Title: CARDIOVASCULAR COLLAPSE IN CARDIAC PATIENTS - OUTCOME FOLLOWING CARDIAC SURGERY

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Introduction: Patients with severe cardiovascular disease are potentially prone to develop cardiac arrest or cardiovascular collapse. This is especially true following major stresses like myocardial ischemia, infarction, cardiac catheterization, coronary angioplasty, trauma or induction of anesthesia. The outcome from cardiovascular collapse in these patients following cardiac surgical intervention is not clearly known. In this report we reviewed the types of stresses resulting in cardiac arrest, the appropriate surgical interventions performed and the outcome following anesthetic and surgical intervention.

Materials: At our institution 1360 cardiovascular surgeries were performed using cardiopulmonary bypass during 1983. Patients who arrested during cardiac catheterization, during induction of anesthesia and patients transported to the operating room with cardiopulmonary resuscitation in progress were included in this investigation. Data collected for each patient included age, sex, height, weight, cardiac catheterization data, the procedure which precipitated cardiac arrest, the interval from cardiac arrest to cardiopulmonary bypass, inotropic and/or mechanical support required during weaning from the cardiopulmonary bypass, the number of hospital days, morbidity and mortality and long term follow-up.

Results: Nine patients met the criteria to be included in this study. Age of the patients varied from 19 to 72 years with a mean of 50.5 years. There were five males and four females. One patient developed cardiac arrest twice in the Emergency Room. Five patients developed cardiac arrests in the Cardiac Catheterization Laboratory, three arrests were on the medical floors and two cardiac arrests occurred in the Operating Room. Total number of arrests exceed total number of patients since some patients arrested more than once. The patient who arrested in the Emergency Room was a 19 year old female with a stab wound to the heart with transection of left anterior descending coronary artery. Four patients who arrested in the Cardiac Cath Lab had coronary artery disease with poor ventricular function. Three patients had cardiac arrest on the floor and all had poor left ventricular function with multiple but surgically bypassable coronary artery lesions. Two patients arrested in the operating room during anesthetic induction. Five patients who developed cardiac arrest were transported to the operating room with an endotracheal tube and cardiopulmonary resuscitation in progress. These patients did not respond to medical management including external defibrillation. Causes that precipitated cardiac arrest included cardiac catheterization in two patients, attempted angioplasty in two patients, massive myocardial infarction in three patients and trauma to the heart in one patient. All patients had aorticcoronary bypasses done following cardiac arrest. All patients required massive inotropic support following cardio pulmonary bypass. Most of them required more than one type of inotropic drug. Three patients had intra aortic balloon pump prior to their arrival to the operating room which facilitated weaning from cardiopulmonary bypass. Three patients required insertion of intra aortic balloon pump during weaning from cardiopulmonary bypass. Three patients did not require mechanical support. Post-operative course was uneventful in two patients and were discharged from the hospital on the eighth post-operative day. Complications prolonged the hospital stay by 3 days in three patients. Three patients' hospital stay was significantly prolonged with gram-negative sepsis in one patient and pre-operative azotemia in another and hepatic, renal and respiratory failure in the third patient who and required tracheostomy for prolonged ventilatory support. He was discharged on the 40th day following improvement of hepatic and renal failures. One patient could not be weaned from the cardiopulmonary bypass in spite of maximum inotropic and intra-aortic balloon pump support and was pronounced dead in the operating room. Six of the discharged patients did not have any problems during long term follow-up. One patient developed recurrent angina during the sixth post-operative month and was on medical management. One patient who was transferred to a rehabilitation medical center could not be followed. Except for the last patient, the survivors did not develop any temporary or permanent neurologic deficits.

Discussion: Close to 60% of patients who primarily survive a cardiac arrest die in the hospital. Survival data on patients with cardiac disease who undergo cardiac surgery following cardiac arrest is scanty. In 1975 Kaiser et al. reported that 8 patients were resuscitated from cardiac arrest and then electively underwent aortocoronary bypass and all 8 patients survived. At the time of arrival to the operating room these 8 patients were hemodynamically stable. In 1981, Cabin et al. reported data on 10 patients with coronary artery disease and fatal cardiac arrest during cardiac catheterization. They suggested that these patients have either left main coronary artery lesion or significant diffuse coronary artery lesions. In our investigation five patients arrived in the operating room with cardiopulmonary resuscitation in progress and the other four were hemodynamically unstable in spite of drug therapy and intra aortic balloon pump assistance. Our results suggest that appropriate anesthetic and surgical intervention can significantly improve mortality and morbidity in these critically ill patients who develop cardiac arrest.