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Biochemical Changes and Metabolic Dysfunctions in Renal Pathology - a New Review

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Abstract

The laboratory can be used as a screening, in the detection of healthy patient samples, in medico social investigations of diseases still unrecorded and not taken into account (e.g. diabetes, atherosclerosis, digestive parasitosis, etc.). The lab can be used by routine analysis or analysis sets in the ambulatory environment (dispensaries and polyclinics), for a quick clinical diagnosis, or for outpatient treatment in patients who do not need admission (ROSOIU N., 2002). The proposed assay sets for the urinary system are: blood count, urea, creatinine, uric acid, ionogram, alkaline phosphatase, alkaline reserve, inflammatory tests, urinalysis, STENFIELD-ADDIS test, dilution and concentration assay, quantitative uroculture, qualitative antibiogram, urinary clearance, creatinine clearance, urethral secretion, cytology and cultures (BADIU G., 1993). So, the data provided by the biochemistry laboratory, interpreted in the context of clinical data, is increasingly contributing to the formulation of diagnosis, prognosis and therapy control.

Keywords: creatinine, urea, pathologies, human health.

Introduction

The data provided by the biochemistry laboratory, interpreted in the context of clinical data, is increasingly contributing to the formulation of diagnosis, prognosis and therapy control. For a better understanding of pathological

processes, we have approached a comparative study on the variation of laboratory clinical parameters in renal pathology, trying to establish a correlation between clinical laboratory, diagnostic and applied therapy data (PAUN, 1987)

Material and Methods

This study focused on a statistical community consisting of a total of 78 patients (58 males representing 74.36% and 20 women representing 25.46%), ages between 60 and 90 years, with an average age of 76.65 years in men and 73.70 years in women. From the patients total, 16 cases of acute pyelonephritis, 11 cases of renal lithiasis, 3 cases of diabetic nephropathy, 4 cases of chronic glomerulonephritis, 7 cases of acute renal failure, 37 cases of chronic kidney failure, of different aetiologies. We chose blood urea and serum creatinine for this study, mainly for being the most important and critical indicator in acute kidney failure when the global depolarization capacity is severely degraded through impaired kidney capacity (nephrectomy), or fixed nitrogen retention state in chronic kidney failure. The experimental data was processed using the IBM SPSS Statistics 20 statistical processing program. The procedures used were: Descriptive statistics (for characterization of discrete and continuous variables defined at the database level), Charts, Parametric Statistical Tests (**Independent Samples t-Test, One-Sample Test).**

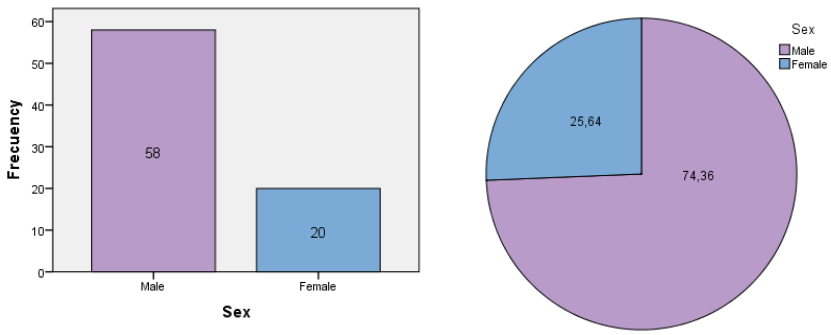

Figure 1. Column and pie representation for the age variable.

Results and Discussions

- Urea values determined for the Males group were between 50 mg / dL and 110 mg / dL with an average of 71.10 mg / dL, a median of 68.5 mg / dL and a standard deviation of 17.59 mg / dL.
- The urea values determined for the Female group were between 59 mg / dL and 150 mg / dL with an average of 91.80 mg / dL, a median of 87 mg / dL and a standard deviation of 21.50 mg / dL.
- Between the mean values of urea measured in the two groups of patients it is found that there are statistically significant differences: t = -4.28; df = 76; Mdiff = -20.69 mg / dL; p <0.001 <α = 0.05; The 95% confidence interval of the mean value difference = (-30.26, -11.06) mg / dL (Independent Samples t-Test).

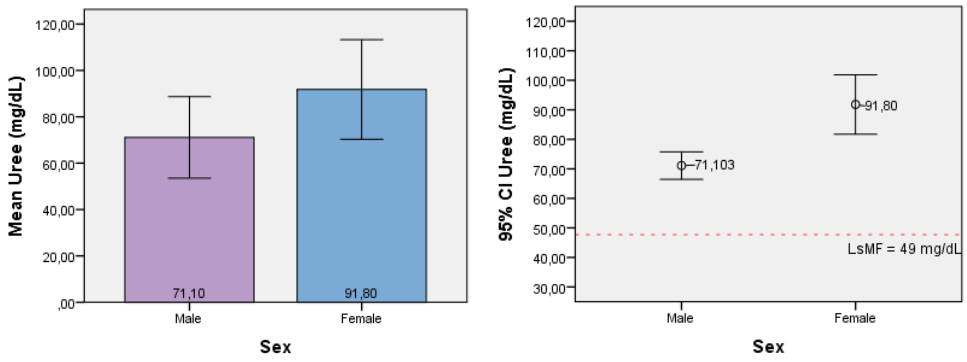

Figure 2. Diagram Bar + Error Bar (Left) and Error Bar Diagram (right) along with the lower and upper boundaries for the Male-Female Comparative Urea variable.

