[ET-32] Developing a multidisciplinary in situ simulation based curriculum to improve resuscitation skills among members of peri-operative services

Lo C, Njoku D, Shaffner D, Koka R, Patel S, Hunt E, Gentry C, Dodson A
Johns Hopkins University , Baltimore , MD, USA

Background: Intraoperative arrest is a rare and potentially devastating complication that can affect either healthy or ill children. Resuscitation during a perioperative arrest can be difficult due to patient positioning, limited access due to a sterile surgical field, use of cardiac depressants, surgical procedure, or underlying medical conditions. Despite of PALS training by OR team members, resuscitation is often chaotic. To address these issues leaders from Pediatric Anesthesiology and Perioperative Nursing developed a multidisciplinary in situ simulation based education curriculum to improve the quality of resuscitation in the OR.
Method: A prospective observational cohort study was carried out to obtain pilot data regarding the quality of resuscitation during a simulated arrest and to identify areas of deficiency. Those who participated in the simulation were also surveyed regarding their past resuscitation experience.
Results: This is an ongoing study with data from seven in situ simulations. An intraoperative arrest (ventricular fibrillation) due to massive blood transfusion in a trauma patient was simulated. The participants included 19 anesthesia providers (residents, fellows, CRNA and SRNA) and 20 perioperative nurses. The data is expressed as a mean value time from the onset of the arrest. The mean duration of arrest was 9 min 45 sec with arrest onset recognized and verbalized by participants as either loss of end tidal CO2, blood pressure, pulse oximetry or EKG changes. In only one instance was ventricular fibrillation verbalized as the cause of arrest. Time to inhalation agent discontinuation was 1 min 13 sec (two instances of failure to verbalize gas off), surgical drapes were down in 1 min 41 sec and chest compressions were initiated within 23 sec. All the team leaders encouraged the compressor to push harder, faster, used end-tidal CO2 and/ or diastolic BP as a guide, and changed compressors as seemed necessary. Timing for epinephrine administration was inconsistent, resulting in insufficient dosing or overdose. Most participants failed to recognize correct cause of arrest and suspected hypovolemia or tension pneumothorax in a trauma patient and hence delayed shock delivery. None of the providers activated ECMO at 6 minute. The survey showed that providers were unfamiliar with location of difficult airway cart (31%), the crash cart (26%) and intraosseous needles (40%). Surveyed members reported lack of a standardized method to record events of arrest, poor crowd control and the need for further training.
Discussion: In situ, simulation based, training can help to improve the dynamics of complex work flow during an arrest. High quality CPR is the cornerstone for successful outcome following a cardiac arrest. Based on our results, in situ resuscitation simulation can be applied to OR staff to identify areas of weakness and planning for future training.
References:
Howard-Quijano KJ et al: Anesthesiology residents' performance of pediatric resuscitation during a simulated hyperkalemic cardiac arrest. Anesthesiology 2010; 112:993
Hunt EA et al: Delays and errors in cardiopulmonary resuscitation and defibrillation by pediatric residents during simulated cardiopulmonary arrests. Resuscitation 2009; 80:819
