
41 Enhancing Burn Medical Care During a Disaster Using a Novel Augmented-Reality Application

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Introduction: In disaster or mass casualty situations, access to remote burn care experts, communication, or resources may be limited. Furthermore, burn injuries are complex and require substantial training and knowledge beyond basic clinical care. Development and use of decision support (DS) technologies may provide a solution for addressing this need. Devices capable of delivering burn management recommendations can enhance the provider's ability to make decisions and perform interventions in complex care settings. When coupled with merging augmented reality (AR) technologies these tools may provide additional capabilities to enhance medical decision-making, visualization, and workflow when managing burns. For this project, we developed a novel AR-based application with enhanced integrated clinical practice guidelines (CPGs) to manage large burn injuries for use in different environments, such as disasters.

Methods: We identified an AR system that met our requirements to include portability, infrared camera, gesture and voice control, hands-free control, head-mounted display, and customized application development abilities. Our goal was to adapt burn CPGs to make use of AR concepts as part of an AR-enabled burn clinical decision support system supporting four sub-applications to assist users with specific interventional tasks relevant to burn care. We integrated relevant CPGs and a media library with photos and videos as additional references.

Results: We successfully developed a clinical decision support tool that integrates burn CPGs with enhanced capabilities utilizing AR technology. The main interface allows input of patient demographics and injuries with step-by-step guidelines that follow typical burn management care and workflow. There are four sub-applications to assist with these tasks, which include: 1) semi-automated burn wound mapping to calculate total body surface area; 2) hourly burn fluid titration and recommendations for resuscitation; 3) medication calculator for accurate dosing in preparation for procedures and 4) escharotomy instructor with holographic overlays.

Conclusions: We developed a novel AR-based clinical decision support tool for management of burn injuries. Development included adaptation of CPGs into a format to guide the user through burn management using AR concepts. The application will be tested in a prospective research study to determine the effectiveness, timeliness, and performance of subjects using this AR-software compared to standard of care. We fully expect that the tool will reduce cognitive workload and errors, ensuring safety and proper adherence to guidelines.

42 COVID-19 Slowdown? Not in Our Burn Center!

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Introduction: There has been a great concern that the COVID-19 pandemic has interfered with burn care. The feeling has been that resources have been shifted to treating the COVID patients and that "shelter-in-place" requirements have reduced the risks for burn injury. The ABA and other organizations have sent biweekly surveys in order to determine how the pandemic has interfered with burn care. Despite these concerns, we seemed very busy.

Methods: The inpatient data was collected in our adult and pediatric burn centers between January 1, 2020 and August 31, 2020.

Results: During the COVID-19 pandemic there was an increase in burn admissions in both adult and pediatric centers. At the same time there were 1270 COVID-19 adult admissions and 4 COVID-positive admissions at the pediatric center. In the adult center, there was increase from 414 total admissions from fiscal year 2019 (7/2018-6/2019) of 414 to 495 for fiscal year 2020 (7/2019-6/2020). The average daily census also increased from 18.33 to 18.36 during the same period. The monthly number of burn admissions increased from 38.5/month for the last six months of 2019 to 44/month for the first six months of 2020. The admission rate continued in July (41) and August (47). In the first 8 months of 2020, there were 356 admissions with a mean TBSA of 11.3%. There were many large burns admitted in late summer. The mean TBSA of the 12 bed ICU on September 11, 2020 was 60.6% (range 25–85%). In the pediatric unit, there were 174 admissions through July 2020, a 6% increase from the preceding same period. There was a 6% decrease in burn reconstruction.

Conclusions: Despite a significant burden of COVID-19 patients, burn admissions also increased at the same time. There was no evidence that "shelter-in-place" requirements changed the risk for burn injuries. Resources for critical care needs should not be siphoned away from burn centers during pandemics. Risky behaviors leading to burns do not go away despite new health crises.