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ORIGINAL

Offering the opportunity for family to be present during cardiopulmonary resuscitation: 1-year assessment

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Take-home message: The long-term benefits on post-traumatic stress disorder and depression to being offered the possibility of witnessing resuscitation are still present at 1 year. The incidence of traumatic grief is diminished when a family member is offered the possibility of witnessing CPR.

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Abstract *Purpose:* To evaluate the psychological consequences among family members given the option to be present during the CPR of a relative, compared with those not routinely offered the option. *Methods:* Prospective, cluster-randomized, controlled trial involving 15 prehospital emergency medical services units in France, comparing systematic offer for a relative to witness CPR with the traditional practice among 570 family members. Main outcome measure was 1-year assessment included proportion suffering post-traumatic stress disorder (PTSD), anxiety and depression symptoms, and/or complicated grief. *Results:* Among the 570 family members [intention to treat (ITT) population], 408 (72 %) were evaluated at 1 year. In the ITT population ($N = 570$), family members had PTSD-related symptoms significantly more frequently in the control group than in the intervention group

[adjusted odds ratio, 1.8; 95 % confidence interval (CI) 1.1–3.0; $P = 0.02$] as did family members to whom physicians did not propose witnessing CPR [adjusted odds ratio, 1.7; 95 % CI 1.1–2.6; $P = 0.02$]. In the observed cases population ($N = 408$), the proportion of family members experiencing a major depressive episode was significantly higher in the control group (31 vs. 23 %; $P = 0.02$) and among family members to whom physicians did not propose the opportunity to witness CPR (31 vs. 24 %; $P = 0.03$). The presence of complicated grief was significantly greater in the control group (36 vs. 21 %; $P = 0.005$) and among family members to whom physicians did not propose the opportunity to witness resuscitation (37 vs. 23 %; $P = 0.003$). *Conclusions:* At 1 year after the event, psychological benefits persist for those family members offered the possibility to witness the CPR of a relative in cardiac arrest.

Keywords Cardiac arrest · Family presence · Post-traumatic stress disorder · Complicated grief

Introduction

The grief caused by the loss of a family member can induce pathological responses: a depressive state, anxiety, post-traumatic stress syndrome, or complicated grief [1–5]. These morbid factors can be influenced by the circumstances of death and particularly by whether the family is offered the opportunity to witness the patient's medical treatment [6, 7].

The concept of family presence during the cardiopulmonary resuscitation (CPR) of a patient was introduced in the 1980s [8]. In 2010, the American Heart Association recommended that family members be present during resuscitation procedures without reference to studies providing a high standard of proof of benefit [9]. In spite of these recommendations, most health-care professionals are highly reluctant to permit families to witness resuscitation attempts [10, 11].

We published in 2013 results of a multicenter, randomized trial that demonstrated a significant short-term improvement on several psychological parameters when the health-care team offered the family the possibility to be present during CPR [12].

In this article, we report our 1-year prespecified assessment of psychological symptoms and grief following the offer (or absence thereof) for family to be present during CPR of a relative from our trial.

Patients and methods

Participant selection and study procedures

The PRESENCE trial design (a multicenter randomized controlled trial) has been previously reported [12]. Fifteen prehospital emergency medical services units (SAMU) in France participated in this study from November 2009 to October 2011. Five hundred and seventy adult family members of adult patients in cardiac arrest occurring at home were prospectively included. A medical team member systematically asked family members allocated to the intervention group if they wished to be present during the resuscitation, and those accepting were accompanied by a supporting emergency staff member who provided technical information on the resuscitation. A communication guide (see electronic supplementary material) was available in order to help introduce the relative to the resuscitation scene and, when required, to help with the announcement of the death. These recommendations were developed from published guidelines [6, 13, 14]. Family members allocated to the control group were not routinely given the option to be present during CPR. Two hundred and sixty-six family members were allocated to the intervention group (266 relatives, 100 % given the opportunity to witness resuscitation) and 304 (59 relatives, only 19 % given the opportunity to witness resuscitation) to the control group. The study was approved by the institutional review board (Comité de Protection des Personnes Ile-De-France 10).

Follow-up and psychological assessment of family members

At 1-year post-resuscitation, a trained psychologist, unaware of group allocation, asked enrolled relatives to answer a structured questionnaire by telephone. The interviewer asked relatives to complete the impact of event scale (IES), the hospital anxiety and depression scale (HADS), the inventory of complicated grief (ICG), and the structured diagnosis of a major depressive episode (MINI) [15–18]. A relative was deemed unreachable after 15 calls went unanswered.

