

BACKGROUND

Evaluation of renal function is based on the measurement of serum creatinine concentration. However, creatinine (as marker of renal function) is not an early indicator of impairment of kidney function, because it rises significantly only in case of decrease of the renal function more than 50%. The reason is that the kidneys have a large functional reserve that can bind normal creatinine levels even with advanced kidney damage. Moreover it should be borne in mind that there is a wide variability of creatinine levels due to several factors (age, gender, muscle mass, physical activity, food protein intake, rate of tubular secretion) and a considerable individual variability.

Cystatin C basic protein of 13 KDa not glycosylated, produced and released into the blood at a constant speed by all nucleated cells. It's filtered to Glomerular layer, reabsorbed and completely catabolized by the renal tubules. Gender, age, race, muscle mass, steroidal therapies, inflammation, liver disease (that modify significantly creatinine serum concentrations) do not affect in contrast the concentrations of Cystatin C. We wanted to test the feasibility of using Cystatin C as a marker for early kidney damage more quickly and accurately in place of Creatinine.

METHODS

We considered a population sample of 180 patients (of various age including diabetes and hypertensive followed at the Day Hospital Units) compared with a sample of normal subjects going to our Laboratory Unit for a blood control. Over the blood samples we assayed Creatinine values (measured with standardized enzymatic method by Unicel DxC 600 Beckman Analyser) Cystatin C (measured with a FEIA-Fluorimetric Enzyme Immuno Assay on AIA-1800 by Tosoh Bioscience Tokyo, Japan) Albuminuria (IMMAGE with Nephelometric method by Beckman) (Fig. 1)

