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BRIEF COMMUNICATION

Hospital-associated venous thromboembolism in pediatrics

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Abstract

Venous thromboembolism (VTE) in the in-hospital setting is considered the second contributing factor for damage in hospitalized patients, only losing to catheter-related infections. In the pediatric population, several studies show an increase in the incidence of intra-hospital VTE attributed to increased survival of critically ill patients and the use of intravenous catheters. These, in turn, are considered the main risk factors for VTE in children, while in the adult population, cancer is more prominent.

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From 2007 to 2009, venous thromboembolism (VTE) affected more than 600,000 people in the USA, resulting in more than 180,000 deaths and an annual cost of \$27 billion¹. Recent research conducted in the USA showed that the total cost of treatment for adult patients who develop VTE during hospitalization is more than twice that of patients who do not develop VTE (\$52,127 in patients with VTE compared to \$24,164 in those without for a 6-month treatment)². Both deep venous thrombosis (DVT) and pulmonary thromboembolism (PTE) are preventable causes of death in hospitalized adults, and thromboprophylaxis plays an important role in reducing the risk for DVT in adults³. By contrast, there are few studies on VTE in children.

In the last two decades, VTE incidence in children has exponentially increased. In 1994, the first Canadian Registry of VTE reported an incidence of 0.07 VTE cases for every 10,000 children/year compared with 56-160 cases for every 10,000 adults/year⁴. That incidence has now increased approximately tenfold, as shown by the US estimate of 42-58 VTE cases for every 10,000 hospitalized children using data from a database of pediatric hospital patients in the USA⁵.

DVT is currently the second main cause of preventable in-hospital damage, according to a study conducted in 80 pediatric hospitals in the USA⁶. VTE incidence in children exhibits a bimodal pattern, with the first peak occurring in newborns and infants. The second peak happens in adolescents, particularly in girls, because of the use of hormonal contraceptives and pregnancy, which are both risk factors for thrombosis⁷.

The increased incidence of intra-hospital VTE is probably due to a longer survival of chronic patients thanks to medical advances, particularly in the care of critical patients. It is also probably related to the growing use of invasive devices, such as intravascular catheters, which cause 90% of neonatal VTE cases and 60% of all pediatric cases. Finally, an increased VTE detection in children has also been made possible by better imaging techniques for thrombosis detection and by pediatricians being more aware of the severity of VTE⁷.

There are few Brazilian publications on hospital-associated pediatric VTE. This condition has significant clinical consequences that include post-thrombotic syndrome, PTE, and even death. This makes a nationwide study on this subject very important.

Another argument supporting an investigation of VTE incidence in Brazilian hospitals is related to the quality of medical services. On the other hand, strictly speaking, high-complexity pediatric hospitals with high intra-hospital VTE incidence would no longer meet the required minimum standard of quality to continue admitting patients⁸.

Therefore, this study has a quality control aspect as well. There is also no information about locally adopted therapeutic choices, which may influence the outcome of thrombosis patients. Thus, it is important to define the main VTE risk factors and clinical characteristics of these patients, so that a latter study can evaluate whether the already well-established VTE prophylaxis strategy for adults is also applicable to the pediatric population.

In an attempt to answer that question and considering the scarcity of Brazilian data about this subject, a multicenter observational study was devised, with a two-way cohort and nested control-case study, aimed at identifying VTE risk factors. This study was named TROMBOPED. Partnerships between Brazilian institutions, such as the initial agreement between the Federal University of Rio de Janeiro and the D'Or Institute for Teaching and Research, will be fundamental to create a protocol that is applicable to the country's reality.

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