The IES and HADS scores were described in our main study [12]. Briefly, the IES score ranges from 0 (no PTSD-related symptoms) to 75 (severe PTSD-related symptoms). Presence of PTSD is defined by an IES score greater than 30. The HADS is made up of two subscales, one evaluating symptoms of anxiety ($HADS_A$; seven items) and the other assessing symptoms of depression ($HADS_D$; seven items) [16]. Subscale scores range from 0 (no distress) to 21 (maximum distress).

HADS subscale scores above 10 indicate moderate to severe symptoms of anxiety or depression [7, 19].

The ICG score is a self-administered questionnaire designed to diagnose traumatic grief, based on the criteria developed by Prigerson [3]. This scale has been translated into French and validated by Bourgeois [20]. It is composed of 19 items representing symptoms of traumatic grief which appear within 2 weeks post-loss and last for more than 2 months. The aim of this test is to identify subjects at risk of complicated grief. Complicated grief is defined as a score greater than or equal to 25.

The MINI (DSM-IV) is a brief, structured, standardized diagnostic interview for the major axis I psychiatric disorders in DSM-IV (American Psychiatric Association 1994). In this study, we evaluated survivors using module "A" (major depressive episode). It is used to formulate diagnoses based on the DSM-IV criteria. This instrument, which is widely used internationally, has been validated in French and compared to the structured clinical interview for DSM (SCID-P) and the composite international diagnostic interview for ICD-10 (CIDI). It is an interviewer-administered evaluation that can be used by researchers after a brief training session [18, 21].

Statistical analysis

The main analysis of the percentage of PTSD-related symptoms was based on the intention-to-treat (ITT) population (i.e., 570 randomized patients). For this main analysis, we considered participants who did not complete IES assessment because of emotional distress as equivalent to having PTSD-related symptoms, and we used multiple imputation for the other participants with missing data [22]. Ten data sets were created with missing IES values replaced by imputed values. The model used to impute IES values included patient and family member demographic variables, patient status at 28 days along with study group, and the presence or not of relatives during the resuscitation. The results from analyzing the individual imputed data sets were combined using Rubin's rules [23]. In addition, a secondary analysis based on whether or not relatives were given the option to witness CPR was made for the different outcomes regarding the psychological status of relatives. The fact that both analyses converge toward the same conclusion makes it more reliable.

Data are reported as means (±SD) or medians (25th–75th percentiles) for continuous variables and as percentages for qualitative variables. Generalized estimating equations (GEE) were used for categorical outcomes and mixed models of ANOVA were used for quantitative outcomes, using center as a random effect and adjusting for the relative's relationship to the patient. When necessary, normalizing transformation was performed. We also assessed whether participants' IES or HADS scores increased or decreased between the 90-day and 1-year interviews (ΔIES and ΔHADS). All statistical tests were two-tailed with a type one error of 0.05 and $P < 0.05$ was considered significant. Statistical tests were performed using SAS statistical software (version 9.3; SAS Institute Inc, Cary, North Carolina).

Results

Among the 570 family members (ITT population), 408 (72 %) were evaluated at 1 year (observed cases population), among which 239 (59 %) were given the option to witness resuscitation (Fig. 1). There was no significant difference between the numbers of patients not assessed according to study group.

Psychological assessment

In the intention-to-treat population ($N = 570$), family members had PTSD-related symptoms significantly more frequently in the control group than in the intervention group [adjusted odds ratio, 1.8; 95 % confidence interval (CI) 1.1–3.0; $P = 0.02$] and among family members to whom physicians did not offer the option to witness CPR versus family members that were given the opportunity to witness resuscitation (adjusted odds ratio, 1.7; 95 % CI 1.1–2.6; $P = 0.02$).

Analyses of psychological variables in observed cases population ($N = 408$) according to randomized groups and proposal of family presence are reported in Table 1. Similar results were obtained between the two randomized groups when we considered only patients with an IES score available at 90 days ($P = 0.01$; Table 1). The proportion of family members presenting symptoms of depression evaluated by $HADS_D$ or MINI score was significantly higher in the control group and among family members to whom physicians did not offer the option to witness CPR. ICG score and presence of complicated grief were significantly more important in the control group and among family members to whom physicians did not offer the option to witness CPR (Table 1).

