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Abnormal red blood cell rheology as a contributor to Gulf War Illness


Currently, 25-32% of military personnel that were deployed to the Persian Gulf for Operations Desert Shield and Storm (1990-1991) are afflicted with the chronic disorder known as Gulf War Illness (GWI). Veterans with GWI exhibit persistent health issues such as unremitting fatigue, widespread musculoskeletal pain and cognitive impairment being the most commonly reported symptoms. The purpose of this study was to determine whether the microrheological behavior of RBCs is altered in GWI following exercise. We recruited seventeen Gulf War veterans (GWV) with GWI (GWI+) and 10 age matched controls (GWI-). Venous blood was collected pre and post exercise. RBC deformability and aggregation were measured by ektacytometry along with complete blood counts. RBCs were more deformable in GWI+ pre and post-exercise as indicated by higher elongation indices when compared to GWI-. Aggregation formation, stability and kinetics were similar between GWI+ and GWI- pre and post exercise. Complete blood counts were also similar, with the exception of mean corpuscular hemoglobin (MCH), mean corpuscular hemoglobin concentration (MCHC)

and RBC distribution width (RDW) which was elevated in GWI+. In this study, we observed increased deformability in veterans with GWI+ at rest and following exercise. These results suggest that the already abnormal erythrocytes in GWIV are not worsened by a bout of exercise and that this underlying abnormality may be a contributing factor to their feeling fatigued. Further research is required to confirm our findings and the role of RBC microrheology in GWI.

Speaker Biography

Michael R Condon, completed his PhD and currently working as a senior scientist in the Department of Surgical Services at the veteran's affairs, New Jersey Health Care System. He has over 20 years experience examining the effect of trauma/injury. His previous research focused on the effect of hemorrhagic shock on red blood cell (RBC) deformability and its contribution to organ injury/failure. His current research explores the involvement of RBC dysfunction as a contributor to disease, has led to a strong collaboration with Dr Michael J Falvo from the New Jersey war related illness and injury study center, examining RBC contribution to the maintenance of symptoms reported by veterans identified as having Gulf War Illness (GWI).

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