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Coagulation tests during exchange transfusions

Since bleeding, particularly intracranial hemorrhage, and portal vein thrombosis and embolism may complicate exchange transfusions we investigated coagulation during this procedure. Many pediatricians prefer heparinized fresh blood with or without neutralisation of heparin by protamine after exchange transfusion. Others use ACD blood with or without additional heparin. But there is no agreement on the amount of heparin to be substituted.

At our institution we injected heparin in a dosage of 50 IU / kg body-weight at the beginning and in the middle of exchange transfusion. Fig. 1 shows two typical curves of thrombin time during exchange transfusion.

The longlasting overdose of heparin is certainly dangerous and makes no therapeutical sense, the fast normalisation on the other side may lead to thrombosis of umbilical vein catheter and pulmonary and cerebral embolism.

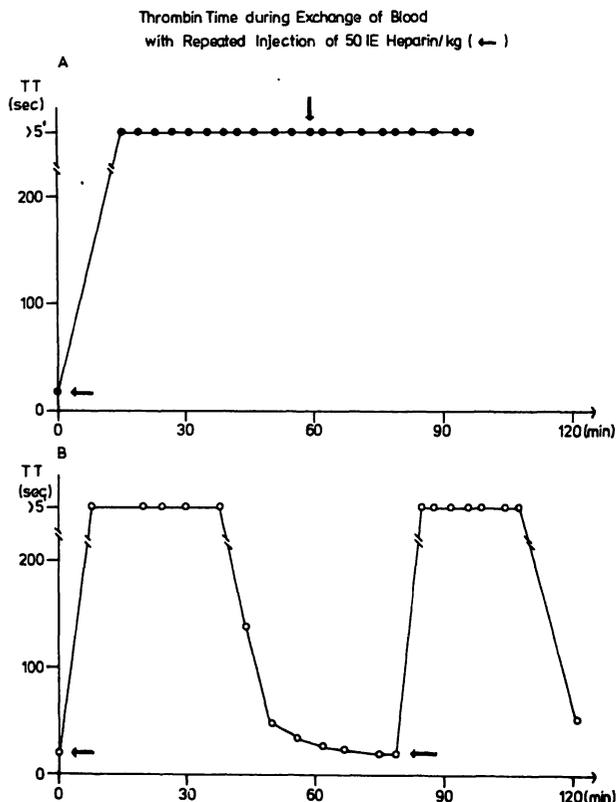


Fig. 1 Thrombin time during exchange transfusion

Heparin metabolism varies extraordinarily in new-borns (Fig.2).

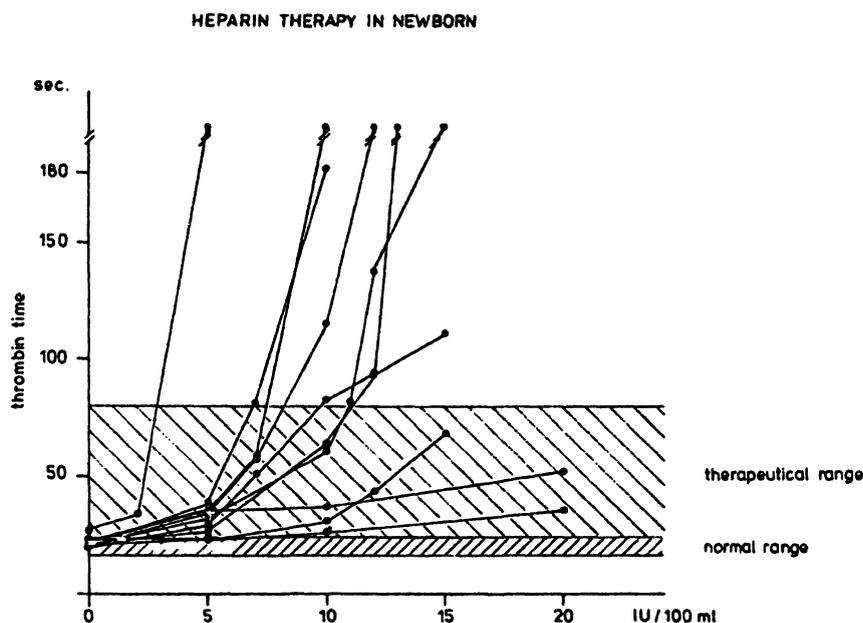


Fig.2 Heparin " sensibility " in vitro in healthy new-borns

Using heparinized fresh blood severe overdosage of heparin must be expected since 500 ml of stored blood contain 450 IU of heparin.

To obtain a therapeutical heparin level we apply a continuous infusion of 100 IU to 200 IU of heparin per kg body-weight after an initial bolus of 10 IU to 20 IU per kg body-weight. In addition we prefer fresh ACD-blood and add such a quantity of heparin, that in each exchange step the removed equals the reinfused heparin.

We assume an effective heparin level of 10 IU / kg and add 50 IU of heparin to 500 ml blood.

It is advisable to check thrombin time during the exchange transfusion, since occasionally the bleeding risk is increased even when applying these low heparin doses.

Systemic heparinization is thought to be especially important during exchange transfusion in new-borns with septicaemia, which is often complicated by disseminated intravascular coagulation. Aggravation of intravascular coagulation may occur, when clotting factors are infused.

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