D-DIMERS, POTENTIAL PREDICTIVE FACTOR OF SURVIVAL IN ACUTE ISCHEMIC STROKE IN PATIENT WITH DIABETES

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Abstract

Determination of plasma level of D-dimers in patient with acute ischemic stroke can be used as a potential predictor of survival and correlated with the degree of disability of the patient.

This study shows a correlation between the serum level of D-dimers in the diabetic patients with acute ischemic stroke, which may result that the level of D-dimers could be a good predictor of survival in acute ischemic stroke but not a predictor of disability and prognosis.

Keywords: D-dimers, acute ischemic stroke, diabetes, survival.

Abstract

Determinarea nivelului plasmatic al D-dimerilor la pacientul cu accident vascular cerebral ischemic acut poate fi utilizat ca potențial factor predictor al supraviețuirii și corelat cu gradul de dizabilitate a pacientului.

Acest studiu prezintă o corelație între nivelul seric al D-dimerilor la pacientul diabetic cu accident vascular cerebral ischemic acut, de unde ar putea rezulta faptul că nivelul D-dimerilor ar putea fi un bun predictor de supraviețuire în accidentul vascular cerebral ischemic acut, dar nu și un predictor de dizabilitate și prognostic.

Cuvinte cheie: D-dimeri, accident vascular cerebral ischemic acut, diabet zaharat, supraviețuire.

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Introduction

Stroke is one of the leading causes of mortality and disability worldwide⁽¹⁾. Acute ischemic stroke is characterized by disturbance of cerebral blood flow and accounts for approximately 80-85% of strokes⁽²⁾.

Diabetes is a clear risk factor for stroke, especially for ischemic stroke. Carbohydrate metabolism disorders have a high prevalence in patients with cerebrovascular disease. People with diabetes are at double risk of developing ischemic stroke compared to non-diabetic patients⁽³⁾. Low LDL is likely associated with risk of hemorrhagic transformation after acute ischemic stroke⁽⁴⁾.

D-dimers represent fibrin degradation products, circulating peptides, formed during the activation of the coagulation process⁽⁵⁾. The increased level of D-dimeri signifies an increased tendency for fibrin formation and thrombosis⁽⁶⁾. Increased plasma concentration of D-dimers has been associated with cerebral venous sinus thrombosis⁽⁷⁾, spontaneous cerebral hemorrhage⁽⁸⁾.

Objectives

The aim of our study is to present the importance of the serum level of D-dimers in acute ischemic stroke in the diabetic patient versus the non-diabetic patient, where the hypothesis is whether the level of D-dimers

can be considered a survival factor in acute ischemic stroke in the diabetic patient.

Material and method

This study is of a prospective, observational, longitudinal type conducted within the Oradea County's Emergency Clinical Hospital between 2016-2019. In the study, 340 female and male patients aged 40-90 years were enrolled.

Patients were divided into 2 diabetic and non-diabetic groups, where we analyzed as the main criterion the serum level of D-dimers as a survival factor in acute ischemic stroke. The serum level of D-dimers was evaluated in the first 24 hours upon admission to our center, and the examination was performed from plasma, the working method of spectrophotometry, these being analyzed on the Architect 4000 analyzer.

Results

The serum level of D-dimers in the study group is generally between 100ng / ml and 1500 ng / ml, with an average of 313.5, (95% CI for the median 273.4426 to 372.4591). The highest value of the level of D-dimers is 5693 ng / ml, and the smallest is only 120 ng / ml with an arithmetic mean of 620.3 (95% CI for the mean 538.3055 to 702.3298). highly statistically significant ($p < 0.0001$) (Figure 1). Diabetics have significantly higher levels of d-

Figure 1. Serum level of D-dimers in the patient with acute ischemic stroke

Figure 2. Serum level of D-dimers in diabetic versus non-diabetic patient in acute ischemic stroke

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dimers compared to non-diabetic patients (1241 vs 357), (95% CI for the mean 1028.3 to 1454) for diabetic patients and (95% CI for the mean 313.6 to 402.1) Non-diabetics, this difference is highly statistically significant. $P < 0.0001$ Also the standard deviation of the mean of diabetic patients is much higher than of non-diabetic patients (1078 vs 347), from which we can deduce that the level of d-dimers is very variable and generally increased in diabetics who have suffered an acute ischemic stroke (Figure 2).

There is a significant statistical and directly proportional correlation between the level of the D-dimers and the status from the discharge (RANKIN score). Basically, the higher the level of the D-dimers from the diagnosis, the higher the degree of disability (95% Confidence interval for r 0.02468 to 0.2338) $P = 0.01$ (Figure 3). The ROC analysis of the D-dimer level reveals a cut-off point of 674 ng / ml, with a sensitivity of 46.43% and a specificity of 74% (95% CI 0.471 to 0.580). If this level is not reached, we can say that 74% of patients will not die, thus D-dimers become a predictor of survival and not death and must be taken into account (Figure 4).

Discussions

In our study there were significantly higher serum levels of D-dimers in the group of diabetic patients compared to the group of

non-diabetic patients. Some previous prospective epidemiological studies reveal an association between serum D-dimer levels and stroke^(9,10,11).

In some studies the results show that serum D-dimers were associated with stroke severity⁽¹²⁾, infarct volume^(13,14) and stroke progression⁽¹⁵⁾.

The positive serum value of D-dimers in patients with acute ischemic stroke has been indicated by several previous studies confirming this study as well^(16,17).

This study presents a correlation between the serum D-dimer level in the diabetic patients with acute ischemic stroke, which may result in the fact that the D-dimer level could be a good predictor of survival in acute ischemic stroke but not a predictor of disability and prognosis. Increased plasma levels of D-dimers upon admission are significantly associated with a poor prognosis of acute ischemic stroke, suggesting that increased plasma levels of D-dimers within the first 72 hours after onset of ischemic stroke are a predictive marker of bad prognosis at 90 days⁽¹⁸⁾.

Conclusions

The increased plasma level of D-dimers is directly proportional with the degree of disability of the patient with acute ischemic stroke and can be used as a potential predictor of survival in the management of acute ischemic stroke.

Figure 3. Correlation between the degree of disability objectified by the RANKIN scale from the discharge and the level of d-dimers

Figure 4. ROC curve of the level of D-dimers

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