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SPACEFLIGHT ADVANCED TRAUMA & LIFE SUPPORT (SATLS): A TRAUMA MODEL FOR
EXPLORATION CLASS MISSIONS BASED ON THE PRINCIPLES OF BATTLEFIELD ADVANCED
TRAUMA AND LIFE SUPPORT (BATLS)

Abstract

The provision of immediate patient care in low Earth orbit and beyond requires the adaptation of existing management strategies and the development of novel approaches.

The unique environmental considerations associated with spaceflight often mean it is not feasible to employ conventional terrestrial equipment and diagnostic techniques in the trauma setting.

Factors impacting patient care may include altered gravity environments, pressure and temperature discontinuity hazards, environmental contaminants, adverse effects of radiation including electromagnetic interference, as well as physical space limitations. These may increase the ambient risk of injury including likelihood of ballistic injury, blast trauma, crush injuries, burns, major haemorrhage and airway compromise.

Medical responders will be further limited by their protective equipment, available skill sets, and limited resources available. Care may also be complicated by a complex transport pathway to definitive treatment. These factors may also lead to unique ethical challenges for the treating team.

As a conventional trauma team will not be available, all members of an astronaut crew should be proficient in a systematic approach to emergency treatment. This is pertinent given the potential consequences of catastrophic trauma occurring during extended missions.

This is particularly true with the advent of Artemis. The nature of extravehicular activity (EVA) and work performed will expand to include exploratory, scientific, engineering and mining operations. The nature of medical emergencies and pathologies encountered can be expected to change to reflect this. Consequently, treatment preparation and planning needs to evolve to reflect this.

The nature of Artemis operations means that the time to return to definitive medical care on Earth increases from hours on the ISS to a minimum of 3-5 days for Lunar MEDEVAC.

The Battlefield Advanced Trauma and Life Support (BATLS) model provides a suitable paradigm which can be adapted for space flight. Relevant components of BATLS include adaptation to austere or hazardous environments, the anticipation of significant trauma, resource limitation and multiple casualty scenarios. The model also anticipates difficulties accessing definitive care which can be a feature of both military and space environments.

This presentation explores how the BATLS model can be successfully adapted into a Spaceflight Advanced Trauma Life Support (SATLS) model.