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CONTROL OF ANTICOAGULATION IN CARDIOVASCULAR DISEASES

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Key words: *coagulation disorders, blood parameters, anticoagulants, Quick time*

INTRODUCTION

The continued increase in the incidence of cardiovascular disease and the number of people at high cardiovascular risk has also led to the introduction of specific treatments designed to ensure either the primary or secondary prevention of high-risk events. The anticoagulant treatment aims to fluidize the blood inside the arteries.

People in good health are not likely to form clots unless they are bleeding, and their blood is clotting outside the arteries. Anticoagulant treatment can be a great solution for patients with heart disease, but it is important that it is properly managed and monitored.

Preoperative management of patients receiving anticoagulant or antiplatelet therapy involves, as a first step, assessing the individual risk of thromboembolism or bleeding. In the case of patients with coronary stents, the time from its installation to the planned surgery will dictate the management of antiplatelet therapy, given that premature discontinuation of this therapy significantly increases the risk of stent thrombosis with catastrophic consequences.

Discontinuation of anticoagulant therapy is often required for major surgery but increases the risk of thromboembolic events.

The use of "bridge" therapy with unfractionated or low molecular weight heparin is dictated by the assessment of the individual risk of thromboembolism, as this therapy increases the risk of perioperative bleeding.

The development of the coagulation cascade was the first consistent step by which clinical observations on hemostasis also gained scientific support. At the same time, the use of the coagulation cascade to explain the physiological and pathological phenomena related to the appearance of the clot has contributed significantly to the development of therapeutic solutions that have proven in many cases to save lives.

MATERIALS AND METHODS

We investigated 70 patients from chronic departments who may have changes in the normal percentage of coagulation (neurology, surgery, and orthopedics) within the Bacău County Emergency Hospital, during September-November 2021. Mainly, variations of values of APTT (*partially activated thromboplastin time*) and INR during Quick (International normalized ratio INR; international standardized procedure introduced by WHO).

Classical Coagulation Tests - Quick Prothrombin Time (PT) and APTT provide information on coagulation factors and can be used to monitor anticoagulant treatment.

Quick time or Quick prothrombin time (PT). The type of test is blood, the method - coagulometric. Quick prothrombin time (PT) evaluates the extrinsic coagulation pathway and fibrinogen.

The coagulation factors investigated by prothrombin time are factors VII, X, V and II. Coagulation factors are synthesized in the liver and need vitamin K both for synthesis and to exert its action during hemostasis.

APTT, the partially activated thromboplastin time, evaluates the intrinsic coagulation pathway and monitors anticoagulant therapy. Prothrombin time in seconds measures the time required for blood clot to form by fibrin polymerization.

APTT is the most sensitive and specific coagulation factor test.

The INR has diagnostic value for determining the dose of anticoagulant, especially in patients with heart disease. While APTTs are clinically important for patients in other wards.

Critical values: INR> 6 - hemorrhagic risk (especially in patients with gastrointestinal diseases, hypertension, kidney disease, cerebrovascular disease, antiplatelet therapy, other potentiating drugs).

