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**Failure of Chemical Thromboprophylaxis in Critically Ill Medical and Surgical Patients with Sepsis**

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**Abstract**

**Purpose:** Critically ill patients who develop sepsis may be at a higher risk of venous thromboembolism (VTE) prophylaxis failure, however, studies in this population are limited. The objective of this study was to identify the incidence of VTE prophylaxis failure in this population.

**Methods:** This retrospective review of patients admitted to the intensive care unit (ICU) between February 2013 and September 2015 included patients who were diagnosed with sepsis and received heparin or enoxaparin VTE prophylaxis.

**Results:** Of the 355 patients included, 42 (12.5%) developed a VTE. Acute respiratory distress syndrome (ARDS) (31% vs 16.7%,  $p=0.0272$ ) and higher positive end expiratory pressure (10 vs 8,  $p=0.0066$ ) were associated with increased risk of VTE prophylaxis failure. Logistic regression identified ARDS an event risk factor (OR 2.58, 95% CI 1.22-5.42). VTE was associated with an increased ICU (14 vs 9 days,  $p=0.01$ ) and hospital length of stay (26 vs 15 days,  $p<0.0001$ ). The median time from sepsis diagnosis to VTE event was 9 days (IQR 5-13).

**Conclusion:** Critically ill patients with sepsis had a high rate of VTE prophylaxis failure with ARDS being identified as a risk factor for VTE prophylaxis failure.

**Keywords**

Sepsis, venous thromboembolism, acute respiratory distress syndrome, critically ill, anticoagulant, thromboprophylaxis

**1. Introduction**

The incidence of venous thromboembolism (VTE) in hospitalized medical and surgical patients is 40% without thromboprophylaxis [1]. Development of a VTE is associated with increased hospital length of stay, cost, and mortality [1-2]. Critically ill patients are at an increased risk of VTE due to the presence of multiple risk factors such as prolonged immobility, tissue damage from invasive procedures, and pro-thrombotic conditions [3-4]. While utilization of VTE prophylaxis reduces event rates, studies examining this patient population have reported failure rates as high as 9.6% [3]. Risk factors for prophylaxis failure in critically ill patients include history of VTE, end stage renal disease (ESRD), platelet transfusions, vasoactive medications, increased severity of illness, and placement of central venous catheters [3,5-6].

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