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Sedation and memories of patients subjected to mechanical ventilation in an intensive care unit

Sedação e memórias de pacientes submetidos à ventilação mecânica em unidade de terapia intensiva

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ABSTRACT

Objective: To investigate the relationship between sedation and the memories reported by patients subjected to mechanical ventilation following discharge from the intensive care unit.

Methods: This prospective, observational, cohort study was conducted with individuals subjected to mechanical ventilation who remained in the intensive care unit for more than 24 hours. Clinical statistics and sedation records were extracted from the participants' clinical records; the data relative to the participants' memories were collected using a specific validated instrument. Assessment was performed three months after discharge from the intensive care unit.

Results: A total of 128 individuals were assessed, most of whom (84.4%) reported

recollections from their stay in the intensive care unit as predominantly a combination of real and illusory events. The participants subjected to sedation (67.2%) at deep levels (Richmond Agitation-Sedation Scale [RASS] -4 and -5) for more than two days and those with psychomotor agitation (33.6%) exhibited greater susceptibility to occurrence of illusory memories ($p > 0.001$).

Conclusion: The probability of the occurrence of illusory memories was greater among the participants who were subjected to deep sedation. Sedation seems to be an additional factor that contributed to the occurrence of illusory memories in severely ill individuals subjected to mechanical ventilation.

Keywords: Memory; Amnesia; Deep sedation; Adult; Intensive care units

Conflicts of interest: None.

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INTRODUCTION

Sedation and analgesia are frequently performed in intensive care, especially in the case of patients subjected to mechanical ventilation (MV), to afford them comfort and to relieve the pain and anxiety caused by invasive procedures.

In intensive care, the level of analgesia/sedation must be adapted to the individual needs of the patients and should be strictly monitored to avoid excessive and prolonged use of sedatives.⁽¹⁾ Complications associated with low sedation levels include patient-ventilator dyssynchrony, discomfort, agitation, anxiety, and unplanned extubation.⁽²⁾ However, the excessive use of sedatives contributes to increase the length of stay at the hospital and the duration of MV.^(3,4)

Intensive care is associated with a wide variety of stressors. The experience of admission to intensive care units (ICU) and illusory memories may cause short- and long-term psychological disorders.⁽⁵⁾ Some studies have shown that approximately 47% of patients remember real facts and that 34% have illusory

memories relative to their stays in the ICU.⁽⁶⁾ Although the causes are still poorly known, some factors may trigger such memories. Relationships have been identified between illusory memories and disease severity, sedation by means of continuous infusion, duration of MV, and length of stay in the ICU.⁽⁷⁾

Although the effects of sedation and analgesia on the memory relative to stays in the ICU and its psychological consequences are poorly known, some evidence suggests that recollection of some events, such as weaning from MV, may be fearful and anxiogenic experiences.⁽⁸⁾

Some patients are unable to describe recollections, and approximately 5% have little or no recollection of real events that occurred during their stay in the ICU but are able to remember a wide variety of dreams, hallucinations, and nightmares. Most patients (55%) combine memories of real events with hallucinations or nightmares.⁽⁹⁾ Experiencing hallucinations, nightmares, and unreal memories is a source of discomfort, stress, and anxiety that is remembered by patients after discharge from the ICU.⁽¹⁰⁾

There is increasing interest in the short- and long-term emotional disorders exhibited by patients admitted to the ICU. However, the actual impact of this experience is only beginning to be understood. In addition, little is known about the consequences and effects of such disorders on the patients' mental health, recovery, and quality of life.

As a function of the evidence needed for a broad-scope understanding of care at and after discharge from the ICU, the aim of this study was to investigate the relationship between sedation and the memories reported by patients subjected to MV after discharge from the ICU.

METHODS

This prospective cohort study was conducted over one year at the ICU of a teaching hospital in Western Paraná, Brazil. The ICU at this hospital serves as high-complexity reference for 26 regional counties. At the time of data collection, it consisted of 10 beds for adults affected by various clinical conditions. The study complied with Resolution 196/96 of the National Health Council and was approved by the human research ethics committee of the *Universidade Estadual de Maringá* (ruling 461/2008). All of the participants signed an informed consent form.

