

Heparin Quality Control in the Brazilian Market: Implications in the Cardiovascular Surgery.

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Unfractionated heparin (UFH) is a glycosaminoglycan used as an anticoagulant both in therapeutic and surgical procedures. The UFH preparations are heterogeneous regarding their chemical composition and molecular weight distribution. Recently, there was a change in the heparin manufacturer in Brazil and Lique mine, which was the main product used has been put out of the market. As a consequence, an increasing number of blood dyscrasias, reexploration and other side effects have been observed, mainly in cardiac surgery. Therefore, we evaluated the anticoagulant activity and structural features of UFH solutions currently available in the Brazilian market and compared with those of Lique mine and of an international heparin control. The structural integrity of the samples were analyzed by nuclear magnetic resonance (NMR) and their anticoagulant activity was assessed by APTT, anti-Xa and anti-IIa assays. Except for Lique mine, the anticoagulant activity of all heparins samples varied significantly compared to the international standard. In some preparations we noted only 70% of the reported activity. ¹H NMR spectra showed contamination with dermatam sulfate in two samples. In two other heparin samples, about 30% of glucosamine residues are non-sulfated at position 6. Furthermore, heparin preparations were fractionated by gel permeation chromatography. In comparison with Lique mine and the international control, commercially available heparins presented higher amounts of low molecular weight material (about 20% of the total sample). Anticoagulation assays are in progress to evaluate the specific activity of those fractions. Overall, our results indicate that solutions of commercial UFH available in Brazil possess remarkable different biochemical profiles concerning anticoagulant activity, molecular weight and chemical structure and purity.