Evaluating the efficacy and safety of Thumper device for cardiac arrest: A systematic literature review and meta-analysis

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Abstract

Background:Cardiopulmonary resuscitation (CPR) is a major rescue measure for cardiac arrest (CA) patients, and chest compression is the key of CPR. The Thumper devices has been invented to solve the deficiency of manual compression.However, current randomized controlled trials (RCTs) provide controversial findings. Objectives: This meta-analysis aimed to compare the clinical benefits of using the Thumper devices with manual chest compressions during the provision of CPR of patients in CA. Methods: Relevant studies were retrieved from the Ovid, PubMed, Web of Science, EMBASE, Cochrane, CNKI etc.,electronic databases and by manually searching the reference lists of research and review articles. All RCTs published in either English or Chinese until June 31, 2020, were included in the meta-analysis. The odds ratios (ORs) and their 95% confidence intervals (95%CIs) for the return of spontaneous circulation (ROSC), survival rate (SR), and the incidence of rib fractures (RFs) were compared between the manual and Thumper chest compressions. Results: A total of 2164 records were identified, of which 16 were RCTs with an overall risk of bias ranging from low to medium classification.Following CPR, the hazard ratios for ROSC, SR, and RF were significantly better for the Thumper chest compression with ORs of 2.56, (95%CI 2.11-3.11, I2=0%), 4.06, (95%CI 2.77-5.93, I2=0%), and 0.24 (95%CI 0.14-0.41, I2=0%), respectively. Conclusions: The Thumper compression device improved the ROSC, SR and decreased the incidence of RFs in CA patients when compared with manual chest compression. Its use is, therefore, recommended during the resuscitation of CA patients.

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