Heparin and its derivatives in the treatment of arterial thrombosis: a review

M. Dvorak, M. Vlasin, M. Dvorakova, P. Rauser, L. Lexmaulova, Z. Gregor, R. Staffa

https://doi.org/10.17221/3014-VETMED

Citation: Dvorak M., Vlasin M., Dvorakova M., Rauser P., Lexmaulova L., Gregor Z., Staffa R. (2010): Heparin and its derivatives in the treatment of arterial thrombosis: a review . Veterinarni Medicina, 55: 523-546.

download PDF

Arterial occlusion due to thrombosis caused by ruptured atherosclerotic plaques (Baba et al., 1975) has been recognized as a major cause of morbidity and mortality in western populations. Thrombosis may occur in various sections of arterial circulation, peripheral arteries of the limbs, coronary arteries, brain arteries, or both major and minor vessels within the abdominal cavity. The ultimate consequence is varying degrees of organ failure, mostly of ischemic origin. Arterial thrombosis represents a continuous problem, debilitating patients and decreasing their quality of life. Moreover, along with chronic heart failure, it can significantly decrease patient life expectancy. Arterial thrombosis results in ischemia, with serious systemic consequences, such as metabolic breakdown. The major goal of treatment remains fast and efficient recanalization – surgical, interventional or thrombolytic. To be able to prevent acute reocclusion with severe consequences (rhabdomyolysis, compartment syndrome, excessive tissue necrosis leading to limb amputation, etc.), several adjunctive treatment regimens have been advocated. Among others, thrombin inhibitors and platelet inhibitors have been widely used for both prophylaxis and adjunctive treatment. Direct thrombin inhibitors and antithrombin stimulators have been recognized as typical antithrombotic drugs. Direct (antithrombin-independent) thrombin inhibitors can be divided into two main categories: monovalent, active site inhibitors (argatroban, efegatran, inovastan, melagatran) and bivalent (hirudin, hirugen, hirulog, bivalirudin), while antithrombin stimulators represent standard (unfractionated) heparin (UFH) and its depolymerizing products – low molecular weight heparins (LMWH's). Recently, a clear change in the main use of heparin, as well as low-molecular weight heparins has been advocated representing a shift from treatment and prophylaxis of deep vein thrombosis to prophylaxis of thromboembolic disease following vascular, cardiovascular or orthopedic surgery, treatment of unstable angina and prevention of acute myocardial infarction. The main effect of heparins lies in their anticoagulant activity. Heparins are involved in different pathways of the coagulation cascade with anticoagulant, antithrombotic, profibrinolytic, anti-aggregative, as well as anti-inflammatory effects. Moreover, there is a little doubt about their anti-proliferative and anti-ischemic activity (Penka and Bulikova, 2006). Unlike standard heparin, low-molecular weight heparins do not affect the patient's general coagulation profile. Obviously, the difference in molecular weight results in different pharmacokinetic and pharmacodynamic properties of the agents.

Keywords:

coagulation; arterial thrombosis; standard heparin; low-molecular weight heparins

download PDF

Contact

Mgr. Zuzana Karlíková
Executive Editor
phone: + 420 227 010 352
e-mail: vetmed@cazv.cz

Address

Veterinární Medicína
Czech Academy of Agricu Sciences

Slezská 7, 120 00 Praha 2, Republic