A Crew Resource Management Program Tailored to Trauma Resuscitation Improves Team Behavior and Communication

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BACKGROUND: Crew Resource Management (CRM) is a team-building communication process first implemented in the aviation industry to improve safety. It has been used in health care, particularly in surgical and intensive care settings, to improve team dynamics and reduce errors. We adapted a CRM process for implementation in the trauma resuscitation area.

STUDY DESIGN: An interdisciplinary steering committee developed our CRM process to include a didactic classroom program based on a preimplementation survey of our trauma team members. Implementation with new cultural and process expectations followed. The Human Factors Attitude Survey and Communication and Teamwork Skills assessment tool were used to design, evaluate, and validate our CRM program.

RESULTS: The initial trauma communication survey was completed by 160 team members (49% response). Twenty-five trauma resuscitations were observed and scored using Communication and Teamwork Skills. Areas of concern were identified and 324 staff completed our 3-hour CRM course during a 3-month period. After CRM training, 132 communication surveys and 38 Communication and Teamwork Skills observations were completed. In the post-CRM survey, respondents indicated improvement in accuracy of field to medical command information ($p = 0.029$); accuracy of emergency department medical command information to the resuscitation area ($p = 0.002$); and team leader identity, communication of plan, and role assignment ($p = 0.001$). After CRM training, staff were more likely to speak up when patient safety was a concern ($p = 0.002$).

CONCLUSIONS: Crew Resource Management in the trauma resuscitation area enhances team dynamics, communication, and, ostensibly, patient safety. Philosophy and culture of CRM should be compulsory components of trauma programs and in resuscitation of injured patients. (J Am Coll Surg 2014; 219:545–551. © 2014 by the American College of Surgeons)

Crew Resource Management (CRM) is a communication tool developed in the aviation industry. Review of airline disasters determined safety information was often known to individual crew members but not to all crew members. Inadequate interpersonal communication, poor decision making, and lack of leadership resulted in ineffective information sharing, which inspired CRM, to improve safety through enhanced communication for all team members. This is particularly important for those teams in which there is a perceived power inequality. By flattening the hierarchy, communication is encouraged, leading to improved team interactions.[1]

A growing number of health care disciplines are now using CRM techniques.[1] Such initiatives have been described as transformative and culturally sustainable in improving patient safety.[2,3]

Crew Resource Management in our facility was initially implemented in our operating rooms. Our hospital Board of Directors sought opportunities to improve safety in other patient-care venues. From this established

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Abbreviations and Acronyms

CATS = Communication and Teamwork Skills
CRM = Crew Resource Management
ED = emergency department
HFAS = Human Factors Attitude Survey
TRA = trauma resuscitation area

operating room model, our trauma resuscitation-specific CRM process evolved.

Patients meeting trauma activation criteria are met on arrival in the resuscitation area by the multidisciplinary trauma team. The team goal is to meet the immediate needs of the patient with appropriate resources. Members bring various educational levels and backgrounds, as well as varying degrees of clinical experience.

Trauma team members participate in a number of educational courses to prepare them to resuscitate patients. Advanced Trauma Life Support teaches physicians how to evaluate and resuscitate patients.[4] Similarly, Advanced Trauma Care for Nurses teaches nurses how to assess and care for patients.[5] Although these courses teach their respective audiences how to evaluate and resuscitate patients, little attention is explicitly targeted to teach effective communication. Other team members are rarely exposed to team dynamic education beyond technical skills.

Because of the high volume and acuity of trauma resuscitations, where excellent communication is essential to successful outcomes, we developed a trauma resuscitation-focused CRM program. This article describes the development, implementation, and effectiveness of a modified CRM process in the trauma resuscitation area (TRA). The purpose of this study was to evaluate the effectiveness of a team-building process in resuscitation of trauma patients. Specifically, would the use of a CRM program, modified for use in the TRA, improve teamwork and communication?

METHODS

This investigation highlights efforts to improve patient safety in trauma resuscitations in our 572-bed community teaching hospital with state designation as a Level I regional resource trauma center. The emergency department (ED) sees approximately 77,500 visits per year; 1,600 patients are admitted to the trauma service. Of those, approximately 15% have an Injury Severity Score >15.

A multidisciplinary steering committee with representation from Emergency Medicine, Trauma Services, Nursing, Quality Management, Patient Safety, and Surgical Services was convened. A project charter was completed with timeline development. A process flow map of team communication related to trauma resuscitation was created for purposes of identifying opportunities for CRM effectiveness.

A 23-question predidactic education survey about trauma resuscitation teamwork and communication was developed based on the Human Factors Attitude Survey (HFAS).[2] The HFAS has been used to evaluate CRM in medical settings and is based on similar work by the National Aeronautics Space Administration and the aviation industry.[2] The HFAS was modified to include topics on team leadership, team effectiveness, decision making, and communication. The surveys were formulated in a standard 5-point Likert scale ranging from strongly agree to strongly disagree. The providers surveyed were asked to give a 1-word description of communication in the TRA. The descriptors were classified as positive, negative, or neutral.

The Communication and Teamwork Skills (CATS) assessment was used to observe teamwork and communication.[6] The CATS assessment includes categories for coordination of care, situational awareness, cooperation, and communication. An independent observer, trained in the use of CATS, scored trauma resuscitations. Results of observations were recorded by noting observed behavior and did not indicate the appropriateness or effectiveness of the observation.

Based on the results of the HFAS and CATS, problem areas for communication in the process flow map were identified. Root causes were considered and solutions were suggested and incorporated into the didactic curriculum. Any staff member that participated in trauma care was required to attend CRM training. This commitment was financially supported by our institution.

After completion of the didactic CRM training, participants were resurveyed using the identical HFAS. The same independent observer from the pre-CRM training observations used CATS to score post-training resuscitations. Statistical analyses by chi-square and Fisher's exact test were conducted using IBM SPSS Statistics software (version 19, 2012, SPSS, Inc). The project was evaluated and approved by the WellSpan Institutional Review Board.

RESULTS

The initial Trauma Communication Survey was completed by 160 personnel (49.4% response). Twenty-five pre-CRM trauma resuscitations were observed and scored using CATS. Communication issues were identified and the following recommendations to improve team interactions were made: standardize and consistently report patient information during all handoffs, especially prehospital to medical command