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ASPECTS REGARDING THE FLUID-COAGULATING BALANCE IN SOME BLEEDING SYNDROMES

Ionuț Stoica, Cocuța Barabaş, Maria Prisecaru

Key words: *coagulation disorders, determination of D-dimers, disseminated intravascular coagulation (DIC)*

INTRODUCTION

Hemostasis is a complex process involving vascular, platelet, and plasma clotting factors.

Disorders of hemostasis are the result of an imbalance of the normal ratio between the two mechanisms: hemostasis and fibrinolysis. They will cause a change in the blood vessels of large, medium or small caliber, which is expressed clinically by bleeding or thromboembolism.

Breaking the hemostatic balance may be due to a quantitative or qualitative abnormality of one of the participating factors, so the imbalance is isolated and simple; more rarely, it is associated with one or other parameters, such as: vascular wall, platelets, coagulation or fibrinolysis plasma proteins.

There are also situations in which these disorders do not have clinical manifestations and are revealed only by laboratory examinations, in case the patient is subjected to a surgical emergency that also requires paraclinical investigations.

Disseminated intravascular coagulation leads to both bleeding and thrombosis. Bleeding is much more common than thrombosis, but the latter may predominate if coagulation is activated to a much greater extent than fibrinolysis.

Thrombosis is most commonly manifested by ischemia and gangrene with digital localization, but catastrophic events can also occur, such as renal cortical necrosis and adrenal hemorrhagic infarction. Disseminated intravascular coagulation may also produce secondary microangiopathic hemolytic anemia.

Disseminated intravascular coagulation has a difficult paraclinical picture. Thrombocytopenia and increased D-dimers are usually the only abnormalities. Fibrinogen levels are normal and thromboplastin time (TPT) may be normal. Therefore, this paper aims to analyze the changes in D-dimer values in patients presented at the Bacău County Emergency Hospital, in the Emergency Department or hospitalized in different sections of the hospital, for a certain period of time. D-dimers are considered a marker of hypercoagulability and endogenous fibrinolysis, with elevated levels in thrombosis patients.

MATERIALS AND METHODS

126 patients were evaluated in the wards of the Bacău County Emergency Hospital, between January and March 2021, aged between 18 and 96 years, who presented to the Emergency Reception Unit. These have been investigated for the diagnosis of coagulation disorders or disseminated intravascular coagulation (CID), initiation or continuation of therapy in patients already diagnosed.

The analyzes were performed in the Medical Analysis Laboratory of the Bacău County Emergency Hospital.

The PATHFAST analyzer, produced by Mitsubishi Chemical Europe GmbH, Germany, was used to determine the D-Dimers.

The determinations are made on the patient's plasma, obtained by centrifuging the blood collected in test tubes with 0.105 M (1/9) sodium citrate anticoagulant. Centrifugation is performed for 5 minutes at 3000 rpm, using the ROTOFIX 32 A centrifuge, produced by Hettich Zentrifugen, Germany.

RESULTS ADN DISCUSSIONS

From the analysis of the data in the table, a distribution by age groups of the investigated patients was made, which is shown in figure 1.

It was observed that:

- the highest share is held by patients aged between 61-70 years, respectively 37 patients, which represents 29.37% of the total number of patients investigated;
- followed in approximately equal proportions by patients aged 71-80 years, respectively 23 patients, which represents 18.25% of the total number of patients investigated and patients aged 51-60 years, respectively 20 patients, which represents 15.87% of all patients investigated;
- they are closely followed by patients aged 41-50 years who are 14 in number, ie 11.11% of the total number of patients investigated and patients aged 81-90 years, respectively 13 patients, which represents 10 , 32% of all patients investigated;
- in the age group 31-40 years, 11 patients were investigated, ie 8.73%, and in the age group of

21-30 years, 5 patients were investigated, ie 3.97% of the total;

- patients aged between 91-100 years have a lower share, being 2 in number (1.59% of the total number of patients investigated), while in the age group 11-20 years only one patient was investigated (0.79%).

