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FAST FACTS AND CONCEPTS #179

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Background Survival to discharge following cardiac arrest occurring in the hospital is infrequent. This Fast Fact will review data on CPR outcomes in hospitalized patients.

- I. The largest and most comprehensive source of in-hospital CPR outcomes data is the National Registry of Cardiopulmonary Resuscitation, reporting 14,720 resuscitation attempts (2000-2002) in adults from 207 U.S. hospitals (1). A uniform case inclusion definition was used which included both cardiac and respiratory arrests requiring an emergency response from hospital personnel.
 - Survival 20 minutes after CPR was 44%, but only 17% of all CPR patients survived to discharge. The survival to discharge for ventricular fibrillation and pulseless ventricular tachycardia was 34% and 35%, respectively, but only 10% for asystole and pulseless electrical activity.
 - Pre-CPR, 84% of patients came from home. Among survivors, 51% returned home, the remainder being discharged to another hospital, a rehabilitation facility, or a nursing home. Two percent were discharged to hospice care.
 - Neurological function of survivors was assessed using a five point scale (1 = good performance to 5 = brain death). Pre-CPR, 68% were in category 1, falling to 59% at discharge. In other words, 86% of category 1 patients remained at this level if they survived CPR, whereas 14% had neurological decline.
 - Overall functional performance was assessed using a similar five point scale (1 = good to 5 = brain death). Overall performance declined: 49% of survivors were category 1 pre-CPR compared to only 37% after CPR, a 25% decline in overall function.
- II. A meta-analysis of CPR outcomes was reported in 1998; it included data from 49 research publications after 1980, totaling 9,838 patients (2).
 - Depending on the rigor of CPR event definition, immediate survival was 41-44% and survival to discharge was 13-15%.
 - Only five studies reported discharge information. Of these, 73 of 93 patients (78%) returned to their home.
 - Factors predicting survival to discharge included myocardial infarction, coronary heart disease, and hypertension.
 - Factors which predicted a failure to survive to discharge included:
 - Sepsis the day prior to the CPR event
 - Serum creatinine >1.5 mg/dl
 - Metastatic cancer
 - Being African-American (this risk factor has subsequently been challenged – see Reference 3)
 - Dementia
 - Dependent status
- III. Historically, the CPR success rate in cancer patients has been thought to be less than 2%. A recent meta-analysis reviewed 42 studies from 1966-2005. Since 1990, 6.7% of cancer patients (localized: 9.1%; metastatic: 7.8%) survived CPR to discharge (4). Survival to discharge for ward patients was better than ICU patients: 10.1% vs. 2.2%. Data on neurological outcome were not included.
- IV. Renal dialysis patients: 3 studies have looked at CPR outcomes in a total of 137 dialysis patients. Survival to discharge was seen in 14% of patients. One study examined long-term survival: of 74 patients undergoing CPR, only 2 (3%) survived six months (vs. 9% of non-dialysis controls) (5).

Summary CPR for hospitalized patients is associated with poor outcomes, as the cause of arrest is usually associated with advanced chronic illness rather than an easily reversible acute cardio-pulmonary event (e.g. isolated arrhythmia). When talking with patients about CPR, physicians can say roughly 15%, or 1 in 6 patients, who undergo CPR in the hospital may survive to discharge. However, specific co-morbidities will reduce the chance of survival, and surviving patients are at risk for a range of CPR-related complications including permanent neurological and functional impairment.

References

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