



CASE REPORT

Consciousness during Cardiopulmonary Resuscitation: A Case Report

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PUBLISHED

30 November 2024

CITATION

Kalawila, AU., and Weerasingha, HM., 2024. Consciousness during Cardiopulmonary Resuscitation: A Case Report. Medical Research Archives, [online] 12(11). <https://doi.org/10.18103/mra.v12i11.5908>

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DOI

<https://doi.org/10.18103/mra.v12i11.5908>

ISSN

2375-1924

ABSTRACT

Patient awareness or apparent consciousness during cardiopulmonary resuscitation (CPR) is a less-described scenario in the field of emergency medicine. A small but crucial quantity of cerebral blood flow is usually generated by chest compressions, and it is hypothesized that, due to various mechanisms, the cerebral perfusion pressure generated could be high enough to allow the patient to remain conscious. The existence of clinical indicators of cerebral perfusion during CPR despite having no return of spontaneous circulation known as CPR-Induced Consciousness (CPR-IC)^{1, 14}.

Here we report a case of a 23-year-old male with acute Left Anterior Descending Artery (LAD) occlusion leading to cardiac arrest, where the patient displayed signs of awareness during CPR. Since such a level of consciousness is usually associated with the return of spontaneous circulation (ROSC), this can lead to confusion among the life support providers, and could hinder resuscitation efforts. Therefore, recognition of this phenomenon is vital, and gentle restraint and sedation are acceptable management strategies for the condition.

Keywords: Cardiac arrest, Consciousness, CPR, CPR induce consciousness, Emergency Medicine

Introduction

Unresponsiveness is a critical criterion for diagnosing cardiac arrest, as the Basic Life Support (BLS) algorithm initiates with identifying unresponsiveness.¹ Consequently, it is presumed that the patient will remain unconscious until the return of spontaneous circulation (ROSC) is achieved, and this is the most common scenario in cardiopulmonary resuscitation. However, recently there have been reports of observed awareness, consciousness, or seemingly purposeful activity during cardiopulmonary resuscitation which have drawn significant academic scrutiny.²⁻⁶

Effective cardiopulmonary resuscitation (CPR) is the cornerstone of care in cardiac arrest resuscitation. Guidelines recommend uninterrupted good quality CPR to increase the chance of survival.¹ However, CPR has not been demonstrated to duplicate normal physiology, not even when it is performed according to guidelines. Only 10–30% of coronary blood flow and 30–40% of cerebral blood flow are restored even with good-quality compressions.⁷ Case records have revealed the possibility of showing consciousness if the cerebral perfusion pressure is restored with effective CPR.⁶ When pulseless patients receive active CPR, CPR-induced consciousness (CPR-IC) is defined as the manifestation of at least one of the following behaviours: impulsive movements, speech, increased jaw tone, or eye opening.⁸

Beyond the physiological mystery, it is a challenging phenomenon for medical professionals to deal with patients who show awareness, cognitive activities, or consciousness while receiving CPR yet do not have a pulse. It is more challenging to continue life support when the patient is able to oppose chest compressions actively. As of right now, there is no consensus or guidelines on the management of CPR-induced consciousness (CPR-IC).

We report on a case of CPR-IC to increase awareness about this phenomenon and its repercussions on resuscitation. Further, we are discussing the suggested management options. This patient presented to the Emergency Treatment Unit (ETU), National Hospital of Sri Lanka in January 2023.

Case presentation

A 23-year-old male presented to the ETU with severe central chest pain associated with neck pain and diaphoresis for 30 minutes. An ECG was taken immediately, which showed anterior hyperacute T waves. A hyperacute anterior STEMI was suspected. Soon after, the patient became unresponsive, and the monitor showed ventricular fibrillation (VF). Advanced life support (ALS) was immediately commenced. During the initial 10–15 minutes during CPR, the patient appeared to have purposeful movements, attempting to fend off the rescuers from performing chest compressions, moaned during defibrillations, and on one occasion spoke out loud. This was a new and unsettling experience for the resuscitation team, creating a state of confusion as to whether the patient had regained spontaneous circulation. CPR was halted for rhythm and pulse checks more frequently than desired, during all of which the pulse was absent and the rhythm was VF. Gentle manual restraint was employed to prevent the patient from interfering with chest compressions. After 15 minutes into

the resuscitation, the apparent consciousness gradually disappeared.