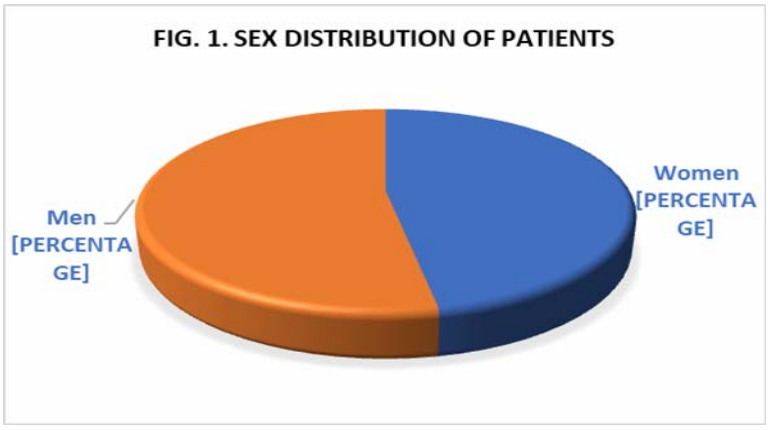
RESULTS AND DISCUSSIONS

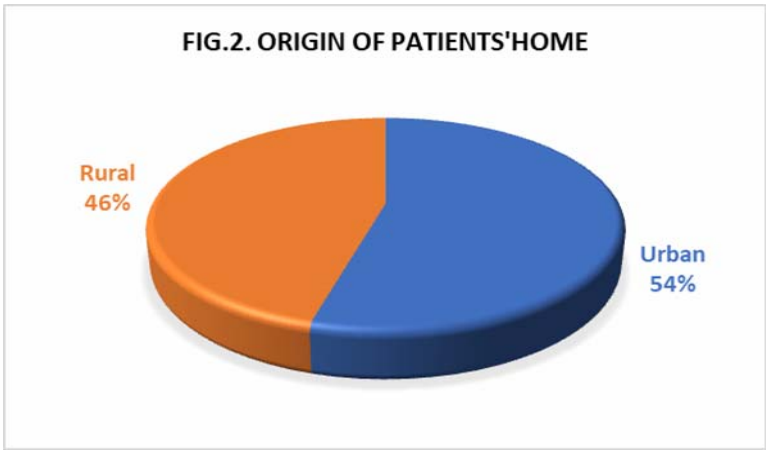
Of the 70 patients, 47 were women and 53 were men (Fig. 1). Figure 2 shows that most patients come from urban areas. (54%).

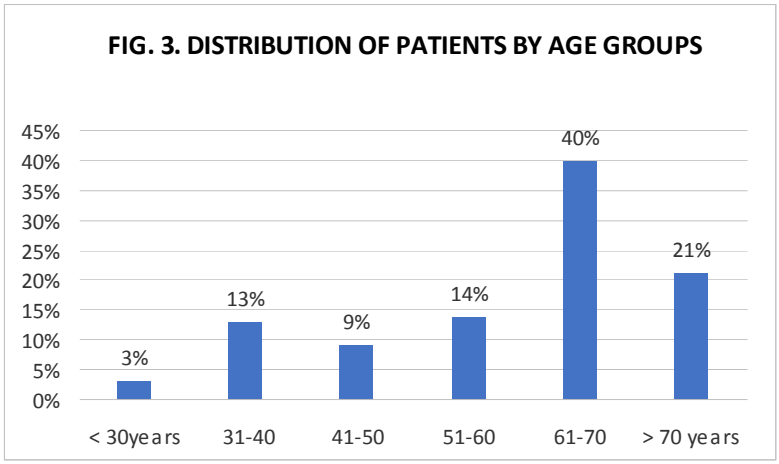
Regarding the percentage distribution by age groups, Figure 3 shows the predominance of patients in the 61-70 age group, and the least represented are patients under 30 years.

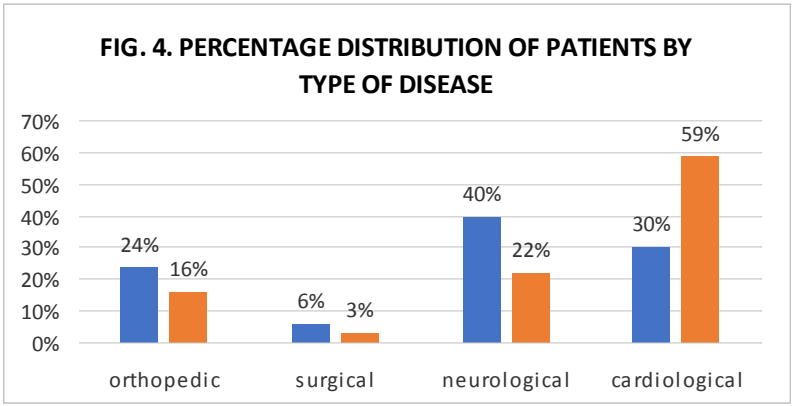
According to the type of disease of the patients with coagulation problems investigated (Fig. 4), as expected, most come from those with