All of the patients admitted to the ICU during the study period that met the following inclusion criteria were included for analysis: stay in the ICU >24 hours, use of MV, age older than 18 years, and agreement to participate in the study. Individuals with previously known mental

diseases, with terminal conditions, admitted for suicide attempts, unable to talk, or with significant neurological sequelae after discharge (detected on outpatient visits) were excluded from the study. The participants who missed outpatient follow-up visits were considered as lost for analysis (Figure 1).

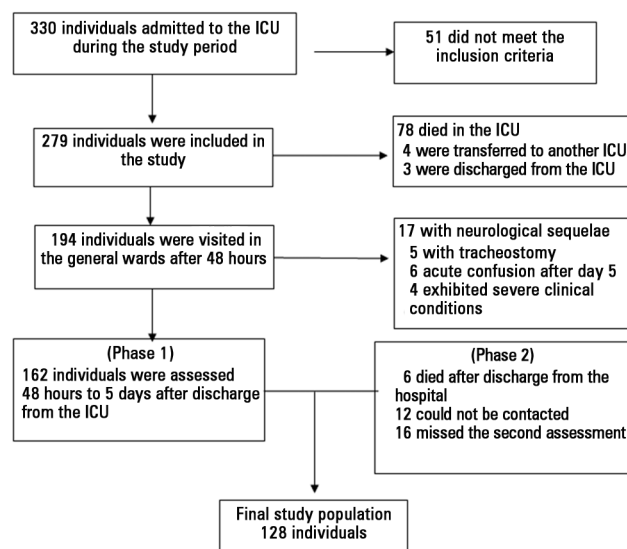


Figure 1 - Flowchart of individuals admitted to the intensive care unit during the study period. ICU - intensive care unit.

The first stage of data collection was conducted during the participants' stay in the ICU. For this purpose, the admission and discharge records were surveyed on a daily basis in the ICU record book. Based on analysis of the clinical records, the individuals who met the inclusion criteria were identified, and their socio-demographic and clinical data were collected, including the information on sedation, length of MV, and length of stay in the ICU and the general wards.

To identify types of memory, the participants with no recollection whatsoever of their stay in the ICU were classified under the category total amnesia; the participants who remembered real occurrences related with treatment, environmental, and emotional events were classified under the category memory of real facts; and the participants with recollections of unreal events, such as nightmares, dreams, and hallucinations, were classified under the category illusory memories. The patients who agreed to participate in the study were informed that the second stage of the study was to be conducted in an outpatient setting on the occasion of follow-up visits.

The second stage of data collection was performed three months after hospital discharge, on the occasion of visits to the outpatient intensive care follow-up clinic. The participants were assessed by the clinic's multidisciplinary staff (including a doctor, nurse, psychologist, physical therapist, nutritionist, social worker, and speech therapist) regarding their overall health condition and to check their clinical conditions and the results of the care provided. On this occasion, the participants' recollections relative to their stay in the ICU were assessed.

Data collection was performed using two instruments. One consisted of a spreadsheet in which information extracted from the participants' clinical records was entered, including socio-demographic (name, age, gender, educational level, and marital status) and clinical (duration of MV, length of stay in the ICU, sedation, cause of admission, complications in the ICU, etc.) data. Regarding sedation, the following data were recorded during the participants' stay in the ICU: a) sedation and analgesia: drug type, length of sedation (days), daily dose, total amounts of midazolam and fentanyl, and length of stay in the ICU without sedation until discharge); b) sedation level: data corresponding to Ramsay's scale and RASS (Richmond Agitation-Sedation Scale); and c) the presence of agitation, mental confusion, and the use of physical restraints. The sedation level was classified based on the RASS score as follows: -2 and -3 as mild to moderate sedation and -4 and -5 as deep sedation over at least 24 hours. RASS is based on clinical criteria, and its score varies from +4 to -5, i.e., from the presence of anxiety and/or agitation to unresponsive coma.⁽¹¹⁾

