Cardiopulmonary Resuscitation Induced Consciousness: Case Report

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Abstract:

Cardiopulmonary resuscitation induced consciousness (CPRIC) is a very rare phenomenon where patients who are in cardiac arrest and undergoing CPR express signs of consciousness like talking, purposeful limb movements, and eyes opening. This phenomenon leads to frequent CPR interruptions while putting the CPR team under pressure affecting the quality of resuscitation provided. This report presents a case of a 49- years- old man who presented with ischemic chest pain. He had a witnessed in-hospital cardiac arrest. During cardio-pulmonary resuscitation he was expressing signs of consciousness despite the absence of return of spontaneous circulation (ROSC). This had forced the CPR team to restrain, sedate and intubate the patient to facilitate the resuscitation process.

Keywords: Cardiac arrest, Awareness, Consciousness, CPR, Cardiopulmonary Resuscitation.

Introduction:

Cardio-pulmonary resuscitation (CPR) remains the most important determinant of cardiac arrest survival. Various resuscitation association guidelines highlight the importance of high quality CPR.[1-4] Patient awareness during CPR (CPR induced consciousness) remains a very rare and challenging phenomenon. CPR induced consciousness (CPRIC) is defined as a display of at least one of the following behaviors: Spontaneous eye opening, jaw tone, speech or body movement; in pulseless patients undergoing active CPR.[5] With the advancement in resuscitation science, the number of reported cases of cardio-pulmonary resuscitation induced consciousness (CPRIC) has increased.[6-8] However, the pathophysiology of this condition remains poorly

understood.[5, 6] CPRIC has multiple implications on the quality of care provided. It causes various psychological effects on the patients and the care providers. We report a case of CPRIC to raise the awareness about such phenomenon and highlight its implications. We will discuss the various proposed treatment options. The case reported was observed at Sultan Qaboos university hospital (SQUH) in 2019.

Case:

A 49 years old male presented to the emergency department (ED) with retrosternal chest pain suggestive of myocardial ischemia. He had a past history of ST-elevation myocardial infarction (STEMI) three months earlier for which he received thrombolytic therapy. His physical examination was unremarkable.

He had an electrocardiogram (ECG) performed shortly after arrival which revealed pathological q-waves at the inferior leads (Figure 1). While being assessed, he became unresponsive and had labored agonal breaths. The cardiac monitor displayed ventricular fibrillations (VF). Cardiopulmonary resuscitation was initiated and 200 Joules (J) electrical defibrillation was delivered. Two minutes later, ROSC was achieved and the repeat vital signs were within normal limits. His repeated ECG was similar to the initial one. Cardiologist performed bedside echocardiogram which revealed akinetic anterior wall and the apex suggestive of the previous myocardial infarction. Ten minutes later he became unresponsive and developed VF again. The cardiopulmonary resuscitation was commenced again and defibrillation was performed. While CPR was being actively delivered, the patient started moving, pulling the hands away from his chest, kicking foot and verbalizing. It was believed that ROSC was attained and hence the CPR was halted. However the cardiac monitor displayed VF and the patient had no palpable pulse. Resuscitation was immediately resumed according to the Advanced Cardiac Life Support (ACLS) guidelines. During the subsequent cycles of CPR, the patient had similar episodes of environmental awareness and consciousness which required physical restrain. The patient was then sedated with midazolam 0.1mg/kg and received Succinylcholine 1.5mg/kg for endotracheal intubation. He achieved ROSC several times for short intervals (<1-2minutes each). The cardiac arrest rhythms alternated between VF and pulseless electrical activity (PEA). He received a total of 23 electrical defibrillations, 2 doses of amiodarone (300mg the 150 mg), 120mg of lidocaine, and epinephrine 1mg every 3 minutes. Patient was actively resuscitated for 2.5 hours. However, all the resuscitation attempts were unsuccessful and his cardiac rhythm deteriorated to asystole and he was declared dead.

