

CASE REPORT

Cardiopulmonary Resuscitation Induced Consciousness: Case Report

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Introduction

High-quality cardiopulmonary resuscitation (CPR) can generate cerebral blood flow capable of inducing different levels of consciousness in patients.¹ This process, called CPR-induced consciousness (CPRIC), has been reported in the literature.²⁻⁴

The prevalence of CPRIC has been estimated at 0.3% to 0.9%. However, this low prevalence could be attributed to study design or sample size.⁵

Some level of awareness during CPR may cause hesitation, affecting the decision to continue the procedure. Additionally, performing CPR on a combative patient can create an erroneous impression of inadequate care, with harmful potential consequences, as well as making everyone involved (patient, care team and spectators) confused and reluctant.

Thus, this study reports on a case of a patient with CPRIC in an out-of-hospital cardiac arrest.

Case Report

According to witnesses, a 59-year-old Brazilian male with systemic arterial hypertension and dyslipidemia complained of heartburn and then suddenly collapsed, having lost consciousness, during physical activity at a recreational club.

A fireman who was at the club identified cardiac arrest and immediately began CPR using an automated external defibrillator device. The ambulance was

called while the patient underwent chest compression. Meanwhile, the patient began moving his upper limbs in an attempt to remove the bag-valve-mask device, apparently having regained consciousness. However, the movements suddenly ceased when CPR was interrupted to place the automated external defibrillator and perform a pulse check. The events were filmed by an onlooker.

After rhythm analysis, the automated external defibrillator recommended a shock, which was performed prior to the arrival of the emergency medical technicians, and CPR was continued by laypersons. About 5 minutes after the call, the emergency medical technicians arrived, finding that the patient had ventricular fibrillation and, after resuming CPR, no movement was observed. The patient then underwent defibrillation (totaling 3 shocks), peripheral venous catheter, epinephrine infusion (1.0mg, repeated every 3 min, totaling 3.0 mg), orotracheal intubation, and continuous high-quality chest compression at a rate of approximately 110/min.

After 15 minutes, spontaneous circulation and sinus rhythm returned. Vital signs after return of spontaneous circulation (ROSC) included a respiratory rate of 16 breaths/min (assisted by bag-valve-mask device), oxygen saturation of 92%, a heart rate of 106 beats/min and systolic blood pressure of 110 mmHg.

During transportation to the hospital, the patient presented hemodynamic instability, and a norepinephrine infusion was started (0.5mcg/kg/min), with good pressure response. He was admitted to the hospital after 20 minutes of ROSC with psychomotor agitation. However, he was unable to respond to simple verbal commands. A 12-lead electrocardiogram was performed, showing acute extensive anterior

Keywords

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wall ST-segment myocardial infarction. The patient was sedated and underwent an emergency coronary angiography, which showed an occlusion in the proximal third of the left anterior descending coronary artery. He was successfully revascularized after placement of a drug-eluting stent.

The patient was then transferred to the intensive care unit, where he underwent targeted temperature management by infusion of 20ml/Kg of cold saline solution at a target temperature of 33 °C and a thermal mattress for 24 hours. He then underwent active rewarming, reaching normal temperature in approximately 12 hours.

In the intensive care unit, the patient remained intubated with mechanical ventilation for 3 days. He developed ventilator-associated pneumonia, receiving meropenem and polymyxin, which led to improvement. On the first day after extubation, periods of mental confusion and psychomotor agitation were observed; complete recovery had occurred by the time of intensive care unit discharge, 8 days after hospitalization. The patient was discharged from the hospital after 13 days, with a cerebral performance category index of 1. Figure 1 shows the case timeline.

Discussion

High-quality CPR provides approximately 30% of normal cardiac output (prior to cardiac arrest), and patients may show signs of consciousness while it is performed.² Individual factors, such as self-regulation of cerebral blood flow, ischemic threshold, and comorbidities, influence cerebral oxygenation and may also contribute to CPRIC.⁶

West et al.⁵ found 41 studies (8 observational studies, 26 case reports, 3 review papers, and 4 sedation protocols) on the subject; the first case was reported in 1962. Olausson et al.¹ and Doan et al.⁷ reported that cardiac arrest in public places and initial shockable rhythm are independent predictors of CPRIC. In these studies, the patients were male, had an initial shockable rhythm, received early CPR, presented spontaneous eye opening, jaw tone, speech, and/or body movement, and 1 in 5 was described as combative. These findings corroborate the present case, since the patient presented similar patterns.