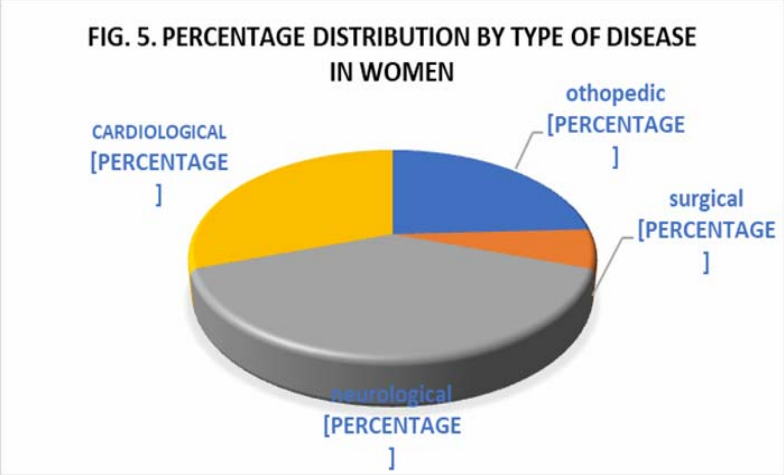
cardiovascular disease. It is found that in this case, men are more affected (59%) than women (30%). In the case of other categories of conditions, women are more involved. In the case of diseases, neurological disorders predominate in women, while cartiological ones predominate in men (figures 5 and 6).

