Extremity Injury

WounDx Clinical Decision Support Tool (CDST)

Complex war wounds require aggressive surgical care. Serial debridement procedures are performed to remove devitalized tissue and decrease bacterial load. While high-pressure irrigation and negative pressure therapy with vacuum-assisted closure application have improved wound management, the basic surgical decision regarding appropriate timing of war wound closure or coverage remains subjective. In the context of high rates (15~20 percent) of wound dehiscence in the combat wounded, researchers at Surgical Critical Care Initiative (SC2i) at Uniformed Services University of the Health Sciences (USUHS) have developed a biomarker based CDST to assist in the decisions on timing of wound closure.[1] Wound dehiscence is defined as loss of greater than 10 percent of a skin graft, dehiscence of a primary wound closure requiring debridement, failure of a tissue flap requiring repeat operative intervention, or need for subsequent amputation. The consequences of these complications are many: lengthy delays to definitive wound closure, increased pain, nutritional setbacks, higher costs, and further loss of function if an amputation level should be raised to save a Service Member's life. This CDST was developed to assist surgeons in determining the optimal timing of traumatic wound closure. The model has been tested/validated internally and performs well (Area Under the Curve (AUC) of 0.84 and 0.87 for dehisced/heal). Grounded in research on datasets from civilian as well as military patients using clinical and biomarker data, this CDST model is expected to reduce wound dehiscence rates from the current rate of 15 percent to only 5 percent. Achieving this goal will produce multiple benefits, including decreased pain, fewer complications, better outcomes, and lower net costs (e.g., reducing the need for repeated operations, hospital-acquired infections, and length-of-stay in the intensive care unit or on the General Ward). It should also increase the likelihood that a severely injured Service Member can eventually RTD. Termed 'WounDx', this CDST has direct applicability in both military and civilian healthcare systems as similar wound failure rates occur in both settings. In short, the WounDx CDST will decrease the time from injury to successful wound closure, thereby improving clinical outcomes and lowering costs for the MHS (estimated savings of $60,000 per patient). An Investigational Device Exemption (IDE) package is being finalized for submission to the FDA, ahead of launching a clinical trial to validate the clinical utility of this CDST.

1 Surgical Critical Care Initiative. (2015a). National and Military Health System Cost Savings from WoundDX. Retrieved from http://www.sc2i.org/site/assets/files/1039/national_and_mhs_cost_savings_from_ woundx-1.pdf