

CCR Rotation
IRB Proposal
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Longer Duration Cardiopulmonary Resuscitation and Survival to Discharge among the Elderly after In-hospital Arrest

A. Study Purpose and Rationale

Recent evidence suggests that longer duration of cardiopulmonary resuscitation is associated with slightly higher survival to discharge from hospital rates.¹ In the large, multi-centered retrospective trial, hospitals with longer median duration of CPR efforts of 30+ minutes had survival to discharge rates of 16.2% versus hospitals with shorter median CPR duration of <10 minutes with rates at 14.5%. While the evidence shows a significant yet small survival to discharge advantage among hospitals with longer CPR duration, none of the patients studied were very elderly. Among patients that are 80 years and above, there is no data regarding CPR duration and survival to discharge rates. As the population continues to age with more living into their 90s and 100s, it is important to further evaluate the role of longer duration of CPR efforts in this cohort.

Multiple studies have shown that octogenarians and nonagenarians have worse survival to discharge rates after both in-hospital and community cardiac arrest compared to younger elderly.²⁻⁵ For in-hospital arrest, these rates vary from approximately 17-22% among octogenarians and down to 12% for nonagenarians.³ While the strongest predictor of outcome after CPR is cardiac rhythm, older age has been associated with lower survival to discharge. The decrease survival benefit has often been attributed to the greater burden of chronic disease and poor functional status among the very elderly. On the other hand, some studies show no association with age and both short term and long term survival rates which leaves the health care provider with little guidance regarding the overall benefit of CPR in this cohort.⁶

Cardiopulmonary resuscitation is a traumatic procedure by which the patient undergoes forceful chest compressions, and often cardiac defibrillation and

intubation. If the patient survives, they may suffer post cardiac arrest brain injury, myocardial dysfunction and pain. It remains contentious whether or not the duration of anoxia and CPR portend to worse neurologic and functional impairment. Bebek et al found that anoxia at 10 minutes and CPR duration >30 minutes are predictors of poor neurological outcome. On the other hand, Golderberger et al found no difference in neurologic status among patients that survived to discharge after short or long CPR efforts. These repercussions of CPR - neurological and functional impairment, poor quality of life and inevitable economic cost – are other factors that should be considered very carefully for patients with cardiac arrest.

The purpose of this study will be to evaluate if there is a benefit of CPR of 20 minutes on survival to hospital discharge in patients 80 years old and above at a larger, academic, tertiary academic medical center. The study will analyze data between January 2009 – December 2011. The study expects that very few patients in any (0-0.5%) will survive to discharge after longer duration CPR. If this is in fact found, it may guide the clinician and hospital regarding the utility of long CPR efforts in the very elderly cohort.

B. Study Design and Statistical Analysis: Retrospective chart review of hospitalized patients greater than 80 years of age that underwent in-hospital cardiopulmonary resuscitation for 20 minutes or more at Columbia Presbyterian Medical Center between January 2009 and December 2011. In hospital cardiac arrests is defined as absence of palpable pulse, blood pressure reading and apnea. The duration of the CPR will be coded in minutes and is defined as the time of onset of CPR until termination of efforts either due to return of spontaneous pulse or declaration of death. Cases of cardiac arrest will be identified from cardiac arrest notes. The primary outcome is survival to hospital discharge.

A one sample Chi-square test will be used to evaluate the rate of survival to hospital discharge among the selected patients. Limited evidence exists regarding this specific age group and CPR. In the Goldberger study, the hospitals with the longest median CPR duration had 1.7% more patients survive to discharge. Given that the patient population of this study is older, the estimated survival to discharge rate is 0.5%. The percentage of survival to discharge that will support the utility of

longer duration CPR is 3%. In order to obtain power analysis estimates of 80% and a p value <0.5, the study will enroll 260 patients.

C. Study Procedure – As described above, this study is a retrospective chart review. The entire study duration is unknown but will likely be approximately 3-4 months for data collection and analysis.

D. Study Drugs – N/A

E. Medical Device – N/A

F. Study Questionnaires – N/A

G. Study Subjects – Inclusion criteria are 1) hospitalized at Columbia Presbyterian Medical Center between January 2009 – December 2011. 2) Age: 80 years of age or older 3) Suffered cardiac arrest during current hospitalization.

Exclusion criteria are 1) prior cardiac arrest 2) Cardiac arrest that occurred in the ED or outside of the hospital

H. Recruitment of Subjects - N/A

I. Confidentiality of Study Data - All study data will be coded and patient identifiers excluded. All data will be stored in a secure location and accessible only to the investigators.

J. Potential Conflict of Interest – N/A

K. Location of Study – The data will be collected in Milstein Building, Columbia Presbyterian Hospital.

L. Potential Risks – N/A

M. Potential Benefits – N/A

N. Alternative Therapies- N/A

O. Compensation to Subjects – N/A

P. Costs to Subjects – N/A

Q. Minors as Research Subjects – N/A

R. Radiation or Radioactive Substances – N/A

S. References:

1. Goldberger ZD, Chan PS, Berg RA, et al. Duration of resuscitation efforts and survival after in-hospital cardiac arrest: an observational study. *Lancet*. Sep 4 2012.

2. Ehlenbach WJ, Barnato AE, Curtis JR, et al. Epidemiologic study of in-hospital cardiopulmonary resuscitation in the elderly. *The New England journal of medicine*. Jul 2 2009;361(1):22-31.
3. Kim C, Becker L, Eisenberg MS. Out-of-hospital cardiac arrest in octogenarians and nonagenarians. *Archives of internal medicine*. Dec 11-25 2000;160(22):3439-3443.
4. Ebell M. In-hospital cardiopulmonary resuscitation. *The Journal of the American Board of Family Practice / American Board of Family Practice*. Jul-Aug 1993;6(4):434-435.
5. Kentsch M, Stendel M, Berkel H, Mueller-Esch G. Early prediction of prognosis in out-of-hospital cardiac arrest. *Intensive care medicine*. 1990;16(6):378-383.
6. Di Bari M, Chiarlone M, Fumagalli S, et al. Cardiopulmonary resuscitation of older, inhospital patients: immediate efficacy and long-term outcome. *Critical care medicine*. Jul 2000;28(7):2320-2325.