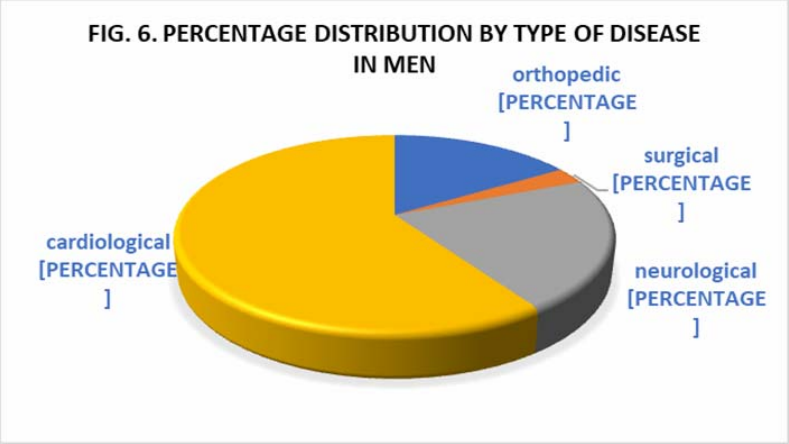










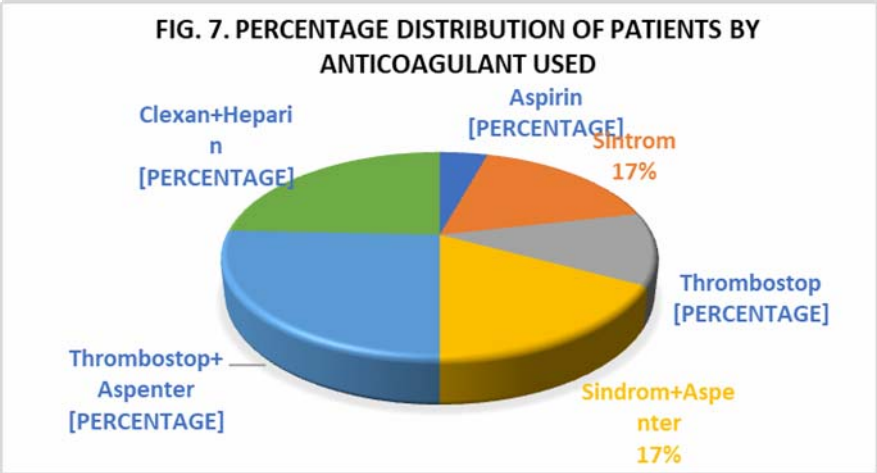


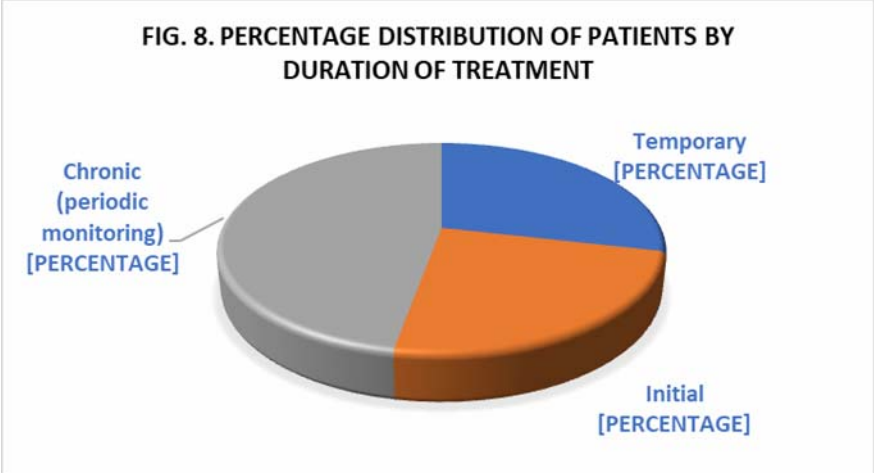
Anticoagulants are, in general, medicinal agents with parenteral (injectable) or oral administration that act through various mechanisms on the plasma system, causing blockage of the blood clotting process in situations where this process is pathological.

Depending on the condition, the doctor will determine the dose of anticoagulant and the duration of treatment. The most used anticoagulants are: Aspenter, Sintrom, Thrombostop, Clexan, Heparin (Fig. 7).

After the percentage distribution of patients according to the anticoagulant used in the treatment, there is a preference for combinations of classic anticoagulants with those of the new generation and a significant reduction in aspirin use which seems to have no therapeutic value as anticoagulant.

In the present study, patients with initial, temporary, and chronic treatment were followed (fig. 8).





Patients with temporary treatment are mostly from related departments who have been treated with Aspenter, Aspirin, Clexan, Heparin, Thrombostop. This type of treatment has been applied to immobilize patients to prevent the formation of vascular thrombi.

Initial treatment is applied to newly diagnosed patients in whom the dose of anticoagulant has not yet stabilized, and they are followed weekly until stabilization (maximum 2 months). Chronic patients are real patients who regularly monitor their anticoagulant concentration values (when they change their medicine bottle, when they go for a check-up and whenever they notice a change such as bruises - bruising or bleeding).

In our study we looked mainly at variations in APTT and INR values during Quick. The INR has diagnostic value for determining the dose of anticoagulant, especially in patients with heart disease. While APTTs are clinically important for patients in other wards.

The control of the anticoagulant effect is done by monitoring the prothrombin time or the Quick time, at present, for standardized results, being used the INR (international normalized ratio) ratio. For an effective but safe treatment (with a low risk of bleeding) it is recommended to keep the INR value as constant as possible between 2-3 (optimal in ≥70% of the time), by constantly communicating with the attending physician and adjusting the daily dose schedule.

INR values	<1,5	1,5-2	2,01-3	>3,01
Sintrom	0	1	3	3
Thrombostop	0	6	2	0
Sintrom+Aspenter	0	0	9	3
Thrombostop+Aspenter	0	3	13	2
Aspenter, Aspirin	3	0	0	0

Coagulation abnormalities can be congenital or acquired. Congenital ones are usually known and have a very low prevalence in the Caucasian population. The most common are FvW deficiency and hemophilia A and B (FVIII and FIX deficiencies, respectively). Deficiencies of other coagulation factors such as thrombopathy are rare. Patients with congenital hemostatic abnormalities may not experience significant bleeding until trauma or surgery. If the anomaly is known, it is recommended to assess the deficit and correct it preoperatively.

