



Aggressive, Early Defibrillation Compared to Traditional Advanced Cardiac Life Support (ACLS) in Post-Operative Cardiothoracic Surgery Patients

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Introduction

According to American Heart Association (AHA) ACLS recommendations, no clear guidelines exist for resuscitation of post-operative cardiothoracic surgery patients. Use of European Resuscitation Council (ERC) guidelines can provide better structure for cardiopulmonary resuscitation (CPR) in these patients while reducing patient mortality.

PICO Question

Population: Post-operative cardiothoracic surgery patients requiring sternotomy

Intervention: Aggressive, early defibrillation

Comparison: Traditional ACLS

Outcome: Survival rates

Question: In post-operative cardiothoracic surgery patients requiring sternotomy, does aggressive, early defibrillation compared to traditional ACLS guidelines increase chances of survival for patients in the Intensive Care Unit?

Methods

Databases: CINAHL, EbscoHost, PubMed

Keywords: *European Resuscitation Council, cardiac surgery, CPR, ACLS, cardiac arrest*

Inclusion Criteria: Articles within 10 years, groundbreaking articles, inpatient arrests, adult cardiac surgery patients

The initial search yielded 302 articles and 8 articles were included for this project.

Results

Level of Evidence	Number of Articles	Summary
Level I	2	<ul style="list-style-type: none"> If defibrillator readily available, administer 3 stacked shocks within 2 minutes⁽³⁾ Changes to existing protocols should be discussed as a unit and training administered to minimize risk of harm⁽³⁾ If cardiac arrest occurs within 24 hours of surgery, survival to discharge is 54-79% with prompt treatment⁽⁷⁾ Need for more than 3 defibrillation attempts should trigger need for re-sternotomy⁽⁷⁾ Resternotomy should be standard practice during cardiac arrest for 10 days following surgery⁽⁷⁾
Level IV	1	<ul style="list-style-type: none"> ≤ 5 minutes of chest compressions resulted in 70 - 79% survival to discharge and 55% survival rate at 4 years post-discharge⁽²⁾
Level V	2	<ul style="list-style-type: none"> If defibrillator not readily available, pacing is recommended for patients in asystole or bradycardic pulseless electrical activity during CPR phase⁽⁴⁾ Evidence to change current ACLS guidelines regarding chest compressions is not strong enough⁽⁴⁾ For ventricular fibrillation, shock x3. Likelihood of 4th shock succeeding < 10%, move to chest compressions and prepare to open chest if resuscitation unsuccessful⁽⁶⁾
Level VI	3	<ul style="list-style-type: none"> Chest re-exploration in the Intensive Care Unit can be safe if standardized protocols are in place⁽¹⁾ Patients who arrest within 24 hours of surgery are likely to benefit from chest reopening. Cardiopulmonary bypass can be beneficial during re-exploration process⁽⁵⁾ Chest reopening within 10 minutes of arrest increases survival⁽⁵⁾ Patients who received CPR after circulatory arrest had better outcomes with re-thoracotomy and CPB used liberally⁽⁸⁾

Group	Question 1	Question 2	Question 3	Question 4
Paired Surveys (n=36)	0.009283	0.000002	0.000000	0.000000
All Surveys (n=71)	0.162884	0.000048	0.000002	0.000000

Conclusions

A thorough review of literature concludes that rapid defibrillation within two minutes of arrest should precede chest compressions when cardiac arrest occurs in post-operative cardiothoracic surgery patients. Furthermore, re-sternotomy is recommended if three attempts at defibrillation are unsuccessful in order to further decrease the likelihood of chest trauma. Higher survival rates to discharge, decreased chest trauma, and nurse and physician stakeholder buy-in serve as reasons to implement early defibrillation efforts in this patient population.

Discussion

Anecdotal reports suggested bedside nurses were uncomfortable providing necessary interventions during a postoperative cardiothoracic surgery arrest. As a result of this present review, simulation education was developed and executed based upon ERC guidelines. Confidence levels and knowledge were measured pre-post simulation and data is currently being analyzed.

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