Progression of psychological outcomes

The median difference in IES and HADS scores did not reach statistical significance between the randomized groups: ΔIES = 2.5 (95 % CI [−5, 10]) in the control group and ΔIES = 3 (95 % CI [−4, 12]) in the intervention group, $P = 0.34$; ΔHADS = 2 (95 % CI [−1, 5]) in the control group and ΔHADS = 1 (95 % CI [−2, 6]) in the intervention group, $P = 0.71$. This was likewise true when groups were allocated by proposal of family presence: ΔIES = 3 (95 % CI [−5, 11]) in the non-proposal group and ΔIES = 3 (95 % CI [−4, 11]) in the

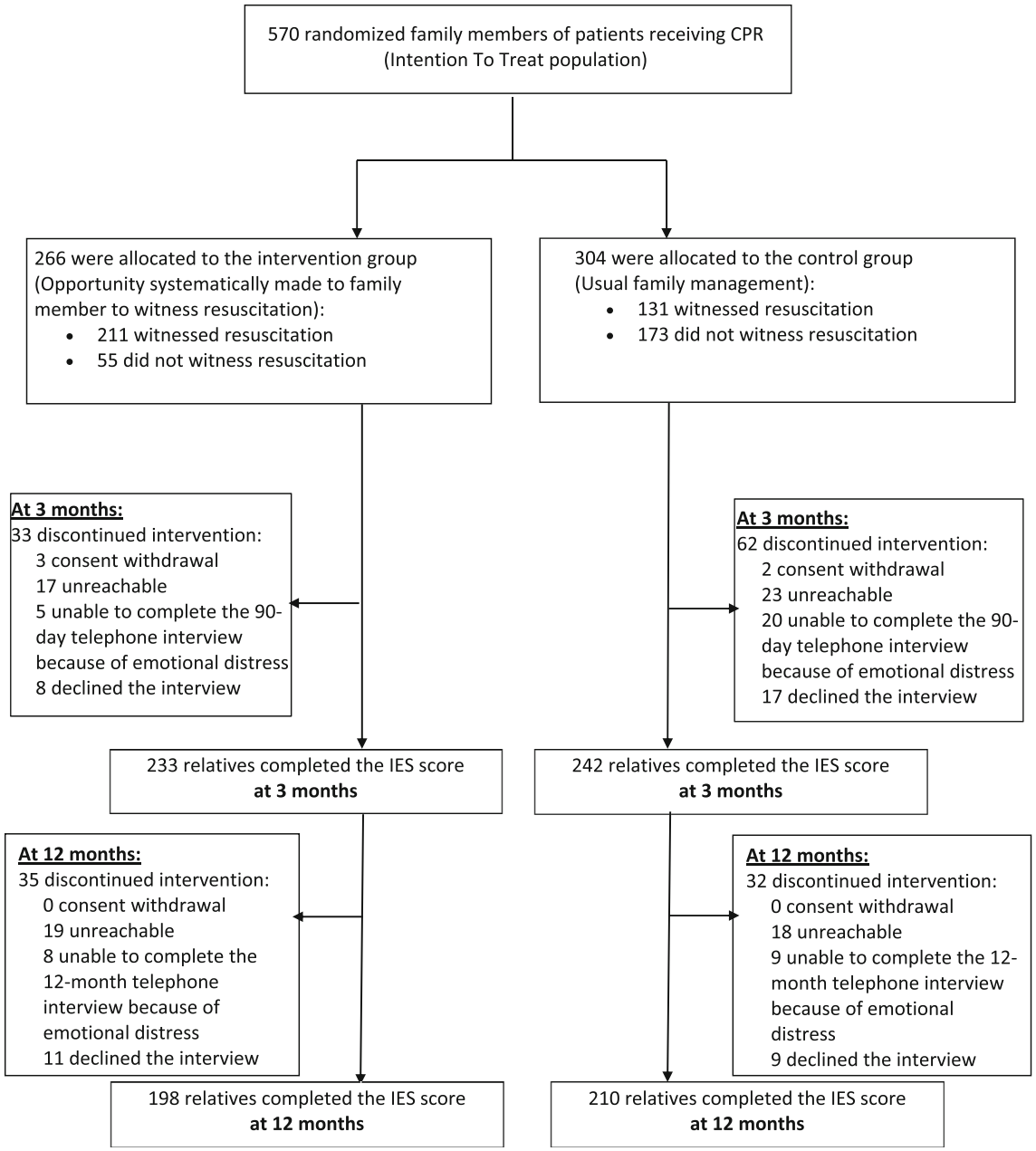

Fig. 1 Flow chart of the study. *CPR* cardiopulmonary resuscitation, *IES* impact of event scale

proposal group, $P = 0.69$; ΔHADS = 2 (95 % CI [−2, 5]) in the non-proposal group and ΔHADS = 1 (95 % CI [−1, 5]) in the proposal group, $P = 0.55$.

Discussion

In this multicenter, randomized trial, 1-year post-event assessment confirms the positive results on psychological parameters observed at 3 months after cardiac arrest of a relative when family members were offered the opportunity to witness CPR. Interestingly, we observe that the rate of complicated grief (measured by ICG score) is lower when the relative is offered the option of witnessing CPR. Our results provide evidence that adverse bereavement may be reduced by adopting specific attitudes and behaviors toward family presence during resuscitation.