The second instrument was used to assess the participants' recollections relative to their stay in the ICU. This instrument was specifically elaborated for the purpose of this study based on the English version of Intensive Care Unit Memory (ICUM), which assesses patients' recollections before and after admission to the ICU.⁽¹²⁾ ICUM has a checklist design and consists of nine items distributed across four domains: recollections related to treatment (nasal and oral tubes, extubation, aspiration, etc.); recollections related to the environment (visits from relatives, noise, transfer to general ward, etc.); recollections related to feelings (pain, thirst, hunger, agitation, confusion, fear, etc.); and unreal or illusory memories (dreams, nightmares, and hallucinations).⁽¹³⁾

To analyze the relationship between sedation in the ICU and the recollections reported later on, the participants were divided into two groups: a) participants not given sedation and b) participants given a combination of midazolam and fentanyl. All of the assessed participants

were given both midazolam and fentanyl (the standard sedation regimen in the ICU studied). Participants were considered as sedated when sedatives were used continuously or in significant intermittent doses. As a rule, the participants in the non-sedation group were given sedatives at the time of tracheal intubation only.

The data collected were stored using Microsoft® Excel® software. Statistica 8.0 and Statistical Analysis System (SAS-9.1) software programs were used for data analysis and interpretation. The presence or absence of memories relative to stay in the ICU was defined as the dependent variable. Comparison of the investigated variables between the sedated and non-sedated groups was performed by means of bivariate analysis, the chi-square test, and Fisher's exact test when needed. The results are described in tables as absolute and relative frequencies. The continuous data are expressed as means and standard deviations, when indicated, and the categorical data as absolute numbers and percentages. The significance level was set at 5% in all of the analyses.

RESULTS

A total of 330 admissions to the ICU occurred during the study period. The final sample consisted of 128 participants (Figure 1), 68.0% of whom were male. The participants' ages varied from 18 to 79 years old; the average age was 43.5 ± 17.1 years old. The participants stayed in the ICU without sedation until discharge to the general wards for an average of 3.5 days ($1-19 \pm 3.1$), and most of the participants (67.9%) were assessed after three days following discharge from the ICU. The participants had been free from sedatives for more than five days by the time of assessment.

Most participants (43%) were admitted to the ICU due to trauma, followed by various medical dysfunctions (31.3%), postoperative care (19.5%), and neurological conditions (6.2%). The average stay in the ICU was 10.2 ± 8.4 days, varying from two to 37 days; half of the sample stayed more than seven days, and more than half (57.0%) was subjected to MV for more than two days; the average length of MV was 7.3 days. The average APACHE II score was 20.2 ± 10.1 (expected mortality of approximately 36%). More than half of the sample (52.3%) had previously known clinical problems, the most frequent of which were: systemic arterial hypertension (SAH), 43.7%; diabetes mellitus (DM), 32.4%; and alcoholism, 18.7%. A total of 78 participants died in the ICU, and six died after hospital discharge. The clinical and demographic characteristics of the sample are described in table 1.

