NEUTROPHIL TO LYMPHOCYTE RATIO AND THROMBOCYTE TO LYMPHOCYTE RATIO, NEW BIOCHEMICAL PARAMETERS IN ACUTE PANCREATITIS

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Abstract

Background. Acute pancreatitis represents an inflammatory disease with different grades of severity, ranging from mild to severe presentation. In current practice there are a lot of biomarkers used in diagnosis and prognosis of pancreatitis.

The aim of this study was to evaluate the differences between a group with acute pancreatitis and a group of healthy people regarding the neutrophil to lymphocyte ratio (NLR), thrombocyte to lymphocyte ratio (TLR), as these two could help in the evaluation of prognosis and severity of acute pancreatitis.

Method. The study had two groups: group A, included 100 patients with acute pancreatitis and group B - 30 healthy people.

Results. In the group A there were 65% male and 35 % female with a mean age of 58.07 ± 15.10 years, in the group B there were 50% male and 50% female with a mean age of 48.06 ± 15.47 years. The majority of the people included in both groups were from the urban provenience. We obtained an important difference between group A and group B regarding the neutrophil to lymphocyte ratio and thrombocyte to lymphocyte ratio with an important statistical significance ($p < 0.001$).

Conclusion. Neutrophil to lymphocyte ratio and thrombocyte to lymphocyte ratio could be promising biochemical parameters in diagnosis and prognosis of acute pancreatitis.

Keywords: acute pancreatitis, neutrophil to lymphocyte ratio, thrombocyte to lymphocyte ratio.

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Rezumat

Introducere. Pancreatita acută reprezintă o condiție inflamatorie, având diferite grade de severitate, variind de la ușoară la severă. În practica curentă există o gamă variată de biomarkeri folosiți în diagnosticul și prognosticul pancreatitei acute.

Scopul studiului nostru este evaluarea importanței raporturilor neutrofile /limfocite, trombocite/limfocite la pacienții cu pancreatită acută versus subiecții sănătoși.

Materiale și metodă. Pacienții incluși în studiu au fost împărțiți în 2 loturi: lotul A ce a inclus 100 de pacienți cu pancreatită acută și lotul B ce a inclus 30 de subiecți sănătoși.

Rezultate. În lotul A au predominat pacienții de sex masculin - 65%, iar vârsta medie a fost de $58,07 \pm 15,10$ ani, în schimb în lotul B distribuția pe sexe a fost similară, cu o vârstă medie de $48,06 \pm 15,47$ ani. Atât subiecții din lotul A, cât și subiecții din lotul B au provenit în marea majoritate din mediul urban. Am obținut o diferență semnificativă statistic privind raporturile NLR și TLR pentru lotul cu pacienți cu pancreatită acută față de subiecții sănătoși ($p < 0,001$).

Concluzii. Raporturile neutrofile/limfocite, precum și trombocite/limfocite pot fi considerate parametri biochimici promițători în diagnosticul și prognosticul pancreatitei acute.

Cuvinte cheie: pancreatita acută, raport neutrofile/limfocite, raport trombocite/limfocite.

Background

Acute pancreatitis represents an inflammatory disease with different grades of severity, ranging from mild to severe presentation. For a good outcome it is necessary to early identify the severity of the disease and to apply a correct management for the high risk patients⁽¹⁾.

Acute pancreatitis represents one of the most common reasons for gastroenterological hospitalization and it is associated

with abdominal pain and high level of pancreatic enzymes⁽²⁾. The most common causes are gallstones and alcohol consumption.

The classification of severity of acute pancreatitis can be defined by the presence of complications that are systemic, local or both. Systemic complications include any failure of an organ (respiratory, cardiovascular or renal) or exacerbation of any preexisting condition. Local complications include peripancreatic fluid

collection, pseudocysts, pancreatic or peripancreatic necrosis (sterile or infected)⁽³⁾.

To establish the severity of acute pancreatitis it is necessary to take into account clinical symptoms and signs, biochemical parameters and imagistic signs. Several scoring systems have been developed, including clinic, laboratory and radiographic findings in different combinations: APACHE, Balthazar score, BISAP score. There isn't any earlier score system for predicting the severity of the disease^(4,5,6). That's why in the recent years many clinicians have been tried to develop new scoring system using daily biochemical parameters, such as neutrophil to lymphocyte ratio, thrombocyte to lymphocyte ratio, red cell distribution width (RDW)^(7,8,9,10).

The aim of the study was to evaluate the difference between a group with acute pancreatitis and a group of healthy people regarding the neutrophil to lymphocyte ratio, thrombocyte to lymphocyte ratio, as these two could help in prognosis of severity of the acute pancreatitis.

Method

Our study included patients divided into two groups: group A - 100 patients admitted in the department of gastroenterology with acute pancreatitis and group B - 30 healthy people who came to hospital for routine evaluation.

Laboratory tests (including the complete blood count, total cholesterol, transaminases, bilirubin, alkaline phosphatase levels) were performed to all the patients after a clinical examination.

