Biochemical Features in Hepato-renal Dysfunctions

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Sepsis, one of the leading causes of morbidity and mortality in critically ill subjects has many biochemical disorders, and when hepato-renal dysfunction is associated, it is accompanied most frequently by hypokalaemia, hyponatraemia, increasing values of serum creatinine and urea, various types of serum proteins, metabolic acidosis. The aim of the study is to find correlations and arguments for biochemical disorders in hepato-renal dysfunction in sepsis patients. Our retrospective study included 247 subjects diagnosed with sepsis between November 2012 and April 2014, analysing laboratory data on clinical aspects. Data were processed using SPSS version 16.0. Different plasmatic levels of biochemical parameters were related to organ dysfunctions in sepsis subjects. Even though plasma creatinine levels were higher in hepato-renal dysfunction in sepsis, there were no significant differences between creatinine clearance levels comparing by old renal dysfunction in these subjects, also no significant differences for dyselectrolytemia in hepato-renal dysfunction comparing by other organ dysfunctions in sepsis subjects. Metabolic acidosis and plasma total bilirubin level were found as negative prognostic factors.

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Biological samples were processed according to the standards for biochemistry, haematology, bacteriology laboratories, and the database in Excel was processed by using SPSS 16.0 version, \( p < 0.05 \) being considered statistically significant. When quantitative parameters did not present a normal Gauss Laplace distribution and \( t \)-test could not be applied, non-parametric tests were used (Mann Whitney Test). Creatinine clearance was calculated by using Cockcroft-Gault formula.

**Results and discussions**

The 247 subjects were aged between 3 and 85 years, the median age being 56.3 years, and the predominant profile was that of the urban male patient, without any statistical significant differences between the ages of subjects included in the three lots (calculated \( p: 0.23 > 0.05 \)).

The median value of serum creatinine clearance in the lot with hepato-renal dysfunction was 39 mL/min, while in those with multiple organ dysfunction this value was 67.2 mL/min and 38.9 mL/min in subjects which evolved towards death. Taking into account the fact that some subjects presented renal dysfunction before sepsis, we have tried to establish whether there are statistically significant differences between creatinine clearance values related to previous renal affection and those related to modifications due to sepsis (fig. 1).

According to Mann Whitney Test for data processing, there were no statistical significant differences (calculated \( p: 0.143 > 0.05 \)) between creatinine clearance values in or outside sepsis.

Glutamic pyruvic transaminase (GPT) and Glutamic oxaloacetic transaminase (GOT) values in all three lots analysed by the Mann Whitney Test pointed out statistical significant differences in the two biochemical markers between subjects which had associated a hepato-renal dysfunction in sepsis, as compared to those with multiple organ dysfunctions with favourable evolution and those with unfavourable evolution (calculated \( p: 0.02 < 0.05 \)), (fig. 2 and 3).

The median value of alkaline reserve in the three lots pointed out as the smallest, 21.9 mEq/L, in patients which evolved towards death, as compared to 28.6 mEq/L in patients with hepato-renal dysfunction and 25 mEq/L in those with multiple organ dysfunctions, while comparing two sets of data by Mann Whitney Test underlined a statistically significant difference between alkaline reserve values in deceased patients and the other two lots (calculated \( p: 0.03 < 0.05 \)).

Even if median values of plasmatic Na and K (132.5 mEq/L and 3.1 mEq/L, respectively) were the smallest in the lot of patients with hepato-renal dysfunction, there have not been found statistically significant differences as compared to values in the other subjects with sepsis (calculated \( p: 0.13 > 0.05 \)).

Statistical correlations were found between increased values of plasma total bilirubin (more than 100 mg%) and severe evolution in our sepsis patients, with APACHE II prognostic score calculated more than 25.

Statistical analysis of systemic inflammatory syndrome variables showed no correlation between high blood sugar level and fibrinogen, erythrocyte sedimentation rate levels in sepsis subjects with or without associated hepato-renal dysfunction.

The highest levels of plasma total bilirubin were observed in subjects who associated encephalopathy, cholestase syndrome being found in sepsis liver dysfunction but also in subjects with an old hepatic dysfunction accentuated in sepsis.

The systemic nature of sepsis, the large number of cell types, tissues and organs involved expand the number of
potential biomarker candidates, biochemical disorders, with varied response in time, and it is very difficult to assess the “gold standard” for the diagnosis and establishing status evolution in sepsis [16].

Our analyses have shown that each of these parameters was an independent variable in sepsis subjects, being limiting for understanding them as prognostic factors, even by reducing the results to a categorical group of subjects.

Conclusions
We have identified there are not statistically significant differences in serum creatinine clearance in sepsis renal dysfunction patients comparing by subjects with old renal dysfunction accentuated in sepsis, also no statistical differences for dyselectrolytemia in hepato-renal dysfunction sepsis patients comparing by sepsis subjects with other organ failures.

Hepatic cytolysis enzyme were statistically significant higher in hepato-renal dysfunction than in other organ dysfunction sepsis subjects.

Metabolic acidosis and plasma total bilirubin were unfavourable prognosis factors in our patients, related with neurological altered status and APACHE II score.

References

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