14. MECHANISMS OF ACTION AND METABOLIC EFFECTS OF ANTICOAGULANTS

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Introduction. Anticoagulant drugs antagonize coagulation and are used to prevent or prolong the clotting time. Nowadays physicians from different fields possess a broad panel of multiple anticoagulants to meet a patient's individual needs.

Aim of study. It was to analyze different types of anticoagulants and to mark the clinical importance of their different mechanisms of action and metabolism.

Methods and materials. This was an analytical literature review of scientific articles related to the keywords: anticoagulant drugs, oral anticoagulants, direct inhibitors, anticoagulant treatment. Through a comprehensive search on PubMed with the filters: clinical-trial, meta-analysis, in the last 5 years; 58 scientific articles were selected for the research topic.

Results. Scientific evidence has shown that anticoagulant therapy is currently based on four classes of agents: heparins, vitamin K-dependent antagonist (e.g., warfarin), direct thrombin inhibitors (dabigatran), and factor Xa inhibitors (rivaroxaban). Both heparins and oral anticoagulants (vitamin K antagonists) are efficacious antithrombotic drugs but their use has well-known limitations. They are not selective, acting on a broad range of substrates in the coagulation cascade. In addition, heparins are a heterogeneous mixture of different molecules purified from animal tissues and with variable antithrombotic activity. Oral anticoagulants showed adverse side effects in the form of tissue bruising, gastrointestinal bleeding, and intracranial hemorrhage whereas parental anticoagulants are having side effects in the form of thrombocytopenia and thromboembolism due to antibody-mediated platelet aggregation. Rivaroxaban competitively inhibits Factor Xa, and prevents the progression of the coagulation cascade through the final common pathway, inhibiting thrombin generation. Rivaroxaban is eliminated via both metabolic degradation and renal elimination as an unchanged drug, without modifications in the patient's homeostasis. Ximelagatra n is the first oral direct synthetic thrombin inhibitor with favorable pharmacokinetics and pharmacodynamics; with rapid onset of action, fixed dosing, stable absorption, apparent low potential for medication interactions, and no requirement for monitoring of drug levels or dose adjustment. Its efficacy and safety versus the established treatment with vitamin K antagonists in the prevention of stroke in patients suffering from atrial fibrillation is being investigated.

Conclusion. The present review highlighted the clinical importance and the difference between the mechanisms of action of anticoagulant drugs. Through their inhibitory action at different levels of the coagulation cascade, anticoagulants determine various effects that can influence the therapeutic decision and require an individualized approach to each case.