

BIOLOGICAL PROPERTIES OF AN HEPARIN-POLY(METHYL METHACRYLATE) COPOLYMER.

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The heparin-poly(methyl methacrylate) copolymer was prepared by polymerization of methyl methacrylate on an heparin radical. It was initiated by cerium IV ions and heparin in nitric aqueous solution.

An heparin effect was present in the plasma in contact with the copolymer. It was not due to a release of heparin in the plasma, but to a contact effect. The anticoagulant effect was depending upon the concentration of the copolymer. The activity of clotting factors in plasma, after a contact with the copolymer was not decreased except for factor V. Antithrombin III was selectively adsorbed on the surface of the copolymer.

The copolymer lost progressively its anticoagulant properties after each contact with the plasma. This might be due to the adsorption of fibrinogen on the copolymer. Labelled 125 I albumin, transferrin, Ig G and fibrinogen were not similarly desorbed in the presence of serum and of plasma.

This copolymer seems to offer interesting properties for blood devices.

THE ACTION OF HEPARIN AND OTHER POLYSACCHARIDES ON THE RIGIDITY OF SURFACE LAYERS OF FIBRINOGEN. A. L. Copley and R. G. King, Laboratory of Biorheology, Polytechnic Institute of New York, Brooklyn, N.Y. 11201, U.S.A.

Our earlier findings (Thromb. Res. 1:5,1972), that surface layers (SL) of heparin plasma showed decreased rigidity or torque values (τ) when compared to SL of oxalate plasma from the same blood withdrawal, led to studies of effect of different commercial preparations of heparin (H) and other polysaccharides on SL of 0.4% fibrinogen (Fg) solutions. Depolymerized hyaluronate, chondroitin sulfate and dextran sulfate markedly decreased τ of FgSL. 1% H lowered τ more than 0.1% H. These findings were not consistent with all H preparations, some of which did not lower τ . The anticoagulant activity (AA) of H, thus, does not correspond to this τ reducing action of certain Hs on FgSL. This will be discussed in connection with studies of H uptake on the endothelium by Hiebert and Jaques who concluded that H may act as antithrombotic agent independently from its AA. (Artery 2:26,1976). Our findings with H suggest that in thrombosis therapy any commercial H may not necessarily be useful, if merely its AA is taken into consideration, particularly since the initiation of thrombosis according to Copley's concept is due to the clotting of Fg without thrombin interaction. Since we view FgSL formation on the endothelium to progress to a surface gel state with consequent large increase in volume, the polysaccharides and H preparations, found to reduce τ , may have both surface gelation inhibiting (SL antigeloplastic) and antithrombotic actions. (Aided in part by NIH grant HL19013-02.)

ARE THERE ANY DIFFERENCES IN THROMBOSIS PROPHYLAXIS AND SIDE EFFECTS BETWEEN SODIUM AND CALCIUM HEPARIN? D. Bergqvist and T. Hallbäck, Department of Surgery, Skövde, Sweden.

In clinical studies on low dose heparin both sodium and calcium heparin have been used but no comparative investigation has been made. The aim of this study therefore was to perform a double blind randomized comparison between sodium and calcium heparin on prophylaxis of postoperative thrombosis and possible side effects. 75 patients were included in the study, 39 receiving sodium heparin and 36 calcium heparin (Heparin Vitrum from the same heparin batch was used and the following dosing schedule was followed: 5000 IU s.c. 2 hours preoperatively and then every 12th hour for 5 days). The injection was given on the lateral aspect of the thigh. Deep vein thrombosis was diagnosed with 125 I-fibrinogen test. The activity over the site for heparin injection was also measured. The patients were interviewed by a nurse for local reaction and she also judged haematoma formation from photographs. Bleeding tendency was measured as blood loss during operation and total transfusion need. The groups were comparable concerning age, sex and type of operation. The frequency of thrombosis was 40 % in the sodium heparin group and 43 % in the calcium heparin group, and the blood loss 318 and 454 ml respectively ($p > 0.05$). There were no differences in the patients' subjective local reaction to 125 I-heparin injection or haematoma formation judged from the photographs. Nor did the 125 I-fibrinogen activity over heparin injection sites differ between the two types of heparin.

This study has thus shown that sodium and calcium heparin are identical from the point of view of prophylaxis of postoperative deep vein thrombosis and side effects, provided that the heparin batch is the same in both.