Decreased coagulation factors are treated perioperatively by administration of fresh frozen plasma (PPC), cryoprecipitate (CP) or deficient factor concentrate. PPC contains all coagulation factors, mainly prothrombin, FV and FX and CP contain fibrinogen, FVIII, FvW and FXIII. PPC and CP are produced from allogeneic plasma and there is a risk of transmission of various microbial agents. In addition, they have the disadvantage of volume overload. Thus, PPC contains coagulation factors in a concentration of about 1 U / ml and 1000 ml of PPC can increase the level of deficient factors only by 10-20%. Prothrombin complex concentrate (CCP) contains factors II, VII, IX, X, PC and PS. It also exists in activated form (CCPa), which contains variable amounts of FVII, FIX and FX and is used in the treatment of hemophilia with inhibitors against factors VIII or IX. Plasma-derived concentrate concentrates have the advantage that they have a small volume to be administered and are purified. There are also recombinant preparations, which are the safest.

Careful clinical and biological control is required to benefit from the therapeutic effect, without side effects and complications, the most important of which are bleeding, especially major and / or life-threatening. The risk of a hemorrhagic complication increases in the presence of a hemostasis deficit (acquired or congenital), in the case of pre-existing lesions, trauma or recent surgery, but also with the patient's age or associated pathology (liver or kidney failure).

Parenteral anticoagulation is, in many cases, the initial therapeutic option, instituted under in-hospital surveillance, with the advantage of a fast and relatively controllable effect. Compared to conventional unfractionated heparin, which requires continuous intravenous infusion under regular coagulogram control (APTT), newer low molecular weight heparins (enoxaparin, dalteparin, nadroparin, fondaparinux, etc.) have the advantage of an anticoagulant effect. stable, independent of APTT as well as a much more comfortable administration for both the patient and the medical staff, in subcutaneous injections every 12 or 24 hours.

Until recently, oral anticoagulants were represented only by the class of dicoumarins - vitamin K inhibitors (antivitamins K, AVK), which act on the prothrombin complex of vitamin K-dependent coagulation factors. New oral anticoagulants (NOACs), the direct thrombin inhibitor (dabigatran etexylate) and activated factor X inhibitors (rivaroxaban, apixaban and edoxaban), have been approved for clinical use, and other molecules are currently being investigated.

CONCLUSIONS

Vascular defects, platelets, coagulation and fibrinolytic defects are inevitable consequences of cardiovascular disease and especially of cardiac surgery.

The explanation of the physiological and pathological phenomena related to the appearance of the clot has essentially contributed to the development of therapeutic solutions that have proven in many cases to save lives.

Acquired hemostatic deficiencies are generally transient in duration, variable, and unpredictable in severity.

Knowing the frequency and hemostatic significance of coagulation abnormalities that may occur in cardiovascular disease could help the physician manage the bleeding patient by guiding diagnostic tests and available therapies.

Specific diagnostic therapy is desirable and possible only if blood samples for coagulation testing are promptly determined for bleeding recognition.

Parenteral anticoagulation is, in many cases, the initial therapeutic option, instituted under in-hospital surveillance, with the advantage of a fast and relatively controllable effect.

The choice of a new generation anticoagulant in favor of another is not currently supported by evidence from any direct comparison study.

Anticoagulants work differently and are therefore monitored by different laboratory tests. The doses in which it is administered are very varied.

Initiation of treatment is strictly by the specialist doctor depending on the pathology present, the patient's particular thromboembolic / hemorrhagic risk balance, with doses according to the guidelines in force and with regular monitoring of possible hemorrhagic effects and renal function.

In treatment, according to the anticoagulant used, there is a preference for combinations of classic anticoagulants with those of the new generation and a significant reduction in the use of aspirin which seems that, according to recent research, no longer has the same therapeutic value as anticoagulant.

The control of the anticoagulant effect is done by monitoring the prothrombin time or the Quick time, currently, for standardized results, being used the INR (international normalized ratio) ratio. For an effective but safe treatment (with a low risk of bleeding) it is recommended to keep the INR value as constant as possible between 2-3 (optimal in ≥70% of the time), by constantly communicating with the attending physician and adjusting the daily dose schedule.

ABSTRACT

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