Clearly, emergency physicians are not ready to systematically adopt this attitude. A recent French report and a survey realized after our 3-month results showed that less than 30 % of physicians were willing to allow

Table 1 1-Year psychological assessment of family members enrolled in the study

Outcomes	Randomized groups ($N = 408$)			Option given to family member to witness CPR ($N = 408$)		
	Intervention group ($N = 198$)	Control group ($N = 210$)	P value*	Yes ($N = 239$)	No ($N = 169$)	P value*
IES score, median [IQR]	19 [7–28]	20 [11–35]	0.03	18 [7–28]	21 [11–35]	0.006
Presence of PTSD-related symptoms, no. (%)	39 (20)	67 (32)	0.01	52 (22)	54 (32)	0.08
HADS score, median [IQR][a]	8 [4–13]	10 [5–16]	0.41	8 [4–13]	10 [5–16]	0.22
Symptoms of anxiety, no. (%)	26 (13)	37 (18)	0.74	33 (14)	30 (18)	0.85
Symptoms of depression, no. (%)	19 (10)	32 (16)	0.003	26 (11)	25 (15)	0.01
Saw a psychologist after resuscitation of the patient, no. (%)[a]	23 (12)	27 (13)	0.76	27 (12)	23 (14)	0.59
Received newly prescribed psychotropic drugs after resuscitation of the patient, no. (%)[a]	54 (28)	69 (34)	0.01	66 (28)	57 (34)	0.006
Suicide attempted after resuscitation of the patient, no. (%)[a]	2 (1)	5 (2)	–	4 (2)	3 (2)	–
Major depressive episode defined by MINI score, no. (%)[b]	45 (23)	64 (31)	0.02	57 (24)	52 (31)	0.03
ICG score, median [IQR][a]	16 [9–23]	19 [9–28]	0.06	15.5 [8–23.5]	20 [11.5–28.5]	0.01
Presence of complicated grief, no. (%)	41 (21)	71 (36)	0.005	53 (23)	59 (37)	0.003

Presence of PTSD is defined by IES score >30. Symptoms of anxiety or depression are defined by HADS subscale >10. Presence of complicated grief is defined by ICG >25

CPR cardiopulmonary resuscitation, *IES* impact of event scale, *PTSD* post-traumatic stress disorder, *IQR* interquartile range, *HADS* hospital anxiety and depression scale, *MINI* mini-international neuropsychiatric interview, *ICG* inventory of complicated grief

* P values were calculated using the generalized estimating equations (GEE) for categorical outcomes and mixed model of ANOVA for quantitative outcomes with center as a random effect and relative's relationship to patient as a fixed effect

[a] Missing data are <4 %

[b] 31 (8 %) missing data

the family to observe the resuscitation [24, 25]. Similarly, studies that evaluated family members' involvement in the end-of-life decision-making in ICU found that ICU clinicians need more training in the knowledge and skills of effective communication with families of critically ill patients [26]. A qualitative study by Lind and colleagues reported that relatives want a more active role in end-of-life decision-making. The clinician's expression "wait and see" hides and delays the communication of honest and clear information [27]. During CPR, families need to understand and agree to basic guidelines in order to maintain efficient resuscitation efforts. The support person must remain with the family, providing constant information, explaining interventions, interpreting medical jargon, and discussing patient responses to treatment and expected outcome. Of course, a strong communication guide must be available in the medical unit and the protocol must address obtaining the consent of the whole resuscitation team. Our protocol has been elaborated and published with our 3-month results [12]. A few other studies obtained good results using similar methodology, especially in ICUs [6].

Bereavement, grief, and mourning are universal experiences. While normal grief is not defined as a mental disorder, pathological grief (complicated or traumatic) is now distinguished in the International Classification of Mental Diseases [2]. Complicated grief has been shown in numerous studies to form a symptom cluster for psychological disorders comprised of symptoms of traumatic distress and separation distress [28–31]. One study found that traumatic grief predicts negative health outcomes, such as cancer, heart disease, and suicidal ideation [3]. Indeed, traumatic grief appears to have critical importance in determining the risk for long-term health morbidity. Moreover, complicated grief must be treated as a specific disorder to be distinct from depression and anxiety [31]. This fact may explain why we did not observe a significant increase of anxiety symptoms in the control group whereas the percentage of depression was higher in the control group and among family members to whom physicians did not offer the option to witness CPR.

Conclusion

Bereavement-related PTSD symptoms, depression, and traumatic grief were less frequent when families were permitted to be present during resuscitation. This benefit persists 1 year after the traumatic event. Allowing some family members to remain near the patient during resuscitation facilitates the grief process and prevents mental and physical morbidity related to traumatic grief.

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Conflicts of interest No author has a conflict of interest with regard to this study.

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