The results were presented as mean $\pm$ standard deviation for numeric variables and as absolute numbers and percentage for

categorical variables, using Shapiro Wilk test. Statistical analysis was performed by using R programming soft, version 3.5.3. (2019-03-11) Copyright (C) 2019. The statistical significance was considered for a p value <0.05 .

Results

The baseline characteristics of the study patients are presented in Table 1. The mean age for the group A was 58.07 ± 15.10 years with male predominance (65% of the patients); for group B the mean age was 48.06 ± 15.47 years with an equal sex predominance.

The majority patients from the both group were from the urban environment.

We represent a difference between these two groups regarding the values of number of leukocytes, thrombocytes, haemoglobin, cholesterol, triglycerides, transaminases, bilirubin, alkaline phosphatase (see Table 2). There was a significant difference between group A and group B regarding the granulocytes to lymphocytes ratio, 9.78 ± 11.58 in group A versus 2.34 ± 1.10 in group B ($p < 0.0001$) (see Figure 1).

We also have compared the group with patients diagnosed with acute pancreatic versus the healthy group regarding the thrombocytes to lymphocytes ratio and we have got a significance difference of 243.09 ± 230.60 in group A versus 138.78 ± 51.94 in group B (with a $p < 0.0001$) (Table 3).

Discussions

It is very difficult to obtain a simple, inexpensive, widely applicable in daily clinical practice prognostic score for acute pancreatitis. The current guidelines don't

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Figure 1. Granulocytes to lymphocytes ratio in group A and B

Patient characteristics	group A (No = 100)	group B (No = 30)
Age - Mean $\pm$ S.D	58.07 $\pm$ 15.10	48.06 $\pm$ 15.47
Sex M - No. (%)	65 (65.00)	15 (50.00)
F - No. (%)	35 (35.00)	15 (50.00)
Residency City - No. (%)	75 (75.00)	23 (76.67)
Rural - No. (%)	25 (25.00)	7 (33.33)

Table 1. Baseline characteristics of the study groups

Leukocytes - Mean (IQR)	10855.00 (7600.00)	6720.00 (2450.00)
Trombocytes - Mean $\pm$ S.D	268450 $\pm$ 114454	257366 $\pm$ 51717
Lymphocytes - Mean $\pm$ S.D	1355.00 $\pm$ 581.33	2066.56 $\pm$ 724.38
Granulocytes - Mean $\pm$ S.D	9481.70 $\pm$ 4995.70	4473.00 $\pm$ 1690.53
Basophil - Mean (IQR)	65.00 (205.00)	20.00 (40.00)
Monocytes - Mean (IQR)	800.00 (580.00)	500.00 (240.00)
RDW - Mean $\pm$ S.D	34.92 $\pm$ 15.36	32.87 $\pm$ 13.27
Hb - Mean $\pm$ S.D	13.83 $\pm$ 2.18	14.21 $\pm$ 1.60
Cholesterol - Mean $\pm$ S.D	181.44 $\pm$ 73.38	201.82 $\pm$ 61.53
TGL - Mean (IQR)	100.50 (51.00)	114.00 (76.00)
AST - Mean (IQR)	40.50 (85.00)	21.50 (7.50)
ALT - Mean (IQR)	34.00 (112.00)	20.00 (18.00)
TB - Mean $\pm$ S.D	1.51 $\pm$ 1.49	0.64 $\pm$ 0.27
DB - Mean $\pm$ S.D	0.62 $\pm$ 0.94	0.13 $\pm$ 0.12
AF - Mean (IQR)	92.00 (97.00)	73.00 (32.00)
GGT - Mean (IQR)	148.50 (395.00)	20.00 (9.00)

Table 2. Laboratory parameters in the group A and B

Raport T/L	Lot A	Lot B
Medie $\pm$ D.S	243.09 $\pm$ 230.60	138.78 $\pm$ 51.94*
Median (IQR)	197.10 (131.00)	121.40 (78.30)
Min - Max	53.10 - 2194.00	65.60 - 254.00

Table 3. Thrombocytes to lymphocytes ratio in the study groups (*p<0.0001)

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mention which is the best prognostic score for the assessment of the severity of acute pancreatitis.

Neutrophil to lymphocyte ratio was first reported as parameter in systemic inflammation by Zahorec et al in critically ill patients and after that has been studied in malignant and nonmalignant pathologies^(11,12,13,14).

Yuchen Wang et al showed in a study that neutrophil to lymphocyte ratio can be used as a prognostic value in patients with hypertriglyceridemia induced acute pancreatitis⁽¹⁵⁾.

Robert M. O'Connell et al evidenced in a retrospective study that neutrophil to lymphocyte ratio could have a potential predictive value on admission in patients with acute pancreatitis⁽¹⁶⁾. In our study, patients with acute pancreatitis were found to have higher values not only for neutrophil to lymphocyte ratio but also for thrombocyte to lymphocyte ratio comparing to control.

Conclusions

The new biochemical markers such as neutrophil to lymphocyte ratio and thrombocyte to lymphocyte ratio might represent better tools in stratification of patients with acute pancreatitis. Our study has noticed the importance of these two biochemical parameters in patients with acute pancreatitis compared to healthy people.

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