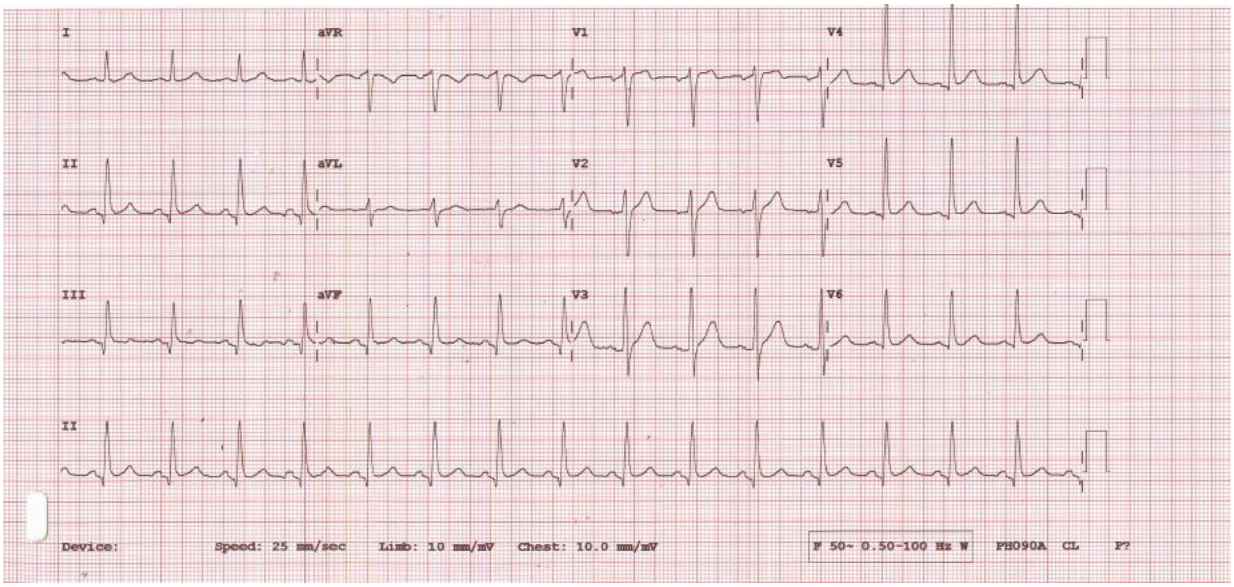

Figure 1: patient's ECG at the presentation.

The resuscitation team seemed overwhelmed by the fact that the patient had CPRIC without having spontaneous cardiac activity. Most of the resuscitation team was unaware of the CPRIC phenomenon which required extensive debriefing to explain the concept and decrease the psychological impact on the care providers.

Discussion:

CPRIC is a newly observed phenomenon and the number of cases that have been reported is very small. An observational study examined the CPRIC in out-of-hospital cardiac arrest (OHCA) patients and identified 112 (0.7%) CPRIC cases among the 16,558 OHCA patients.[5] CPRIC was frequently observed in patients who had early CPR and defibrillation. It was more common among in young, male patients who had ventricular fibrillation or pulseless ventricular tachycardia.[5]

CPRIC appears to affect the resuscitation team performance. Most of the team members confuse CPRIC with ROSC. This leads to frequent inappropriate rhythm and pulse check leading to more frequent resuscitation interruptions. Previous studies demonstrated that CPRIC increases interruption time and decreases the quality of CPR in all aspects.[6, 9-11] A systematic review revealed that among half of the reported cases, the patients were able to push the rescuers, withdraw from the compression and remove endotracheal tube.[6]

CPRIC also has a psychological impact on the resuscitation team. A recent survey reported a detrimental psychological impact among 90% of the resuscitating team members

performance.[9] About 52% of physicians felt uncomfortable during resuscitation and 7% experienced insomnia, nightmares, and mood changes that lasted for weeks.[9]

Survivors of cardiac arrest are at risk of developing short and long term complications. Previous studies reported that 10-20% of cardiac arrest survivors are able to recall specific details of their resuscitation from the period of cardiac arrest.[12-15] On the other hand, 2% of the cardiac arrest survivors were alert during the discussions among the resuscitating team members.[12] The ability of patients to recall the resuscitation details places them at increased risk of short and long term psychological sequelae.[5] Among 101 patients who survived cardiac arrest , 46% recalled memories with overarching themes related to fear, animals, plants, bright light, violence, déjà vu, and family as well as recalling events after the cardiac arrest.[12]

Despite the impact of CPRIC on the resuscitating team and the patients' outcome, there are no available controlled trials addressing this phenomenon. We used midazolam to control the patient agitation during CPRIC. Two guidelines were published about the management of CPRIC based on expert consensus: the Dutch National Ambulance Guidelines and the State of Nebraska Model Protocol (Table 1).[5, 15] Both guidelines were used for the pre-hospital setting. The Dutch guideline recommends fentanyl and midazolam while the State of Nebraska protocol recommends using ketamine and midazolam.

Table 1: Medications used to restrain patients expressing CPRIC.[(11)]

CPRIC: Spontaneous eye opining, purposeful movements, and/or verbal response during CPR
▪ Administer ketamine bolus o IV: 0.5–1.0 mg/kg o IM: 2–3 mg/kg ▪ Consider co-administration of midazolam bolus: o IV: 1 mg If continuous sedation is needed: ▪ Repeat ketamine bolus after 5–10 min: IV 0.5-1.0mg/kg or IM: 2-3 mg/kg or ▪ Start ketamine infusion: o IV infusion: 2–7 μg/kg/min

Conclusion:

CPRIC might have a significant impact on the successful resuscitation of the cardiac arrest victims. The resuscitation team should administer sedating agents and continue to provide high-quality CPR and minimize interruptions. CPR team debriefing is important to minimize the psychological impact and improves team performance. Further studies are needed to address the consequences of CPRIC among health care providers and standardize care.

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