

Venous Thromboembolism in COVID-19 Patients Receiving Treatment in Non-intensive Care Units: Understanding Risks and Management Strategies

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Abstract

The COVID-19 pandemic has presented a multifaceted challenge to healthcare systems worldwide. Beyond the respiratory symptoms commonly associated with the disease, emerging evidence suggests a significant association between COVID-19 and venous thromboembolism. While much attention has been directed towards severe cases requiring intensive care, understanding the risk of VTE in patients receiving treatment outside of intensive care units is crucial. This article aims to explore the prevalence, risk factors, pathophysiology, diagnostic strategies and management of VTE in COVID-19 patients treated in non-ICU settings. Venous thromboembolism remains a significant concern in COVID-19 patients receiving treatment in non-ICU settings. Healthcare providers should maintain a high index of suspicion for VTE, especially in high-risk individuals and implement appropriate thromboprophylaxis and surveillance measures to mitigate the risk of thrombotic events. Further research is warranted to refine risk stratification algorithms and optimize VTE prevention strategies in this patient population.

Keywords: Venous thromboembolism • Non-intensive care units • COVID-19

Introduction

Studies have demonstrated that COVID-19 patients hospitalized outside of ICUs still face a substantial risk of VTE. Research indicates that the prevalence of VTE in non-ICU COVID-19 patients varies widely, ranging from 5% to 25%, depending on factors such as patient population, disease severity and thromboprophylaxis strategies. These figures underscore the importance of vigilance in recognizing and managing VTE in all hospitalized COVID-19 patients, irrespective of ICU admission status. COVID-19 induces a systemic inflammatory response, leading to endothelial dysfunction, platelet activation and dysregulated coagulation pathways, predisposing patients to thrombosis. Hospitalized patients, particularly those with moderate to severe COVID-19 symptoms, may experience prolonged immobility due to illness-related fatigue, respiratory compromise, or bed rest, increasing the risk of VTE [1].

Literature Review

Patients with pre-existing medical conditions such as obesity, cardiovascular disease, diabetes mellitus and cancer have a higher baseline risk of VTE, which is further compounded by COVID-19. Advanced age is a significant risk factor for both COVID-19 severity and VTE, with older patients exhibiting higher rates of thrombotic complications. The pathophysiology of VTE in COVID-19 involves a complex interplay of inflammatory, prothrombotic and endothelial factors. Severe acute respiratory syndrome coronavirus 2 infection triggers an exaggerated immune response characterized by

cytokine release, activation of the complement system and endothelial cell dysfunction. This inflammatory milieu promotes a procoagulant state, leading to microvascular thrombosis, venous stasis and activation of the coagulation cascade, culminating in VTE. Early detection of VTE in COVID-19 patients is paramount for timely intervention and improved clinical outcomes [2].

Elevated D-dimer levels are a nonspecific marker of fibrinolysis and can indicate ongoing thrombus formation. However, D-dimer levels may be elevated in severe COVID-19 due to systemic inflammation, limiting their specificity for diagnosing VTE. This noninvasive imaging technique is the primary modality for diagnosing lower extremity deep vein thrombosis and is readily available in non-ICU settings. Computed tomography pulmonary angiography is the gold standard for diagnosing pulmonary embolism and should be considered in COVID-19 patients with a high clinical suspicion for VTE. In patients with contraindications to CTPA or inconclusive results, V/Q scanning can be used to evaluate for PE. The management of VTE in COVID-19 patients treated outside of ICUs involves a multidisciplinary approach aimed at reducing thrombotic burden while minimizing bleeding risk [3-5].

Discussion

Low molecular weight heparin or fondaparinux is recommended for all hospitalized COVID-19 patients unless contraindicated. Emerging evidence suggests that COVID-19 patients outside of ICU settings are still at increased risk of VTE, albeit to a lesser extent compared to critically ill patients. Risk factors such as advanced age, obesity and comorbidities like hypertension and diabetes contribute to heightened VTE susceptibility. The reported incidence rates of VTE in non-ICU COVID-19 patients vary widely across studies, ranging from 5% to 20%. Management strategies involve a combination of pharmacological thromboprophylaxis, mechanical prophylaxis and close monitoring for signs of VTE. Dosage adjustments may be necessary in patients with renal insufficiency or obesity. In COVID-19 patients diagnosed with VTE, therapeutic anticoagulation with LMWH or direct oral anticoagulants is indicated. Close monitoring for bleeding complications is essential, particularly in patients with renal dysfunction or other comorbidities. Intermittent pneumatic compression devices or graduated compression stockings may be used as adjunctive measures to reduce the risk of VTE in immobilized COVID-19 patients. The optimal duration of anticoagulation therapy in COVID-19 patients with VTE remains uncertain and should be individualized based on

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factors such as thrombus burden, bleeding risk and resolution of underlying inflammation [6].

Conclusion

Venous thromboembolism poses a significant clinical challenge in COVID-19 patients hospitalized outside of intensive care units. Understanding the prevalence, risk factors, pathophysiology, diagnostic approaches and management strategies for VTE in this population is essential for optimizing patient outcomes. A comprehensive approach that integrates thromboprophylaxis, early detection and individualized treatment is paramount in mitigating the thrombotic complications associated with COVID-19. Further research is warranted to elucidate the optimal strategies for VTE prevention and management in non-ICU COVID-19 patients.

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Conflict of Interest

None.

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