Figure 2 shows that out of the 126 patients investigated for the selected period, 70 patients (55.56%) were women and 56 patients (44.44%) were men, ie we can say that the incidence of the disease is higher. among female patients, rather than male patients.

It was found that out of the total of 70 women investigated, 45 come from urban areas, ie 64.29%, while from rural areas come 25 people, ie 35.21%, which is highlighted in the figure 3.

It was also found that out of the total of 56 males investigated, 35 come from urban areas, ie 62.5%, while from rural areas come 21 people, ie 37.5%, which is highlighted in figure 4.

There was also a total distribution of subjects according to the environment of origin and it was observed that the share of the disease in urban areas is significantly higher than in rural areas, as shown in Figure 5. If out of the total number of patients investigated, 80 that is, 63.49%, only 46 patients come from rural areas, ie 36.51%.

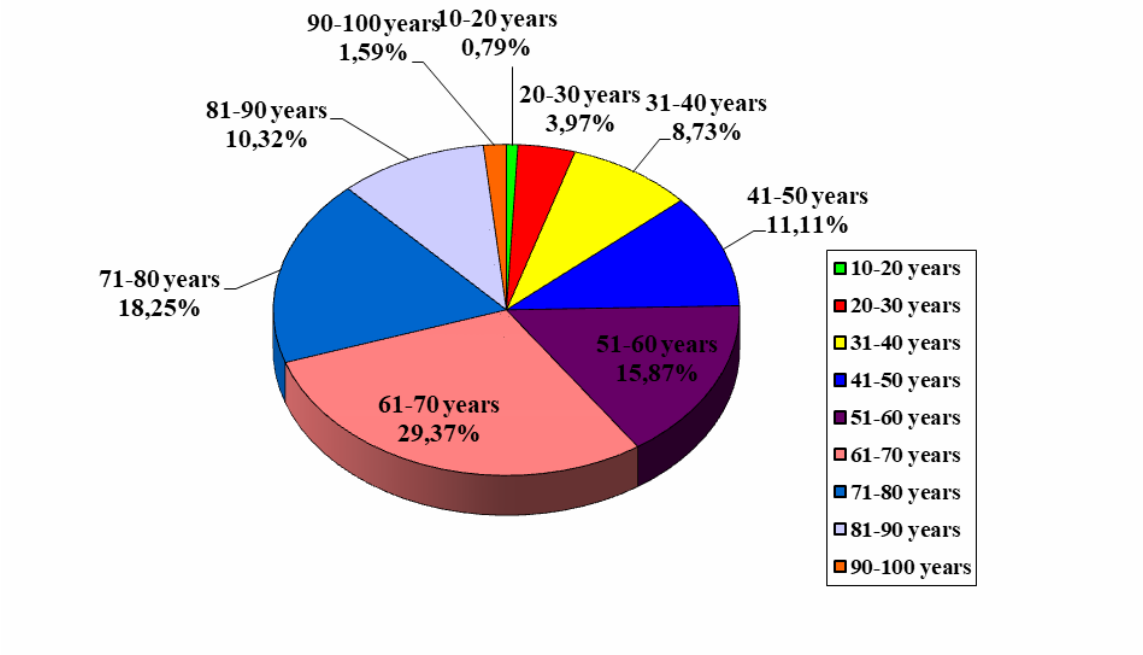

Fig. 1. Percentage distribution of subjects investigated by age groups