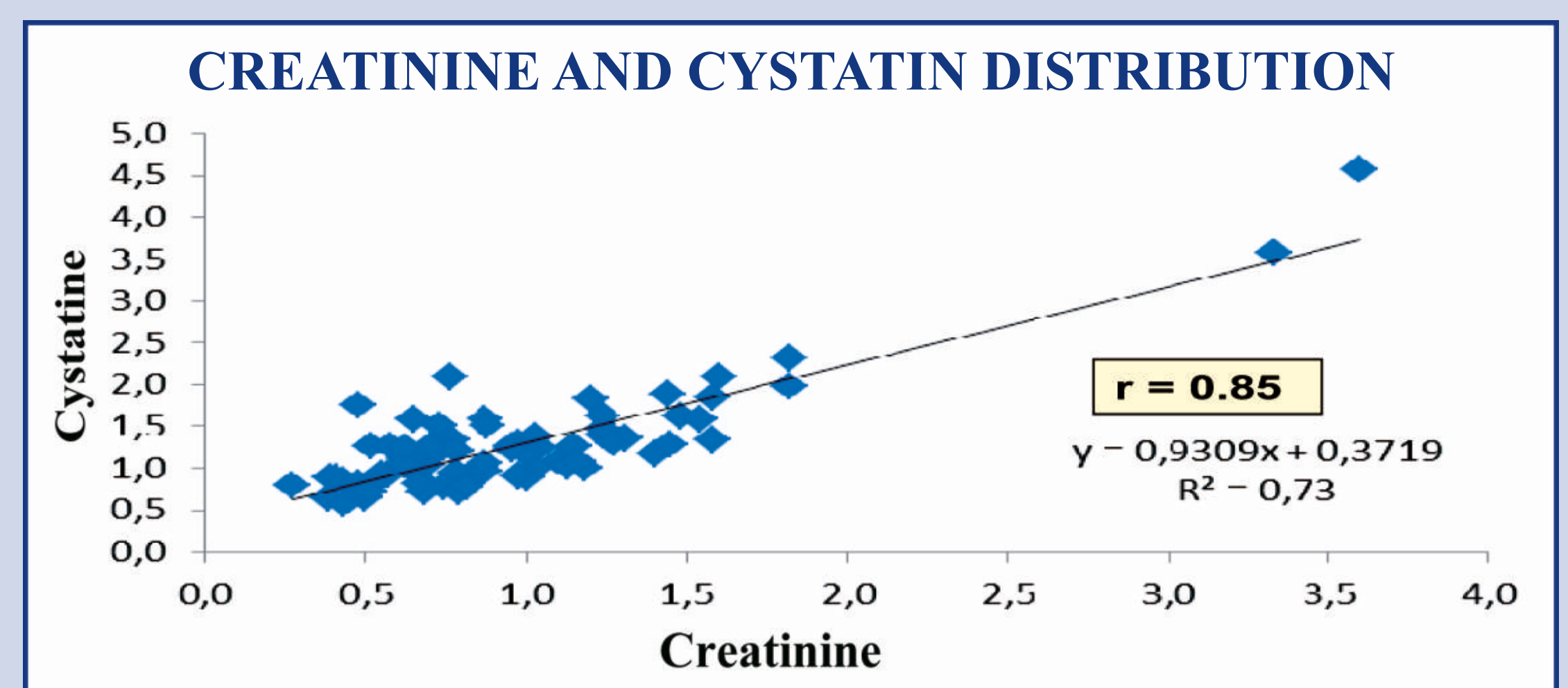


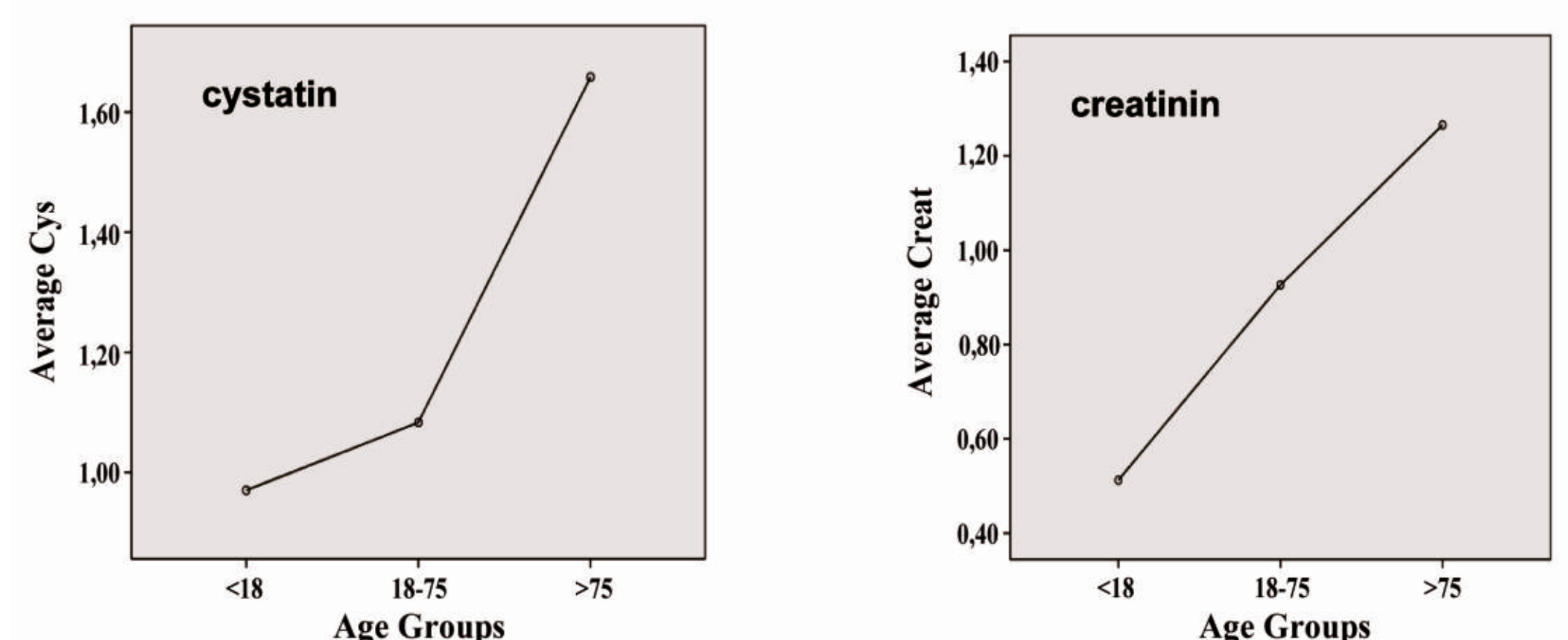
Fig. 1

RESULTS

The data obtained confirmed the correlation between Creatinine and Cystatin C with respect to the trend of renal function showing an increase of both markers with age. However there's a greater increase of Cystatin C from 65 upwards, as if the latter to reflect more precisely the progressive decline of the rate of glomerular filtration according to the age (Fig. 2-3).

