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## Consciousness and Awareness in Cardiac Arrest



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Cardiac arrest (CA) is common in the United States, with a relatively low survival rate of around 10%. Understanding cognitive activity, consciousness, and awareness during CA and their impact on survivorship and psychological outcomes is of interest to organisations like the American Heart Association (AHA) but remains poorly understood.

Some CA survivors report memory issues, depression, and post-traumatic stress disorder (PTSD), while others describe positive experiences like transcendent moments during CA, external visual awareness, and purposeful life reviews without external signs of consciousness. This contrasts with CPR-induced consciousness (CPRIC), where medical staff observe signs of consciousness like agitation, eye opening/rolling, groaning or combativeness.

Among CA patients, many survivors report some form of perceived awareness, transcendent experiences, or diverse themes, including fear or persecution. Studies have suggested the presence of synchronised gamma oscillations on EEG during cardiac standstill and death, raising the possibility of electrocortical biomarkers of lucid consciousness during CA.

The breadth of cognitive experiences during CA and their impact on long-term psychological outcomes remains unknown. It's also unclear whether explicit recall captures the entirety of awareness or if implicit (unconscious) learning plays a role. Despite reports of electrocortical biomarkers of consciousness on EEG during death, no studies have explored their occurrence during CA. Identifying consciousness and its biomarkers could help gauge the depth of awareness during CA and identify individuals at risk for adverse psychological outcomes who may need sedation during CPR.

The main goal of this study was to characterise the cognitive experiences and awareness of CA survivors. Secondary objectives included evaluating the feasibility of testing implicit and explicit recall of visual and auditory perceptions during CA and identifying EEG biomarkers associated with the emergence of consciousness and lucid cognitive activity during CPR.

This was a 25-site in-hospital study. Researchers used independent audiovisual awareness testing, including explicit and implicit learning tasks, continuous real-time electroencephalography (EEG), and cerebral oxygenation (rSO<sub>2</sub>) monitoring. Survivors of in-hospital cardiac arrest (IHCA) were later interviewed to assess their ability to recall awareness or cognitive experiences. Additionally, a separate cross-sectional CA study provided further insights into the experiences of survivors.

The study included 567 IHCA patients. 9.3% survived. Among these survivors, 52.8% completed interviews, and 39.3% reported memories or perceptions during cardiac arrest suggestive of consciousness. These experiences fell into four main categories: 1) emergence from a coma during CPR (CPR-induced consciousness) in 7.1% of cases, 2) consciousness occurring in the post-resuscitation period in 7.1% of cases, 3) dream-like experiences in 10.7% of cases, and 4) transcendent recalled experiences of death in 21.4% of cases. In the cross-sectional arm, 126 CA survivors reinforced these categories and identified another: delusions, which involve misattributing medical events. Due to low survival rates, researchers couldn't thoroughly examine implicit learning. Nobody identified the visual image during the study.

These findings show that consciousness, awareness, and cognitive processes can potentially occur during CA. The emergence of normal EEG may suggest a resumption of network-level cognitive functioning and may serve as a biomarker for consciousness, clarity of thought, and authentic "near-death" experiences.

Source: [Resuscitation](#)

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Published on : Tue, 26 Sep 2023