When protection comes with a risk: Unveiling thrombosis cases following AstraZeneca ® vaccination

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ABSTRACT

Introduction: COVID-19 cases have brought to the development of various vaccines. Among those, various studies show that some of the vaccines carry the risk of thromboembolism, particularly vaccine-induced immune thrombotic thrombocytopenia (VITT) and Cerebral Venous Sinus Thrombosis (CVST). VITT following AstraZeneca® COVID-19 vaccination is more common in younger individuals, particularly women, and after the first vaccine dose. However, other factors leading to VITT is inconclusive and obscured by the many types of studies describing risks of VITT with AstraZeneca® vaccination for COVID-19. This study aims to explore various factors contributing to thrombotic events, long-term health outcomes associated with thrombosis following AstraZeneca® vaccination and comparison of event of thrombosis between different COVID-19 vaccination. **Materials and Methods:** A systematic review was conducted using online databases, including Google Scholar, PubMed, NCBI, Elsevier, and ResearchGate, to identify relevant journal articles published between 2020 and 2025. The search focused on studies related to thrombosis or thromboembolism in connection with the AstraZeneca COVID-19 vaccine and its outcomes. Keywords: Thrombosis/thromboembolism, AstraZeneca®, vaccine, COVID-19. From these keywords and topic relevance, a total of 40 articles were found and other references were found within the articles reviewed. **Results:** Studies investigating long-term outcomes following thrombosis associated with the AstraZeneca® COVID-19 vaccine indicate that patients with vaccine-induced immune thrombotic thrombocytopenia (VITT) and cerebral venous sinus thrombosis (CVST) frequently experience neurological impairments, with some developing permanent disabilities. The reported mortality rate among these patients is approximately 32%. Persistent mental health issues and reduced work capacity were also observed in a subset of cases. Treatment regimens involving anticoagulants, corticosteroids, intravenous immunoglobulin (IVIG), and eculizumab demonstrated effectiveness in managing VITT. Comparative analyses of thrombotic events across different COVID-19 vaccines revealed that adenoviral vector vaccines exhibited higher event rates than mRNA vaccines, with AstraZeneca® (0.58%) and Johnson & Johnson being more commonly associated with thrombosis in younger females. In contrast, thrombotic events following mRNA vaccines—Moderna (0.41%) and Pfizer (0.35%)—were more prevalent among older individuals, particularly males. **Conclusion:** In conclusion, future studies should explore additional sociodemographic factors and their impact on vaccine-related thrombosis, while ongoing research and public health efforts are essential for improving risk detection, treatment, and communication to ensure safe and effective vaccination programs.

Keywords: Cerebral venous sinus thrombosis, AstraZeneca®, Vaccine-induced immune thrombotic thrombocytopenia, COVID-19