In all groups there's no correlation between Creatinine values and Albuminuria, whereas Cystatin C and Albuminuria showed a more evident relation in the group of hypertensive patients (Fig. 4).

CREATININE AND CYSTATIN RELATED TO AGE GROUPS GROUPS COMPARISON



Cis Creat x age groups
 < 18 n.s. 18 - 75 p = **0,005** > 75 p = **0,0001**
NOT SIGNIFICANT DIFFERENCES BETWEEN DIABETICS AND NON DIABETICS

Fig. 2

CREATININE AND CYSTATIN RELATED TO AGE GROUPS

INTRA GROUPS COMPARISON

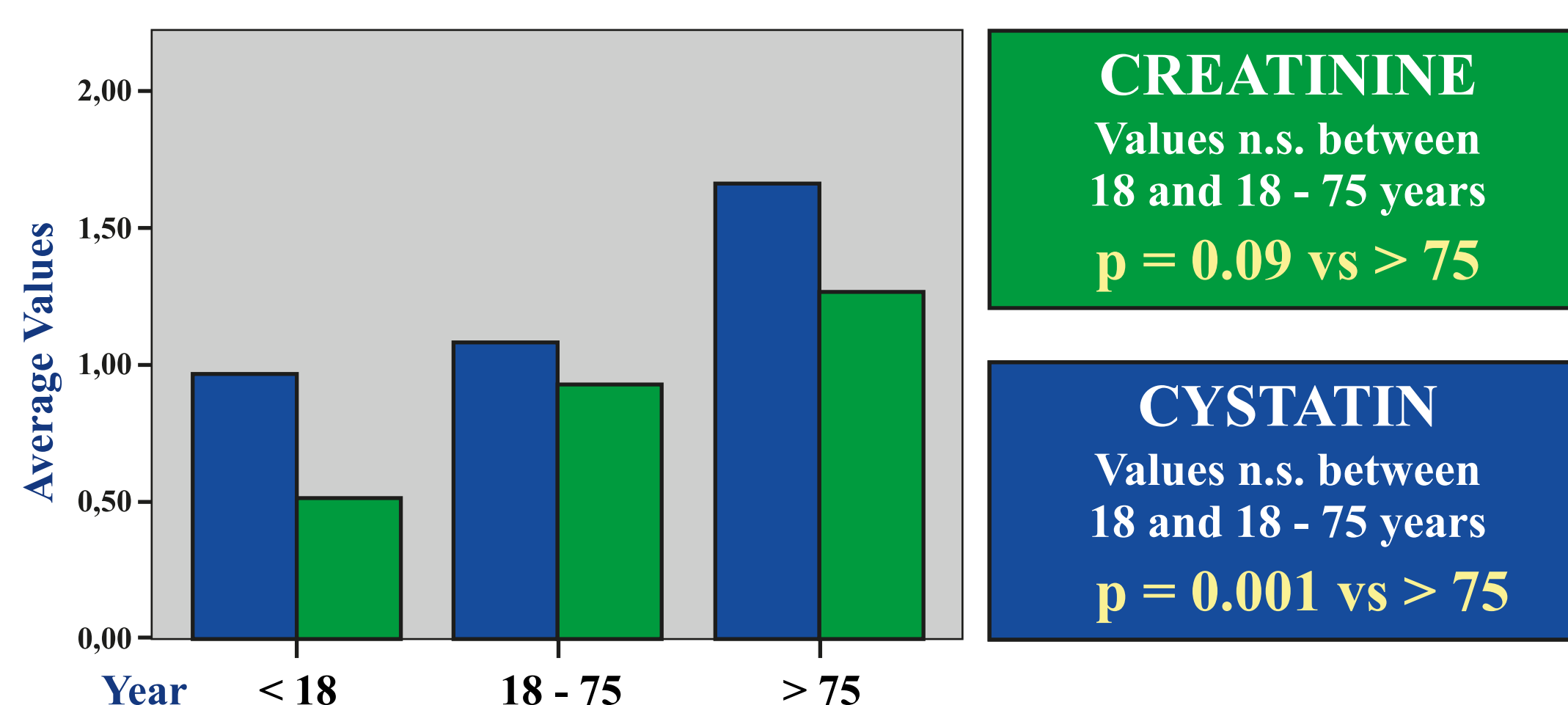


Fig. 3

CREATININE AND CYSTATIN CORRELATION vs ACR

