



US DEPARTMENT OF DEFENSE

# BLAST INJURY RESEARCH PROGRAM COORDINATING OFFICE

## Clinical Decision Support Tools Open Abdomen CDST

Damage control laparotomy (DCL) followed by temporary abdominal closure, resuscitation, and planned re-laparotomy is used to manage critically injured patients who cannot be closed primarily at the initial operation. Leveraging its growing biobank/databank of trauma patients, the Surgical Critical Care Initiative (SC2i) is developing a Clinical Decision Support Tool (CDST) to inform the timing of delayed fascial closure after DCL. Identifying risk factors for delayed fascial closure may help to avoid the complications of multiple attempts to close and optimize the chance of a successful planned staged ventral hernia; this could shorten time to recovery and potentially prevent some of the complications seen after DCL in this population.

Researchers from Uniformed Services University of the Health Sciences (USUHS; Bethesda, Maryland), Walter Reed National Military Medical Center (Bethesda, Maryland), Naval Medical Research Center (Silver Spring, Maryland), Emory University (Atlanta, Georgia), Grady Memorial Hospital (Houston, Texas), Duke University (Durham, North Carolina), Henry M. Jackson Foundation for the Advancement of Military Medicine (Bethesda, Maryland), and Decision Q Corporation (Arlington, Virginia), found that elevated peak serum and wound procalcitonin (PCT) levels may be associated with delayed fascial closure after DCL.

This study included 75 patients who underwent exploratory laparotomy for blunt or penetrating trauma between September 2014 and June 2016 at Grady Memorial Hospital (Atlanta, Georgia), a Level 1 trauma center associated with the SC2i. Serum and peritoneal fluid was collected at the initial laparotomy and all subsequent abdominal operations. Luminex® and PCT assays were performed on all specimens and a multiclass model was subsequently developed to predict the success or failure of fascial closure after trauma laparotomy. This multiclass model best predicts which patients will undergo successful primary fascial closure and open the door to the development of CDSTs to individualize management of injured patients undergoing trauma laparotomy.

This challenge is particularly relevant to combat casualty care; the deployment of the Open Abdomen CDST has the potential to dramatically improve outcomes and lower resources utilization for the Military Health System.

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