By comparing the mean urea values obtained in the two groups of patients (Male / Female) with the corresponding reference values, we found the following:

- For male patients, the average Urea value of 71.10 mg / dL differs statistically significantly from the 49 mg / dL top value: t = 9.56; df = 57; Mdiff = 22.10 mg / dL; p <0.001 <α = 0.05; the 95% confidence interval of the mean difference = (17.47, 26.72) mg / dL, the urea values being above this One-Sample Test.

- For female patients, the mean serum urea of 91.80 mg / dL differs statistically significantly from the 49 mg / dL upper tier value: t = 8.9; df = 19; Mdiff = 42.8 mg / dL; p <0.001 <α = 0.05; the 95% confidence interval of the mean difference = (32.73, 52.86) mg / dL, the Urea values being above this One-Sample Test.
- The serum creatinine levels determined for the Male group were between 1.1 mg / dL and 4.3 mg / dL, with an average of 2.25 mg / dL, a median of 2.1 mg / dL and a standard deviation of 0.77 mg / dL.
- The serum creatinine values determined for the female group were between 1.75 mg / dL and 3.40 mg / dL with an average of 2.19 mg / dL, a median of 1.93 mg / dL and a standard deviation of 0.48 mg / dL.
- Between the mean serum creatinine values measured in the two groups of patients it is found that there are NO statistically significant differences: t = 0.403; df = 53.29; Mdiff = 0.06 mg / dL; p = 0.688> α = 0.05; the 95% confidence interval of the mean value difference (= 0.238, 0.358) mg / dL (Independent Samples t-Test).

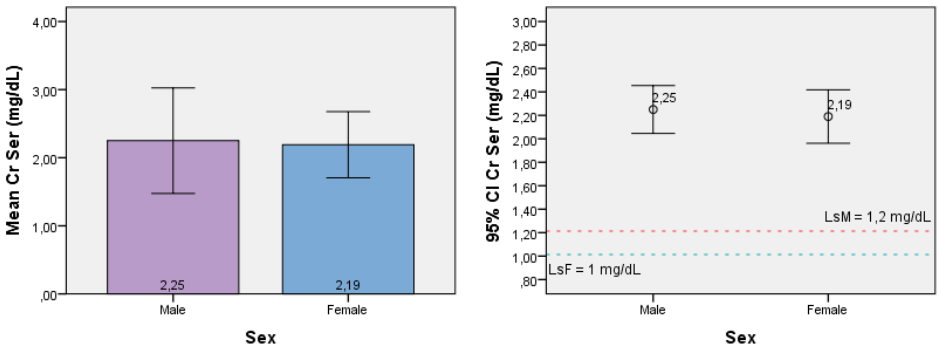

Figure 3. Diagram Bar + Error Bar (Left) and Error Bar Diagram (right) along with the lower and upper bounds for the creatinine Male-Female Comparative Serum variable.

Comparing the mean Creatinine Serum values obtained in the two groups of patients (Male / Female) with the corresponding reference values, we found the following:

- For male patients, the mean serum creatinine of 2.25 mg / dL differs statistically significantly from the upper reference value of 1.2 mg / dL: $t = 10.32$; $df = 57$; $Mdiff = 1.05$ mg / dL; $p < 0.001 < \alpha = 0.05$; the 95% confidence interval of the mean difference = (0.84, 1.25) mg / dL, the Serum Creatinine values being above this One-Sample Test.
- For female patients, the mean serum creatinine of 2.19 mg / dL differs statistically significantly from the upper reference value of 1 mg / dL: $t = 10.95$; $df = 19$; $Mdiff = 1.19$ mg / dL; $p < 0.001 < \alpha = 0.05$; the 95% confidence interval of the mean difference = (0.96, 1.41) mg / dL, the Serum Creatinine values being above this One-Sample Test.

Conclusions

- Blood urea and blood creatinine increases suddenly, when the global depolarization capacity is severely degraded producing acute renal failure
- Blood concentrations of nitrate products in chronic kidney failure moderately increase when the glomerular filtration is below 50% of normal. Any further decrease results in a rapid increase in blood.
- Very high values of BUN are found only in renal failure, and in other cases (which are aetiological factors of renal failure), normal values are met, which means a good kidney function or slightly elevated values that show us a low degree of impairment of renal function. If not treated correctly, these cases may evolve to kidney failure.
- Our data is a modest contribution to further studies of current knowledge in renal pathology by interpreting clinical laboratory values in conjunction with diagnosis, prognosis and applied therapy.

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