Eventually, CPR was continued for 45 minutes, 6 single defibrillations and one double sequential defibrillation were performed; 3 cycles of Adrenaline were given and IV Tenecteplase was administered 15 minutes into the CPR. Post-ROSC ECG showed an Anterior STEMI. The patient remained unresponsive after ROSC. He was sent for an emergent coronary angiogram, which showed total occlusion of the proximal anterior descending branch of the left coronary artery. The occlusion was successfully stented, and the patient was subsequently transferred to the cardiac intensive care unit. After 17 days of ICU and ward care, the patient was discharged with a full neurological recovery. Interestingly, the patient did not recall CPR or his seemingly conscious responses to the resuscitation efforts.

Discussion

This case involves a patient in cardiac arrest who demonstrated purposeful movements and some verbal responses during CPR, illustrating the phenomenon of CPR-induced consciousness (CPR-IC). The phenomenon of CPR-IC encompasses a spectrum of clinical signs of cerebral perfusion that disappear with discontinuation of CPR.

Consciousness, awareness, or cognitive activity during ongoing CPR is uncommon but recently gained more recognition. While mostly being described for cardiac arrests with shockable rhythms (pulseless VT or VF) witnessed by professional rescuers, it has also been described for asystolic cardiac arrests^{8-10,13}. A 2020 Australasian study described a 0.23% prevalence of CPR-IC in out-of-hospital cardiac arrests¹¹. A 2022 scoping review revealed the incidence to be as high as 0.9%¹⁰. These studies reported that the patients regained awareness enough to push away the rescuers, move away from resuscitation, remove ET tubes, speak or clench their jaw, groan, and open their eyes^{8,9,12}. This has led to more frequent pulse checks than usual.¹⁸ Patients with CPR-IC tend to be younger, physically fit males who had an initial shockable rhythm, with a shorter time delay between the onset of cardiac arrest and initiation of CPR.⁸ It is thought to be an indicator of good-quality resuscitation and is associated with an increased rate of survival, although it was not found to be an independent predictor of survival.¹² Only a few survivors had a recollection of the event^{8,10}.

As currently no guidelines exist with regard to CPR-IC, the reported management varies between existing literature. Few cases reported the usage of sedation with ketamine and midazolam⁸⁻⁹. In some cases, the patient was restrained physically to keep them from stopping the resuscitation¹³. Physical restraint may not be the best course of action since it may injure the patient if they have more motor actions preventing resuscitation. Healthcare providers could try to reassure patients and explain what is happening throughout the resuscitation if they respond to vocal redirection and instructions. Since the patient may hear and, on rare occasions, accurately recall the resuscitation events following the ROSC, speech during the resuscitation should also be courteous.

This case is notable as it represents one of the youngest documented instances of CPR-IC. A review of the global literature has identified only four other cases involving younger patients: a 38-year-old male from Canada, a 22-year-old male from Italy, a 24-year-old male from Germany, and a 27-year-old female from Taiwan²⁻⁵. Importantly, all of these patients survived to discharge from the hospital²⁻⁵.

Immediately after observing the cardiac arrest, the medical team commenced manual cardiopulmonary resuscitation (CPR). During the initial implementation of the cardiac arrest algorithm, the team faced several interruptions in CPR due to a misunderstanding regarding the possibility of return of spontaneous circulation (ROSC). Upon recognizing this instance as an example of CPR-IC, the team diligently followed the Advanced Life Support (ALS) protocol, ensuring rhythm checks were conducted every two minutes.

Although the latest guidelines for cardiac resuscitation do not specifically address the use of sedation and physical restraint, the team determined that these measures were essential for managing the patient's level of consciousness effectively. Similar management strategies have been documented by Olausenn⁸. The differentiation between CPR-IC and ROSC presents significant challenges, as demonstrated in this case, which may result in delays in diagnosis and interruptions in the resuscitation efforts.

Growing amounts of evidence support the idea that CPR-IC exists, however, this evidence is primarily anecdotal.

More research is necessary around CPR-IC, to understand the pathophysiology and evaluate the effects from the patient's perspective. Raising awareness of the CPR-IC phenomenon among healthcare professionals enhances the prompt recognition of differences in vital signs, distinguishing between those caused by ROSC and those resulting from CPR-induced consciousness. This improvement can reduce confusion and minimize frequent interruptions for rhythm and pulse checks. Guideline-based CPR-IC management recommendations, with a particular emphasis on sedation, are required to enhance confidence among healthcare professionals managing similar instances.

Conclusion

The phenomenon of CPR-induced consciousness is an emerging area of interest that is expected to become increasingly prevalent in the future, owing to the widespread availability of high-quality resuscitation techniques. Consequently, it is imperative for professional rescuers to possess an awareness of this condition to prevent any interruption to effective resuscitation and to manage the associated challenges. There is a need for greater attention and more studies to establish guidelines for improved management.

Conflicts of interest statement

We do not have any conflicts of interest to declare.

Funding

No funding was received.

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