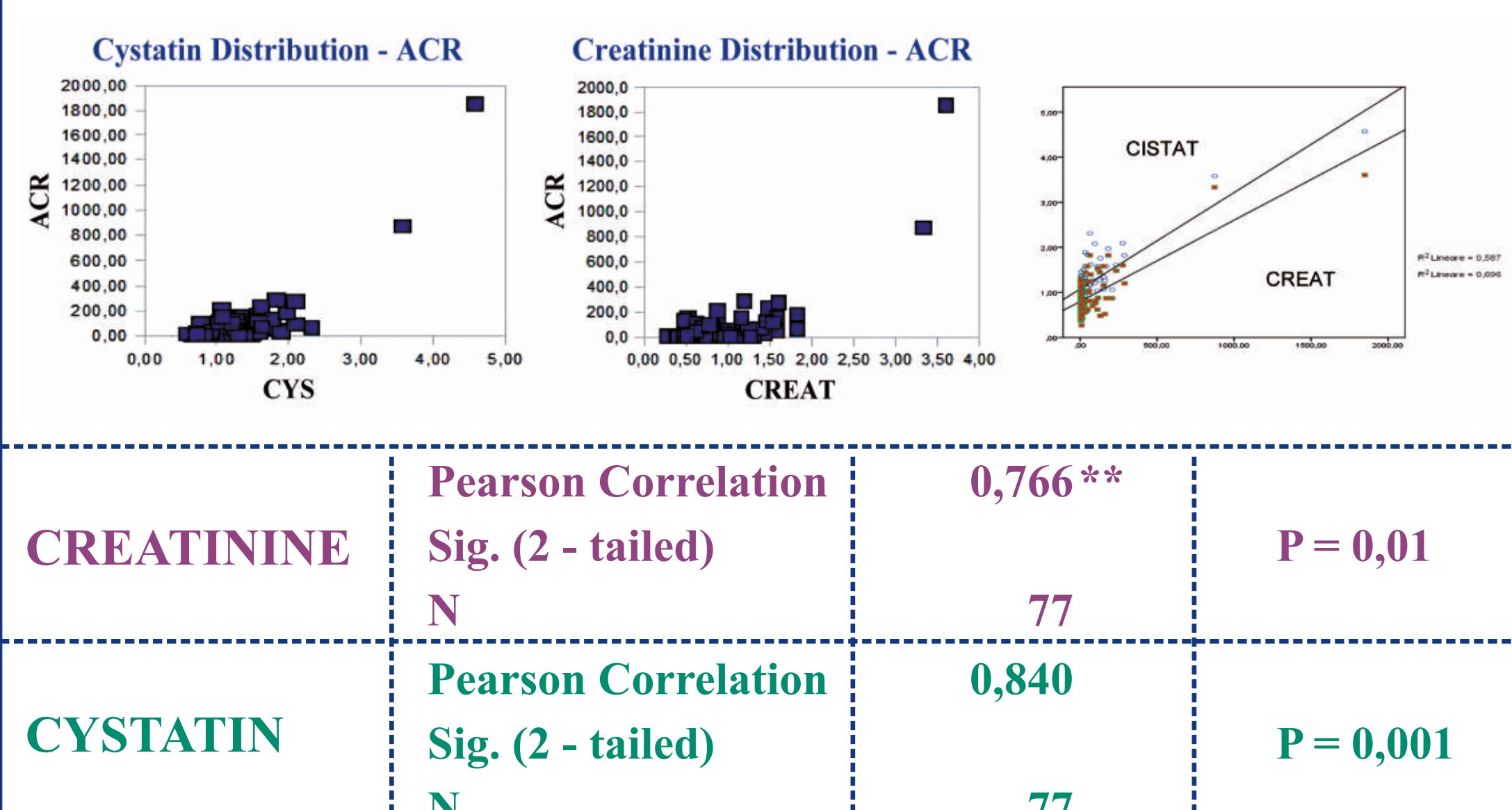


Fig. 4

CONCLUSIONS

Creatinine is the current gold standard Marker of Renal Function also for easy and cheap evaluation methods.

Our preliminary data suggests the usefulness of Cystatin C as a marker for early kidney damage (as mirror of endothelial lesion) with greater diagnostic accuracy especially in the elderly and in the atherosclerotic patients.

The wide availability of automated analytical methods will enable an effective use for the evaluation of early impairment of renal function.