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


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 125I 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. Coxley and R. G. King. Laboratory of Biochemistry, Polytechnic Institute of New York, Brooklyn, N.Y. 11201, U.S.A.

Our earlier findings (Thromb. Res. 115, 1972), that surface layers (SL) of heparin plasma showed decreased rigidity or torque values (T) 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 0.9% fibrinogen (Fg) solutions. Depolymerized hyaluronic, chondroitin sulfate and dextran sulfate markedly decreased T of FgSL. 1% H lowered T more than 0.1% H. These findings were not consistent with all H preparations, some of which did not lower T. The anticoagulant activity (AA) of H, thus, does not correspond to this T reducing action of certain H's on FgSL. This will be discussed in connection with studies of H uptake on the endothelium by Bellet and Jaques who concluded that H may act as an 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 Coxley'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 T may have both surface gelation inhibiting (SL antigeloplastic) and antithrombotic actions. (Aided in part by NIH grant HIL9035-02.)

ARE THERE ANY DIFFERENCES IN THROMBOSIC PROPHYLAXIS AND SIDE EFFECTS BETWEEN SODIUM AND CALCIUM HEPARIN? D. Bergqvist and T. Hallbost, 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 thromboembolism 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 dose schedule was followed: 5000 I.E. i.m. 4 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 Fg–1 fibrinogen test. The activity over the site for heparin injection was also measured. The patients were interviewed by a nurse for local reaction and for any signs or symptoms of the patient. The frequency of thromboembolism was 40% in the sodium heparin group and 45% in the calcium heparin group, and the blood loss 316 and 454 ml respectively (p>0.05). There were no differences in the patients' subjective local reaction to postoperative heparin injections or haematoma formation judged from the 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 thromboembolism was 40% in the sodium heparin group and 45% in the calcium heparin group, and the blood loss 316 and 454 ml respectively (p>0.05). There were no differences in the patients' subjective local reaction to heparin injection or haematoma formation judged from the photographs. For did the T–1 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 thromboembolism and side effects, provided that the heparin batch is the same in both.