Pediatric venous thromboembolism (VTE) has increased over the past 10 years, with central venous catheters (CVC) being the strongest risk factor" Nossair et al (2019).

Abstract:

BACKGROUND: Pediatric venous thromboembolism (VTE) has increased over the past 10 years, with central venous catheters (CVC) being the strongest risk factor. Current tools are not sufficient to predict VTE risk. The utility of biomarkers in predicting CVC-related VTE has been minimally explored. Our objective is to determine the utility of microparticles (MPs), factor VIII (FVIII) activity, and thrombin generation (TG) in prospectively predicting VTE occurrence in hospitalized children with CVCs.

PROCEDURE: In this nested case-control pilot study, consecutive hospitalized children needing CVC placement (1 month to 21 years) were enrolled. Venous samples were collected prior to or within 24 h of CVC placement. MPs were measured using factor Xa initiated clot-based assay. FVIII was measured using a one-stage clot-based assay. TG was measured using calibrated automated thrombogram.

RESULTS: There were three CVC-related VTE events (7%) in our cohort of 42 subjects. Xa clotting time (XaCT) ratio was lower (0.68 ± 0.07 vs 0.95 ± 0.21, P = .4), while FVIII (461 ± 120 vs 267 ± 130, P = .02), peak thrombin (418 ± 89 vs 211 ± 101, P = .001), endogenous thrombin potential (ETP) (1828 ± 485 vs 1282 ± 394, P = .03), and velocity index (VI) (182 ± 28 vs 75 ± 53, P = .001) were higher in subjects with CVC-related VTE compared to those without CVC-related VTE. Sensitivity/specificity analysis revealed optimal cutoff values for XaCT ratio (0.75), FVIII (370), ETP (1680), peak (315), and VI (130), with receiver operating characteristic area under the curve values >0.9.

CONCLUSION: MPs, FVIII, and TG can potentially predict pediatric CVC-related VTE in a prospective fashion. Stratification according to VTE risk may aid in guiding preventative efforts in future studies.

You may also be interested in…

Central venous catheter-associated venous thromboembolism in children
Catheter-related venous thromboembolism following hypothermia
Options for fractured central venous catheter retrieval

Reference:
Nossair, F., Mahajerin, A., Hoang, J., Diaz, D. and Nugent, D. (2019) Promising biomarkers for the prediction of catheter-related venous thromboembolism in hospitalized children: An exploratory study. Pediatric Blood & Cancer. June 21st. doi: 10.1002/pbc.27870. .