



Clinical Paper

Prevalence and risk factors for post-traumatic stress disorder in relatives of out-of-hospital cardiac arrest patients[☆]



Marius Zimmerli^a, Kai Tislar^a, Gian-Marco Balestra^a, Wolf Langewitz^b, Stephan Marsch^a, Sabina Hunziker^{a,*}

^a Medical Intensive Care Unit, University Hospital Basel, Switzerland

^b Department of Psychosomatic Medicine, University Hospital Basel, Switzerland

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ABSTRACT

Aim: Prognostic uncertainty and surrogate decision-making demands associated with prolonged unconsciousness in out-of-hospital cardiac arrest (OHCA) patients in the intensive care unit (ICU) may increase post-traumatic stress disorder (PTSD) risk in their relatives. Our aim was to study PTSD frequency and risk factors in relatives of OHCA patients.

Methods: In this observational study 101 consecutive eligible adult relatives of OHCA patients were interviewed using validated questionnaires, the “Impact of Event Scale-Revised” to detect PTSD and the “Family-Satisfaction with Care in the ICU” to assess potential PTSD risk factors.

Results: PTSD was detected in 40/101 relatives (40%). Multivariate logistic regression identified three significant PTSD predictors [odds ratio, 95% confidence interval]: female gender [3.30, 1.08–10.11], history of depression [3.63, 1.02–12.96], family perception of the patient’s therapy as insufficient [18.40, 1.52–224.22]. Three other predictors were not significantly associated with PTSD (hypothermia treatment of the patient [2.86, 0.96–8.48]), delayed delivery of prognostic information by ICU staff [2.11, 0.83–5.38], family-ICU staff conflict [3.61, 0.71–18.40]). A prediction rule including six factors ($p < 0.15$ each) showed high discrimination (area under the receiver-operating characteristic curve 0.74) with a stepwise increase in risk for PTSD from 0% (no risk factor) to 63% (≥ 3 risk factors). There was no evidence for effect modification either by survival status or neurological outcome.

Conclusion: Relatives of OHCA patients treated in the ICU are at increased risk of PTSD, which can be predicted based on six factors, three ICU-related and potentially at least partly modifiable. Further research is needed to validate our findings and to develop strategies to prevent PTSD in OHCA patients’ relatives.

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1. Introduction

In recent years, healthcare workers in critical care settings have broadened their focus from a “disease-only” approach to a patient- and family-centered approach.^{1–3} Intensivists increasingly have recognized that relatives facing a critically ill loved one experience considerable stress, which may translate into morbidity and mortality.^{4,5} Studies of family members of patients in the general ICU population^{6,7} have shown these relatives to be at high risk for a

variety of adverse psychological outcomes that collectively, have been termed post-intensive care syndrome-family.⁸ These outcomes include anxiety, depression, complicated grief, acute stress disorder and post-traumatic stress disorder (PTSD).

Posttraumatic stress disorder is a syndrome lasting at least four weeks, comprising three types of response to a traumatic event or situation: (1) unwanted recollection, e.g., in nightmares or flashbacks, (2) strong avoidance of reminders of the trauma, and (3) physiological hyperarousal, e.g., insomnia, irritability, difficulty concentrating, or hypervigilance.⁹ PTSD significantly decreases functioning and quality-of-life,^{6,7} and has been associated with poor health behaviors, among them physical inactivity, medication nonadherence, and more intense smoking,¹⁰ and with increased rates of unemployment, poverty, medical care utilization including hospital admission, and suicide.¹¹ Moreover, PTSD has been linked to elevated risk of gastritis, stomach ulcer, arthritis, metabolic conditions, and, particularly, cardiovascular disease including fatal

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* Corresponding author at: Medical Intensive Care Unit, University Hospital Basel, Petersgraben 4, 4031 Basel, Switzerland.

E-mail addresses: SabinaHunziker@gmail.com, HunzikerS@post.harvard.edu (S. Hunziker).

cardiac events.^{12–14} By definition, PTSD manifests at least one month after the precipitating trauma, but it may emerge months later.

PTSD appears to be substantially more frequent in family members of ICU patients than in the general population. Symptoms consistent with the syndrome were detected in roughly 30% of relatives within 3 months after conclusion of their loved one's ICU stay; higher prevalence – up to 50% – was found in relatives who felt that they received incomplete information regarding their family member's case or whose loved one succumbed in the ICU.⁷ The highest PTSD prevalence – 60% – was seen in relatives of patients dying in the ICU after end-of-life decision-making, especially when communication with ICU staff was perceived to be suboptimal.¹⁵ By contrast, lifetime PTSD prevalence has been estimated at ~8% in the US general population.¹¹

Given PTSD epidemiology in family members of ICU patients and the characteristics of out-of-hospital cardiac arrest (OHCA) patients, relatives of the latter may be at particularly high risk of PTSD. Due to their severe condition and hypothermia treatment, OHCA patients typically are unconscious during their initial days in critical care, prolonging the period of prognostic uncertainty and forcing relatives to act as surrogate decision-makers.¹⁶ Moreover, adverse neurological outcomes and death in the ICU or ward are frequent in OHCA patients.¹⁷

