



US DEPARTMENT OF DEFENSE

## BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

### Extremity Injury

### Incidence and Clinical Correlates of Venous Thromboembolism (VTE) after Combat-related Amputation

Deep vein thrombosis (DVT) and pulmonary embolism (PE) are potentially life-threatening complications that have not been well studied after traumatic limb amputations caused by combat injury. This is particularly true for US Service Members who sustained severe blast injuries causing high-level and often multiple limb amputations during the recent conflicts, 2009–2011. Researchers at the Naval Health Research Center (NHRC) and Naval Medical Center San Diego (NMCSO)—with funding from Extremity Trauma and Amputation Center of Excellence (EACE) and the Navy Bureau of Medicine and Surgery (BUMED) Wounded, Ill, and Injured (WII) Program—reviewed casualty records in NHRC’s Expeditionary Medical Encounter Database (EMED). The objective was to determine the incidence, post-injury timing, and risk factors for DVT and PE following combat-related limb amputations. Injuries and treatments documented by providers at Role 2 or 3 facilities in Iraq or Afghanistan were reviewed for 366 patients who sustained traumatic amputations proximal to the wrist or ankle. The research team recorded the Injury Severity Score (ISS), number of blood transfusions during initial 24 hours, duration of mechanical ventilation, intensive care unit length of stay, primary outcome, and diagnoses of DVT or PE through 12 months post-injury. Findings included that 28 percent of patients had DVT and/or PE diagnoses, including 16 percent who had a PE.<sup>1</sup> Approximately two thirds of DVT/PE cases occurred within 10 days of injury and nearly 90 percent occurred during the first 60 days post-injury. Increased number of ventilator days and units of blood transfused were significantly associated with increased likelihood of DVT. Increasing units of fresh frozen plasma (FFP) transfused was significantly associated with increased likelihood of PE. Prophylactic medication significantly decreased the likelihood of DVT and PE. The present study helps providers identify early treatment factors that increase patient risk for the life-threatening complications of DVT and PE. The prevalence of PE and DVT was relatively high after traumatic amputation. Therefore, post-injury surveillance and use of prophylactic medication is indicated for this population. Identification of risk factors for DVT and PE helps focus acute care resources more efficiently on patients who are most likely to develop these complications.

<sup>1</sup> Hannon, M., Tadlock, M. D., Melcer, T., Walker, J., Bandle, J., Nieves, K., & Galarneau, M. (2016). Venous thromboembolism after traumatic amputation: an analysis of 366 combat casualties. *The American Journal of Surgery*, 212(2), 230–234. <https://doi.org/10.1016/j.amjsurg.2016.01.031>

