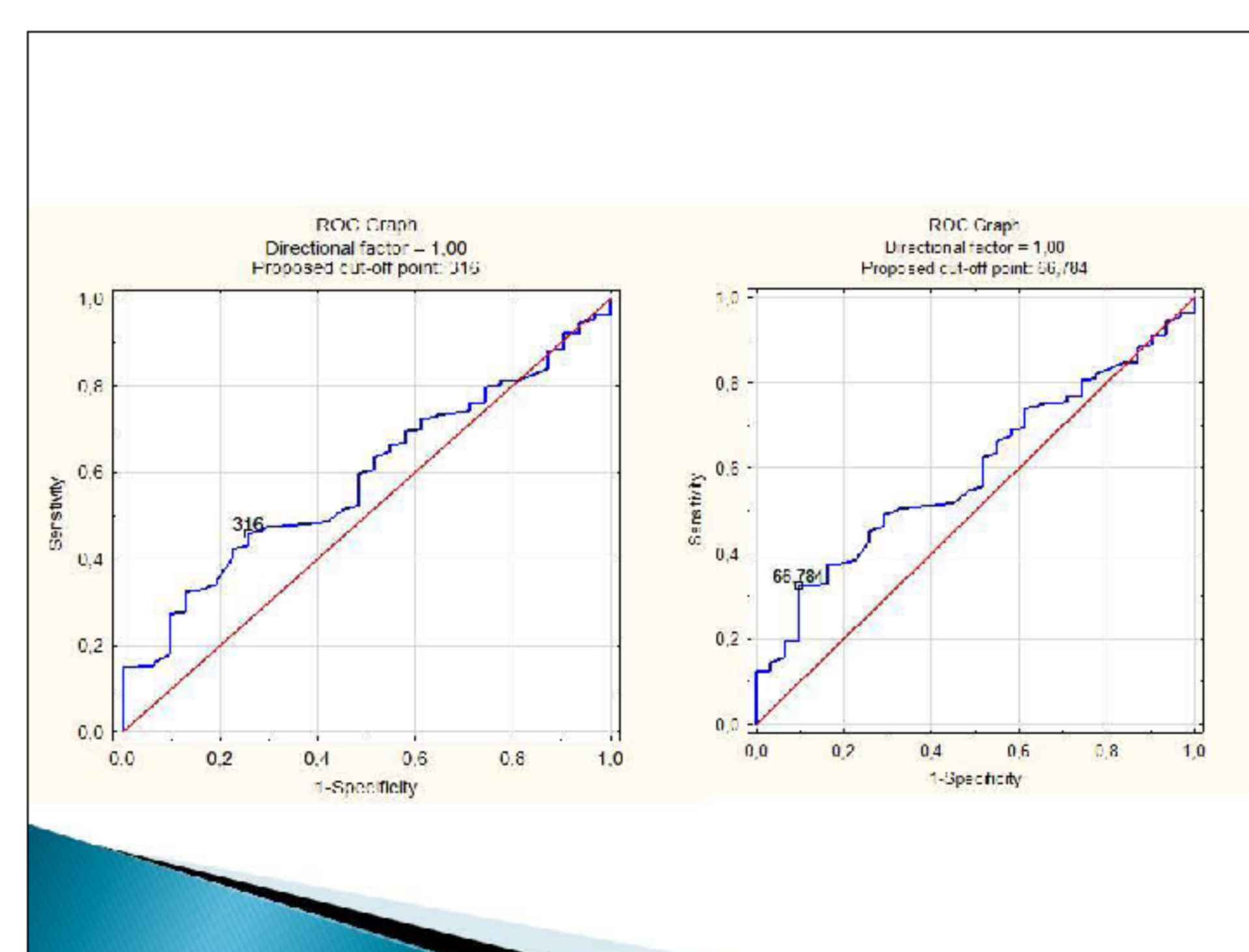
rQB of 316 mL/min and QB/QD of 66.8% were indicated by the ROC curve analysis as cut-off values differentiating patients in respect to cTnT levels. Subjects dialyzed with QB ≤316 mL/min had lower cTnT compared to patients dialyzed with QB >316 mL/min (28, 3–68 vs 41, 8–76 ng/L, p=0.002); cTnT was 31, 4-76 ng/L at QB/QD ≤66.8% and 41, 3-75 mg/L at QB/QD >66.8%, p=0.008. Patients of both prospective groups began the study with similar cTnT, but higher cTnT was shown at 36<sup>th</sup> and at 53<sup>rd</sup> weeks in HF-HD group (GLM P = 0.019). MARSplines model (GCV 0.0008, corr. R<sup>2</sup> = 0.87) indicated that an increase in cTnT in HF-HD group was associated with lower initial cTnT levels (15 references), rQB increase (7) and serum albumin decrease (5). During LF-HD, cTnT increase was shown between the start and the 15<sup>th</sup> study week (ΔcTnT 2, -48 - +508 ng/L) and, as shown by MARSplines model (GCV 0.00006, corr. R<sup>2</sup> = 0.99), was associated with serum phosphorus increase (21), older age (10), and diabetic nephropathy (9). cTnT decrease between 15<sup>th</sup> and 53<sup>rd</sup> week of the study (ΔcTnT -8, -408 - +110 ng/L) was associated with cTnT levels at 15<sup>th</sup> study week (13), RRT vintage (6) and decrease in serum phosphorus (5 references, MARSplines model, GCV 0.00002, corr. R<sup>2</sup> = 0.99).



Comparison of demographic, clinical and laboratory parameters of extracorporeal dialysis patients having serum cTnT concentration in the upper quartile with the respective data of remaining patients

Parameter	cTnT quartile 4 N 61	cTnT quartiles 1-3 N 186	P value
Age (years)	67.7 (26.3-86.3)	63.7 (23.1-91.8)	0.02MW
Diabetes mellitus (n, %)	28 (45.9)	44 (23.7)	0.0009C
Diabetic nephropathy (n, %)	25 (41.0)	36 (19.4)	0.0007C
Coronary artery disease (n, %)	28 (45.9)	57 (30.7)	0.03C
Cardiomyopathies (n, %)	26 (42.6)	45 (24.2)	0.006C
Mitral valvular disease (n, %)	15 (24.6)	17 (9.1)	0.004Y
Atrial fibrillation (n, %)	13 (21.3)	8 (4.3)	0.0001Y
NYHA class III-IV (n, %)	22 (36.1)	21 (11.3)	0.001C
COPD (n, %)	8 (13.1)	8 (4.3)	0.03Y
cTnT (ng/ml)	0.111 (0.07-0.595)	0.035 (0.003-0.076)	<0.0001MW
CRP (mg/L)	8.7 (0.8-241.2)	5.7 (0.4-113.8)	0.04MW
B <sub>2</sub> -microglobulin (mg/dL)	3.9 (0.085-7.72)	2.78 (0.085-13.9)	0.01MW

Statistical tests: C - Chi square, MW - Mann Whitney, Y - Chi square with Yates correction



## Conclusions:

- In stable RRT patients, silent myocardial injury indicated by increased serum cTnT levels is mainly associated with RRT vintage, age, serum phosphorus and CRP, however also higher rQB and/or QB/QD may contribute to myocardial damage during ED.
- Increases in serum cTnT occurring during ED may be reversible if an influence of responsible factors is eliminated or diminished.