

Risk Factors in Pediatric Venous Thromboembolism

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DESCRIPTION

Deep Vein Thrombosis (DVT), which can spread through the bloodstream and obstruct the pulmonary vasculature, is a disorder known as Venous Thromboembolism (VTE), which occurs when blood clots develop in the deep veins of the arm, groin, or leg (Pulmonary Embolism (PE)). A tiny portion of pediatric VTE is caused by cerebral venous thrombosis. In adults who are hospitalized, VTE is a recognized cause of morbidity and mortality. There are national recommendations on identifying risk factors and when to start prophylaxis, so it is preventable. Although pediatric VTE is less common than adult VTE, it is nonetheless found in hospitalized children, especially in tertiary care centers. The majority of kids with VTE have a variety of observable risk factors.

In general pediatrics, the estimated annual incidence of VTE is 0.14 to 0.21 per 10,000 kids. VTE occurs in five to eight cases out of every 10,000 hospital admissions in pediatric patients. Since most VTE cases are asymptomatic, the actual incidence may be much higher. VTE can either be provoked or unprovoked (i.e., caused by underlying diseases or observable risk factors). 80% of VTE in hospitalized children is induced, and it happens in kids who have many risk factors. The majority of VTE cases develop later in childhood and adolescence, with just 2–8.5% occurring in children without risk factors. In contrast, up to 50% of VTE in adult hospital patients happens without any risk factors.

The overall incidence has two peaks: One in newborns under 2 years old and the other in adolescence. Risk evaluations must take into account the risk factors of smoking, obesity, pregnancy, and the combined oral contraceptive pill in teenagers. Female adolescents are twice as likely as male adolescents to have VTE. Children are substantially less likely to develop VTE than adults, and there are a number of reasons for this reduced frequency. Risk factors that can be acquired over time, such as smoking, oral contraception, pregnancy, and cancer, are less common in children. Diseases that harm the vascular endothelium in kids are less common (e.g., diabetes and hypertension). Child

coagulation systems differ significantly physiologically from adult coagulation systems. From infancy to adulthood, the coagulation cascade, common pathway, and fibrinolytic processes are continuously evolving, which has an impact on the pathway's overall functionality. When compared to adult levels, vitamin K-dependent coagulation protein concentrations are 50% lower at birth and reach adult levels by 6 months of age. Seven procoagulants are present in much lower quantities in children than in adults. Children between the ages of 1-6 have a 25% lower capacity to generate thrombin than adults between the ages of 20 and 25. Levels of the thrombin inhibitor, 2-macroglobulin, are also twice as high in these groups as they are in adults. Only 5% of pediatric patients have no known risk factors, while more than 80% of VTE cases in these patients have one or more risk factors.

The presence of a Central Venous Catheter (CVC) is the main risk factor. Infection, immobilisation, trauma, cancer, chronic inflammatory diseases, and hereditary thrombophilias are additional risk factors. A CVC is linked to two thirds of VTE in kids. This connection explains why children's upper and lower limbs experience VTE in the same anatomical region with comparable frequency. The location of the CVC is crucial since lines placed in the femoral (32%), subclavian (27%), and brachial (12%) veins have a higher incidence of VTE than those placed in the internal jugular vein (8%). The risk is not materially affected by the size and type of CVC used.

Depending on the type of thrombus, VTE in children is treated differently. Treatment aims to stop thrombus progression and embolization, avoid recurrence, and reduce long-term consequences. The length of treatment varies depending on whether the VTE was triggered or not. Low-Molecular-Weight Heparin (LMWH) should be used to begin anticoagulant therapy. For situations where a quick anticoagulation reversal may be necessary, Unfractionated Heparin (UFH) might be employed (e.g., high risk of bleeding after surgery). LMWH has a number of benefits over UFH, including the ability to be delivered subcutaneously, a more predictable response, and fewer monitoring and dose-adjustment requirements.

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