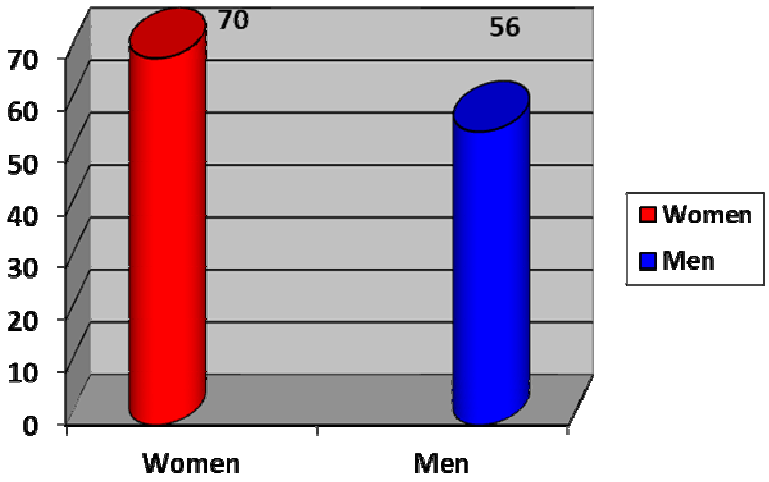

Fig. 2. Distribution of subjects according to sex

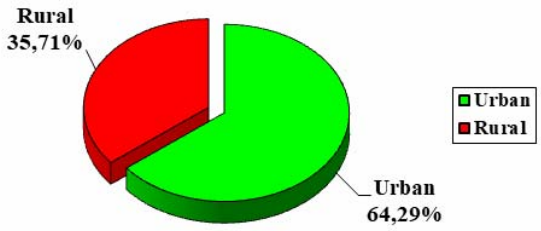

Fig. 3. Distribution of females according to the environment of origin

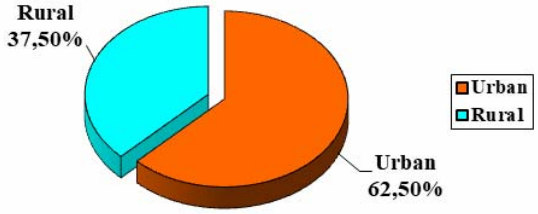

Fig. 4. Distribution of males according to the environment of origin

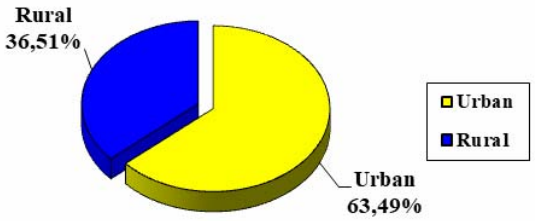

Fig. 5. Distribution of subjects according to the environment of origin

Figure 6 shows a variation of the values obtained for D-dimers in the patients under study. Given that the maximum limit of the reference range is 0.701 μg / mL FEU, it is found that in a small number of persons (43) a test value within the reference range was found. A value of 18 μg / mL FEU was found in 18 individuals, ie higher than the linearity limit of the test.

Platelet activation is not the main mechanism of initiation of the CID process, and thrombocytopenia is mainly caused by platelet uptake into fibrin intravascular deposits. Decreased platelet count contributes to hemorrhagic syndrome.

A number of additional tests were performed on these patients.

