P-208

Factors influencing activated clotting time after single intravenous bolus administration of 100 IU per kilogram of unfractionated heparin during cardiac catheterization in children

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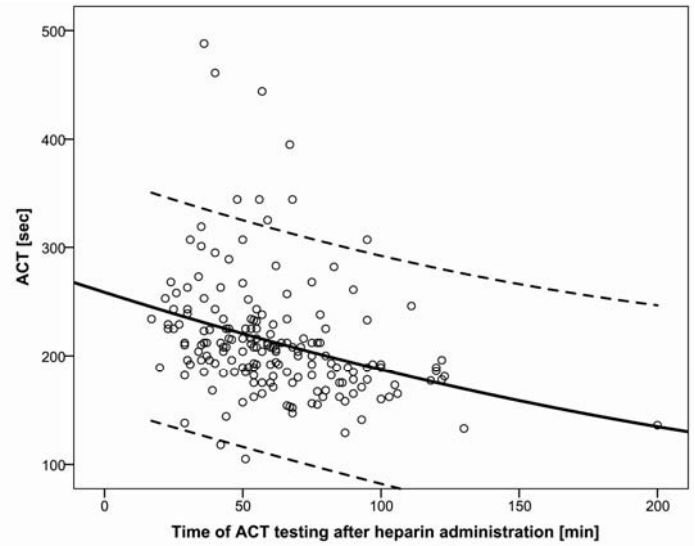
Background: Anticoagulation using single intravenous bolus administration of unfractionated heparin (UFH) as primary prevention of thrombotic events in children undergoing cardiac catheterization (CC) is standard of care. Potential side effects of UFH include severe bleeding, therefore dosage must be calculated carefully. Aim of the study was to determine the effect of UFH monitored by activated clotting time (ACT) during diagnostic and interventional CC in children.
Methods: In a retrospective single centre case study all consecutive patients undergoing diagnostic or interventional CC between April 2012 and October 2013 were evaluated. By routine, they were treated by single intravenous bolus administration of 100 IU per kilogram UFH. ACT values were measured at the end of CC.
Results: We included 183 patients (90 female) aged median 2.8 years (range 0 – 18.9 years). CCs were diagnostic in 39 and interventional in 144. ACT values were obtained at (mean±SD) 61±26 min after UFH bolus. ACT levels ranged between 105 seconds up to 488 sec, with a 25-percentile of 182 sec, 50-percentile of 204 sec and 75-percentile of 229 sec (see figure, solid line mean ACT, dotted line 95% confidence interval). Age dependent difference of ACT values comparing different age groups from neonates to adolescents were not obtained (p>0.05). The amount of total fluid volume during CC was 17.7 ml/kg (13.1 – 26.5) correlating with ACT values (Spearman-Rho -0.24, p<0.001). Factors influencing ACT values were medications before CC such as acetylsalicylic acid (ASA) (p=0.002), enoxaparine (p<0.05), but not phenprocoumon (p>0.05). Eight patients (4.4%) had an arterial (7 of 8) or venous (1 of 8) iliac vessel thrombosis after CC, 2 patients (1.1%) had bleeding complications, both complications after CC did not correlate with ACT values (p>0.05).



Conclusions: Single intravenous bolus administration of 100 IU per kg UFH during CC in children obtains a therapeutic range of ACT values within 182 and 229 sec. ACT values are not influenced by age, but by hemodilution, antiaggregation with ASA and anticoagulation using enoxaparine. Complications after CC such as vessel thrombosis or bleeding are not influenced by this UFH regimen.