



US DEPARTMENT OF DEFENSE
BLAST INJURY RESEARCH PROGRAM
COORDINATING OFFICE

Health Outcomes and Long-Term Care Following Extremity Injury

Increased Prevalence of Metabolic Syndrome Among Combat Veterans with Lower Limb Amputation

Studies of World War II Veterans found relatively high rates of cardiovascular disease, including long-term mortality following combat-related amputations. However, little research has described risk factors for cardiovascular disease, including metabolic syndrome among US Service Members who sustained lower limb amputations in the Iraq and Afghanistan conflicts. Approximately 90 percent of these combat amputations were caused by blast injuries. This study described cardiovascular disease risk factors, including metabolic syndrome for patients with lower limb amputations and those with serious lower extremity injuries without amputation. Researchers at NHRC and the San Diego VA, with funding from the BUMED Wounded, Ill and Injured program, identified study patients and injury-specific data in NHRC's EMED. Patients were injured in Iraq and Afghanistan between 2001 and 2008 and had serious lower limb injury without amputation (n = 162), unilateral (n = 380), or bilateral (n = 134) lower limb amputations. VA national data sources provided cardiovascular disease measures over an average of five years post-injury. These measures included blood pressure, body mass index (BMI), high- and low-density lipoprotein cholesterol, and metabolic syndrome. Researchers found significantly increased likelihood of cardiovascular disease risk factors, particularly following bilateral amputation compared to no amputation. These elevated risk factors included high-density lipoprotein cholesterol and metabolic syndrome. Importantly, the team found that the association between amputation and increased metabolic syndrome was significant only for patients with high BMI (>28 kg/m²). For patients with high BMI, the prevalence of metabolic syndrome was 11.5 percent among Veterans without amputation versus 25.9 percent and 32.7 percent for Veterans with unilateral or bilateral amputation, respectively.

The present study indicates that lower limb amputation, and particularly bilateral lower limb amputation, is associated with increased cardiovascular disease risk. The study identifies an important modifiable variable, namely bodyweight or BMI, which is associated with increased likelihood of metabolic syndrome for patients with lower limb amputations. The results support the need for primary care and lifestyle interventions to manage weight and lipid levels, particularly following combat-related amputations.