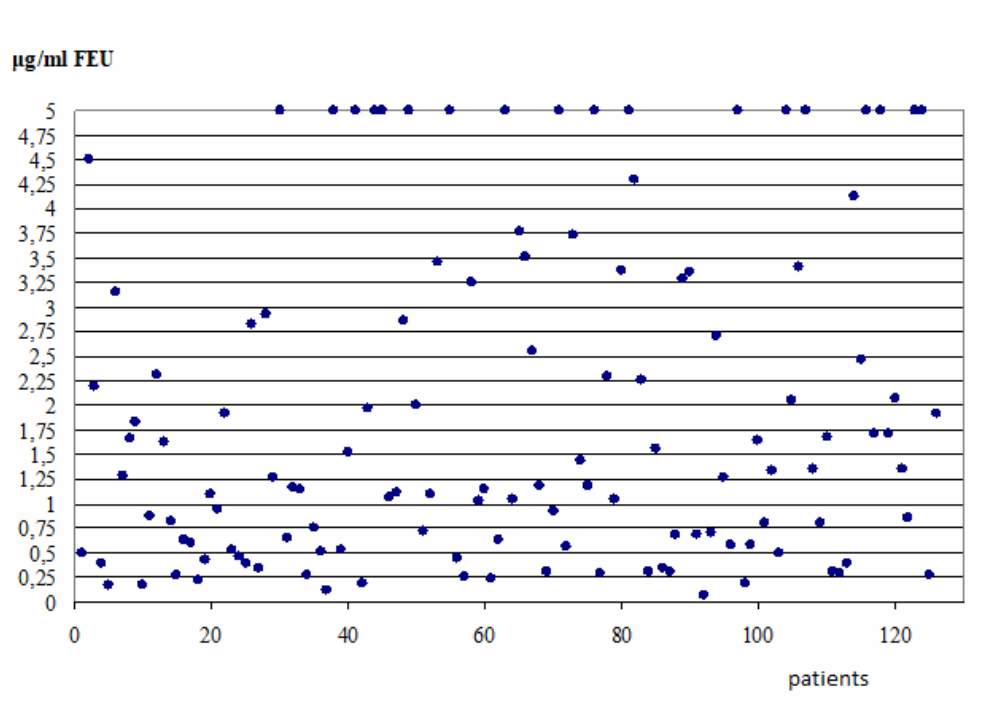

Fig. 6. Variation of D-dimer values in investigated patients

CONCLUSIONS

Disseminated intravascular coagulation (DIC) is a complex disorder of hemostasis, in which there is a generalized activation of the coagulation phase, followed by a marked activation of the fibrinolysis phase.

D-dimers are dosed to help diagnose and monitor the factors that cause hypercoagulation in the blood. Of the 126 patients investigated, a test value within the reference range was found in 43 (the reference values, those considered to be normal D-dimers, are set to be less than 0.5 µg / mL FEU), and 18 individuals had a value> 5 µg / mL FEU, which is higher than the linearity limit of the test.

A positive result of the D-dimer test indicates that the level of products resulting from the fibrin degradation process is very high. This suggests to the doctor that there was a clot in the body that has deteriorated, but does not indicate the exact location. Elevated levels are also associated with liver disease, pregnancy, some cancers or heart disease.

A negative result means that the patient does not have a condition that could lead to the formation of clots and their degradation.

The D-dimer test must be performed in a series of other tests to accurately identify the patient's condition.

Anticoagulant therapy may cause a false negative result of D-dimer. D-dimer levels may increase in the elderly, and false-positive results may be seen in conjunction with elevated levels of rheumatoid factors.

Despite the progress made in understanding the pathophysiology, there is still little evidence that treatment could alter the natural course of the underlying condition. Treatment will rebalance the patient, prevent massive thrombosis or bleeding, and allow for definitive therapy.

ABSTRACT

126 patients with coagulation disorders were evaluated, hospitalized in the departments of the Bacău County Emergency Hospital, between January and March 2021, aged between 18 and 96 years, who presented to the Emergency Reception Unit. Thus, an analysis of the changes in D-dimer values in the investigated patients was performed to establish the diagnosis of disseminated intravascular coagulation (CID), initiate therapy or continue it in patients already diagnosed. A small number of people (43) found a test value within the reference range (reference values, those considered to be a normal level of D-dimers, are set to be lower - <0.5 µg / mL FEU) , while 18 people had a value> 5 µg / mL FEU, which is higher than the linearity limit of the test.

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AUTHORS' ADDRESS

STOICA IONUȚ, PRISECARU MARIA - “Vasile Alecsandri” University of Bacau, Faculty of Biology, Marasesti Street, no.157, Bacau, Romania, e-mail:
ionut_stoica23@yahoo.com;
prisecaru_maria@yahoo.com.

BARABAŞ COCUȚA – Bacău County Emergency Hospital, Spiru Haret Street, no. 2-4, e-mail: cocutabobby@yahoo.com.

Corresponding author:
prisecaru_maria@yahoo.com.