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PERSPECTIVE

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Adverse Effects of Anticoagulant Medication and its uses

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Description

Anticoagulants, also referred to as blood thinners, are chemicals that stop or slow down blood coagulation, lengthening the clotting time. Some of them are found naturally in blood-feeding creatures like leeches and mosquitoes, where they aid in maintaining the bite area's bloodless condition long enough for the creature to draw some blood. Anticoagulants are a family of drugs used to treat thrombotic diseases. Many people take oral anticoagulants (OACs) as pills or tablets, and hospitals use a variety of intravenous anticoagulant dose forms. Some anticoagulants are utilised in medical devices such as blood transfusion bags, heart-lung machines, dialysis equipment, and sample tubes. Warfarin, one of the first anticoagulants, was initially authorised for use as a rodenticide. By interfering with the numerous blood coagulation pathways, anticoagulants are closely related to antiplatelet medications and thrombolytic medications. Anticoagulants specifically impede certain pathways of the coagulation cascade, which occurs after the initial platelet aggregation but before the development of fibrin and stable aggregated platelet products. In contrast, antiplatelet medicines specifically inhibit platelet aggregation (clumping together). Warfarin and heparin are two commonly used anticoagulants [1].

Adverse effects

The most severe and frequent unfavourable side effect of anticoagulants is an increased risk of bleeding, including both large and minor bleeding events [2]. The class of anticoagulant medication being used, the patient's age, and any previous medical conditions all affect the risk of bleeding. The estimated annual incidence of bleeding from warfarin is 15%–20%, and the annual incidence of bleeding that could be fatal is 1%–3%. In comparison to warfarin, more recent oral anticoagulants that are not vitamin K antagonists seem to have less life-threatening bleeding incidents [3]. In addition, people 80 years of age or older may be more vulnerable to consequences from bleeding, with a risk of 13 bleeds per 100 person-years. Given that all Non-Vitamin K Antagonist Oral Anticoagulants (NOACs) are eliminated in part *via* the kidneys in patients with renal impairment receiving NOAC therapy, bleeding risk should be taken into particular consideration. Patients who have renal impairment may therefore have a higher risk of bleeding more frequently. According to a comprehensive review, warfarin had no impact on the death rate or the risk of blood clots in cancer patients. However, 107 more persons per 1000 people had a higher risk of serious bleeding, and 167 more had a higher risk of minor bleeding [4]. Although this conclusion is based on only one trial, apixaban had no impact on mortality, the recurrence of blood clots in blood vessels, major bleeding, or small bleeding.

Although less frequent than hemorrhagic adverse events, nonhemorrhagic adverse events nevertheless need to be constantly watched. Skin necrosis, limb gangrene, and purple toe syndrome are examples of warfarin's nonhemorrhagic side effects [5]. The third to eighth days of therapy are the most prevalent times that skin necrosis and limb gangrene are seen. Although the precise pathophysiology of skin necrosis and gangrene of the limbs is not fully understood, it is thought that warfarin's impact on the inhibition of protein C and protein S formation plays a role. Usually, three to eight weeks after starting warfarin therapy, purple toe syndrome appears. Other side effects of warfarin include vitamin K deficiency, which can suppress growth arrest-specific gene 6 and the *G1a* protein, both of which increase the risk of arterial calcification and heart valve, especially if too much vitamin D is present. Additionally connected to problems in foetal bone growth in moms who used warfarin during pregnancy is the drug's interference with *G1a*

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proteins. Long-term use of heparin and warfarin has also been connected to osteoporosis [6].

Applications in medicine

The decision to use anticoagulants is based on the risks and advantages of anticoagulation. The increased risk of bleeding is the main side effect of anticoagulant medication [7]. The increased risk of bleeding is negligible in normally healthy individuals, but it may be excessive in those who have just undergone surgery, have brain aneurysms, or have other disorders. Anticoagulation typically has the benefit of stopping or slowing the progression of thromboembolic illness [8]. Anticoagulant medication is recognised to be beneficial for some of the following indications:

- Coronary artery disease
- Atrial fibrillation very frequently result in atrial appendage clots.
- Ischemic stroke
- Deep vein thrombosis can both result in pulmonary embolism.
- Mechanical heart valves
- Myocardial infarction
- Pulmonary embolism
- Restenosis from stents
- Cardiopulmonary bypass (or other procedures necessitating a temporary aortic blockage)
- Heart disease

In certain situations, anticoagulation medication can stop the growth or creation of hazardous clots.

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