However, to the best of our knowledge, little if any published research has examined prevalence of or risk factors for PTSD in families of OHCA patients. Data on these topics would be valuable, since the literature on PTSD in general⁹ and in relatives of patients in the general ICU population suggest that the syndrome may be treatable or even preventable: for example, an interventional trial demonstrated that a proactive communication strategy improved outcomes of ICU patients' family members regarding PTSD as well as anxiety and depression.¹⁸

We therefore conducted this observational cohort study to (1) assess the risk of PTSD in relatives of OHCA patients following the patients' ICU stay and (2) investigate factors predicting this adverse outcome. We hypothesized that an inadequate relative–health care worker interaction, i.e., deficient communication with the ICU team or family member dissatisfaction with care and decision-making associated with their loved one's ICU stay, would predict PTSD in family members. Such knowledge will enable development of a clinical prediction rule for PTSD in this setting, as well as communication strategies and psychosocial support strategies which in the near future, may be assessed in prospective interventional trials to improve the relatives' outcomes.¹⁹

2. Methods

2.1. Setting, subjects and ethics

This study sought to include one relative each of consecutive patients admitted to the ICU of the University Hospital, Basel, Switzerland, between January 2007 and August 2012 for treatment of OHCA. To be eligible, the relative had to have served as a surrogate decision-maker for the patient and to speak a local language. The study was approved by the local Ethic Committee and all relatives and patients gave written informed consent.

2.2. Study design

Using a list assembled through our electronic ICU registry, between October 2012 and January 2013, we telephoned eligible patients and relatives to invite participation in the study. If patients were deceased or otherwise could not be reached, we called their relatives listed in the clinical documentation

as next-of-kin. Relatives were recruited according to criteria of a previous study,⁷ i.e., by surrogate decision-making rank (spouse > parents/children > others); if a relative was unavailable to participate, we contacted the family member(s) next in rank.

Baseline data as well as hospital outcomes of consenting patients were collected by abstraction from the electronic registry. After recruitment, family members were interviewed by telephone using validated structured questionnaires described below. To maximize methodological consistency and thereby decrease bias, all family member interviews were conducted by a single physician (MZ) using the same content sequence and study instruments as defined below. Each family member interview typically took between 30 and 60 min.

2.3. Study instruments

The validated German version of the Impact of Event Scale-Revised (IES-r) questionnaire²⁰ was used to detect and measure PTSD symptoms. The original IES-r was designed for generic application after any type of traumatic event, and is well-validated, including for use in different languages (including German language²¹) and also in telephone interviews.^{7,22} Each questionnaire administration is anchored to an index traumatic event, in this case, the loved one's ICU stay for treatment of OHCA. The instrument asks about 22 potential psychological or physical responses to the index event, which are grouped into one of the three subscales, "intrusion" (7 items), "avoidance" (8 items), and "hyperarousal" (7 items). The frequency of each response is rated on the scale, 0, "not at all," 1, "rarely," 3, "sometimes," or 5, "often."

For our study, we used the German translation of the IES-r, which was previously validated in two independent samples and compared with structured clinical interviews for the diagnosis of PTSD.²¹ As suggested, a final IES-r score was calculated using the following validated equation: $-0.02 \times \text{intrusion subscale score} + 0.07 \times \text{avoidance subscale score} + 0.15 \times \text{hyperarousal subscale score} - 4.36$.²¹ In patients with scores >0, PTSD can be diagnosed with high specificity (89%) and sensitivity (79%).²¹

To measure relatives' satisfaction with the index critical care experience and to specifically identify their expectations and needs regarding communication and interaction with the ICU team, we used an expanded German-language version of the Family Satisfaction with Care in the Intensive Care Unit questionnaire (FS-ICU).^{3,23} The FS-ICU is a well-validated 24-item instrument designed to measure two main domains: (1) the patient's and family members' overall satisfaction with care as well as with environmental factors in the ICU (14 items) and (2) satisfaction, expectations, and needs regarding information transfer and decision-making during the patient's ICU stay (10 items).^{3,23–26} Each item is rated on a 0–100% scale, with higher scores denoting greater satisfaction. We expanded the questionnaire with 18 questions regarding communication and interaction with the ICU team (Table 3) which were developed through rounds of consensus conferences within the research team. In each round, potential new items were assessed for content validity and clarity by independent physicians, whose feedback was incorporated to reword the items until ambiguous phrasing was eliminated.

2.4. Patient outcome assessment

In the interview, subjects also were asked about patient outcomes as of that telephone conversation, including death from any cause and neurological status as described in the Cerebral Performance Category scale (CPC).²⁷ CPC scores range from 1, no neurologic disability; 2, moderate disability including hemiplegia, seizures, ataxia, dysarthria, dysphasia, memory loss, or other mental changes, but sufficient cerebral function to live independently

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