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Commentary

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In-hospital Cardiopulmonary Resuscitation Outcomes

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In-hospital cardiopulmonary resuscitation is one the most common medical procedure performed in hospitals. Despite recommended guidelines for reviewing, reporting, and conducting research on in-hospital resuscitation published already in 1997 [1] only recently this subject gained more attention [2]. The overal in-hospital resuscitation survival rate with good neurological outcome is low and varies considerably between hospitals. Reported survival to hospital discharge varies from 0% to 42% with the most common range being between 15% and 20% [3]. There are also differences in survival rates between in-hospital areas like general ward versus emergency department versus intensive care units versus operation room. Definition of in-hospital cardiac arrest or circulatory arrest is very broad, not clearly definied and includes all pulseless cardiac rhythms requiring intervention. The need for chest compressions is the main landmark for inclusion criteria for many in-hospital resuscitation registries. The incidence of treated in-hospital cardiac is rarely reported and values range between 1 and 5 events per 1,000 hospital admissions, or 0.175 events/bed annually [3]. Approximately 200 000 US patients annually experience in-hospital cardiac arrest with resuscitation attempt [2]. The most common causes of in-hospital cardiac arrest in adults are: cardiac arrhythmia, acute respiratory insufficiency and hypotension mainly because of bleeding [4]. Although a primary arrhythmia is one of the precipitants in nearly half of adult cardiac arrests, only 25% of in-hospital cardiac arrest victims have ventricular fibrillation or ventricular tachycardia as the initial pulseless rhythm [5]. Pre-resuscitation risk factors associated with increased mortality after in-hospital resuscitation among others are advanced age, pre-existing malignancy, acute stroke, trauma, septicemia, hepatic insufficiency [6]. The crucial question in each case of cardiopulmonary resuscitation attempt is: what is the likehood of survival with a good neurological outcome? There are variables associated with favorable neurological survival after in-hospital resuscitation like younger age, initial cardiac arrest rhythm of ventricular fibrillation or pulseless ventricular tachycardia with a defibrillation time of 2 minutes or less, baseline neurological status without disability, arrest location in a monitored unit, shorter duration of resuscitation, but also the absence of mechanical ventilation, renal insufficiency, hepatic insufficiency, sepsis, malignant disease, and hypotension prior to the arrest. The cardiac arrest survival post resuscitation in-hospital score card and normogram for favorable neurological survival has been proposed [7]. The presence of resuscitation system errors like delay in defibrillation and/or vasopressor therapy as well as improper timing in airway management are evident from review of the resuscitation records and are associated with decreased survival from in-hospital cardiac arrest in adults [8]. There is a need for anaesthesia related advanced life support guidelines to be issued in support of the existing resuscitation guidelines [9]. Unanswered questions remain: is cardiac arrest survival the best option to measure and what is the success after the cardiac arrest? Having this in mind we should not forget that *no patient whose death is preventable should die in an operation room or hospital – ever* [10].

Key points to be considered for in-hospital cardiopulmonary resuscitation issue:

- Monitoring, reporting and reviewing in-hospital resuscitations cases including long term neurological outcome is recommended.
- Patients who witnessed and/or monitored at the time of cardiac arrest demonstrate a higher rate of survival.
- At the bedsite patient specific information should be available to assist in revising resuscitation plans.
- Hospitals should target the training of first responders and code team personel in compliance with resuscitation protocols.

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