In some situations, various pharmacological interventions have been administered to help patients tolerate CPR. Care teams may consider using doses of sedatives or analgesics to prevent pain and suffering in conscious patients during CPR. No formal guidelines have been developed for emergency medical service teams.^{5,7,8}

In the present case, no pharmacological intervention was performed, since CPRIC occurred prior to the arrival of the emergency medical service team. Caring for a patient with CPRIC can be extremely distressing for everyone involved. Although it has been widely disseminated that the maneuvers should be interrupted if the patient shows signs of life, care providers must be aware that CPRIC may occur and high-quality CPR can be continued if it does. Patients with CPRIC usually show some symptoms, including, but not limited to, opening their eyes, agonal breathing, slight agitation, limb movement, and active attempts to push away devices or stop rescuers from performing CPR. Importantly, these manifestations disappear when the maneuvers are interrupted.⁷⁻⁹

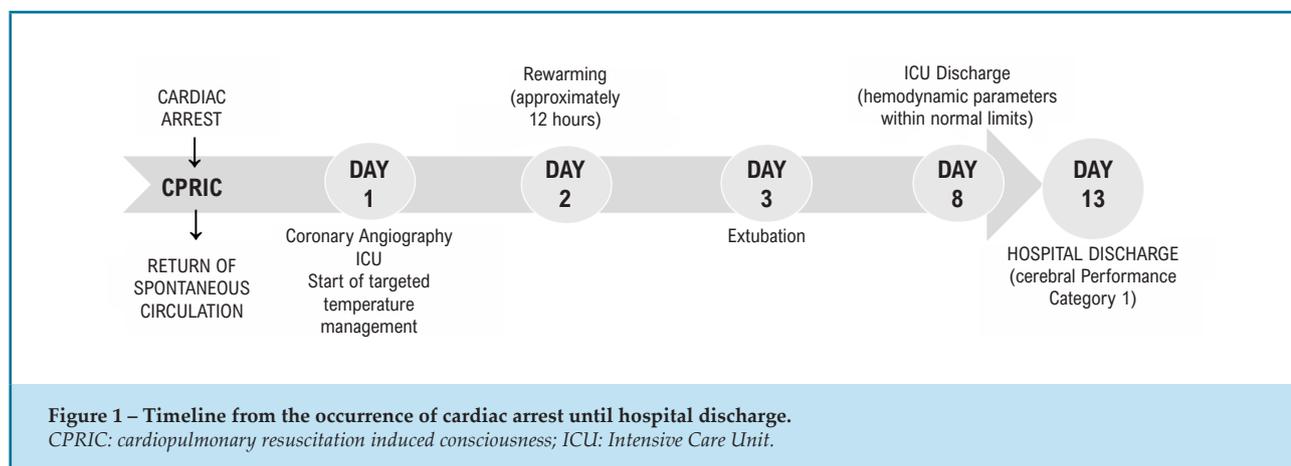


Figure 1 – Timeline from the occurrence of cardiac arrest until hospital discharge.
CPRIC: cardiopulmonary resuscitation induced consciousness; ICU: Intensive Care Unit.

In the present case, the rescuer continued CPR, and CPRIC was confirmed by the emergency medical service (EMS) team when they were shown the video. Although the patient's authorization was not obtained, the images were widely disseminated on social media, to mixed reactions. Many comments from health providers wrongly criticized the rescuer's decision to continue CPR, which was later proven to be correct.

Both the decision to continue CPR and awareness of CPRIC are uncommon. A study investigating CPRIC awareness in a sample of 293 UK paramedics found that nearly half were unaware of it. The authors concluded that this phenomenon should be better disseminated so that health care providers can manage it correctly when it occurs.¹⁰

The patient in the present case presented ROSC and was discharged from hospital with a cerebral performance category index score of 1. The decision to continue CPR may have contributed to the favorable outcome. It is important to emphasize that this patient received early high-quality CPR, had out-of-hospital ROSC, and was admitted to a hospital with an hemodynamic sector and the ability to provide targeted temperature management.

Conclusion

CPR guidelines should mention CPRIC. It is important to spread awareness of this phenomenon since, despite its rarity, it poses a challenge to health care providers.

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Author Contributions

Conception and design of the research: Morais DA; acquisition of data: Moura AD, Guelfi DCF; analysis and interpretation of the data, writing of the manuscript and critical revision of the manuscript for intellectual content: Morais DA, Moura AD, Guelfi DCF, Moraes CMG, Machado GAC.

Potential Conflict of Interest

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Study Association

This study is not associated with any thesis or dissertation work.

Ethics Approval and Consent to Participate

This study was approved by the Ethics Committee on Animal Experiments of the Hospital Mater Dei (MG) under the protocol number 3.9257.799.

