

Association between left ventricular outflow tract (LVOT) opening and successful resuscitation after cardiac arrest

Dott. TOMMASO FOSSALI (1), Dott. DAVIDE OTTOLINA (1), Dott.ssa ILARIA SEPULCRI (2), Dott.ssa MARTINA LOCATELLI (2), Dott. ANDREA GIANCANE (2), Dott. ANDREA PEROTTI (1), Dott. ROBERTO RECH (1), Dott. ANTONIO CASTELLI (1), Dott. EMANUELE CATENA (1)

(1) Anestesia e Rianimazione, ASST Fatebenefratelli Sacco, Ospedale Luigi Sacco, Via G.B. Grassi 74, 20157 Milano, Italia.

(2) Università Degli Studi di Milano, Scuola di Specializzazione in Anestesia e Rianimazione, Italia.

Argomento: Funzione cardiovascolare in terapia intensiva

Background: Survival after cardiac arrest depends on adequate cardiopulmonary resuscitation (CPR). Manual or mechanical external chest compression may be ineffective to restore circulation: structures subjected to external chest compression may differ in forces transfer to intrathoracic structures due to anatomic characteristics and physiological changes.

This clinical study aims to assess the association of trans-oesophageal findings during CPR and successful resuscitation.

Methods: A retrospective cohort study was conducted on patients admitted between July 2015 and November 2017 to the emergency department of the Luigi Sacco Hospital in Milan, a tertiary referral centre, for witnessed refractory out-of-hospital cardiac arrest (OHCA) with criteria for extracorporeal cardiopulmonary resuscitation (ECPR). Trans-oesophageal assessment of right ventricular fractional area change, right ventricular outflow tract fractional shortening, left ventricular volumes, ejection fraction, and aortic diameters were performed.

Results: 19 patients were analyzed. 15 of 19 patients (79%) received venous-arterial extracorporeal membrane oxygenation support. Successful resuscitation with return of spontaneous circulation or electromechanical activity occurred in 7 patients (37%) (group-SUXX). 6 patients (32%) were alive at 24 hours from the cardiac arrest, one patient (5%) survived to hospital discharge. Left ventricular outflow tract (LVOT) was open during CPR in all patients in group-SUXX and in 1 patient with failed resuscitation (group-FAIL) (p 0.0002). None of the patients with closed LVOT had successful resuscitation. Patients in group-SUXX had a higher ejection fraction (p 0.03), ascending aortic diameter (p 0.04), and survival rate than those in group-FAIL (p 0.015). In a multiple variable Cox's proportional model LVOT opening was the only variable associated with successful resuscitation.

Conclusions: The trans-oesophageal echocardiographic examination can be performed in the emergency setting during cardiopulmonary resuscitation. In these young populations with out-of-hospital witnessed refractory cardiac arrest, LVOT opening was associated with successful CPR.