Table 1 - Characteristics of the study population

Variables	Total (128)	Sedated (86)		p value (mild versus deep)	Non-sedated (42)	p value (sedated versus non-sedated)
		Mild-moderate (12)	Deep (74)			
Clinical and demographic data						
Gender						
Male	87 (68.0)	10 (83.3)	53 (71.6)	0.3951	24 (57.1)	0.0665
Female	41 (32.0)	2 (16.7)	21 (28.4)		18 (42.9)	
Age						
18-40	56 (43.8)	5 (41.7)	39 (52.7)		12 (28.6)	
41-60	45 (35.1)	4 (33.3)	22 (29.7)	0.7420	19 (45.2)	0.0531
>60	27 (21.1)	3 (25.0)	13 (17.6)		11 (26.2)	
Cause of admission						
Trauma	55 (43.0)	5 (41.7)	43 (58.1)	0.5644	07 (16.7)	<0.001
Medical	40 (31.3)	6 (50.0)	27 (36.5)		07 (16.7)	
Surgical	25 (19.5)	0	0		25 (59.5)	
Neurologic	8 (6.2)	1 (8.3)	4 (5.4)		3 (7.1)	
APACHE II (mean±SD)	18.29±8.93	20.08±9.4	19.91±8.7	0.951	15.2±8.6	0.006
Sedative total amount (mg, mean±SD)						
Midazolam		482.0±720.4	2,933.3±4,723.9	0.078	----	----
Fentanyl	----	7.27±13.2	33.67±56.5	0.112		
Propofol		0	0			
Outcome and progression						
Length of stay in the ICU						
Up to 48 hours	15 (11.7)	1 (8.3)	0	0.0316	14 (33.3)	<0.001
3-7 days	78 (38.3)	8 (66.7)	44 (59.5)		27 (64.3)	
>7 days	35 (50.0)	3 (25.0)	30 (40.5)			3 (2.4)
MV length (days)						
≤2	55 (43.0)	8 (66.7)	8 (10.8)	<0.001	40 (95.2)	<0.001
>2	73 (57.0)	4 (33.3)	66 (89.2)		2 (4.8)	
Hospital stay after ICU (days)						
Up to 7	45 (35.2)	7 (58.3)	24 (32.4)		14 (33.3)	
8-14	54 (42.2)	4 (33.4)	32 (43.2)	0.1864	18 (42.9)	0.9500
>14	29 (22.6)	1 (8.3)	18 (24.4)		10 (23.8)	
Duration of sedation (days)						
<2		6 (50.0)	5 (6.8)			
2-7	----	5 (41.7)	38 (51.3)	<0.001	----	----
>7		1 (8.3)	31(41.9)			
Psychological disorders (outpatient)						
Anxiety	43 (33.6)	2 (16.7)	27 (36.5)		14 (33.3)	
Depression	16 (12.5)	1 (8.3)	10 (13.5)	0.0483	5 (11.9)	0.4576
Anxiety + depression	14 (10.9)	1 (8.3)	10 (13.5)		3 (7.1)	
PTSD	19 (14.8)	0	13 (17.6)		5 (11.9)	

APACHE II - Acute Physiologic Chronic Health Evaluation II; SD - standard deviation; ICU - intensive care unit; MV - mechanical ventilation; PTSD - post-traumatic distress disorder. All variables are expressed as n (%), except when otherwise indicated.

Approximately 67.2% of the participants were given sedation by continuous midazolam and fentanyl infusion. The sedation levels were maintained as a function of the clinical conditions. A combination of midazolam and fentanyl was frequently used in cases with prolonged sedation. Fentanyl alone was used during the period of MV weaning, and haloperidol associated with physical restraints was used when patients presented with psychomotor agitation. Following discontinuation of sedation, 56.9% of participants exhibited psychomotor agitation and mental confusion and thus were given haloperidol.

Among the participants given sedatives, most (88.4%) were sedated for more than two days (5.5 days on average) by means of continuous infusion (67.2%) of combined midazolam and fentanyl. The participants remained sedated with midazolam for an average of 6.2 days and with fentanyl for an average of 7.7 ± 6.6 days, with a range of 1 to 33 days. Fentanyl alone was given to some participants at the time of MV weaning.

The probability for the participants to exhibit subsequent psychological disorders was higher for the patients who were sedated (67.2%) and subjected to deep sedation ($p=0.048$).

Most participants (84.4%) were able to describe some memories from their stay in the ICU; among these participants, 39.1% reported recollections of real events, and 5.5% reported illusory memories, such as dreams (13.3%), nightmares (7.0%), and hallucinations (25.0%). Many participants (39.8%) reported combined recollections of real events and delusions. As to the recollections of real events, the ones most frequently reported were: transfer to the general ward (83.2%), visits from relatives (76.4%), confusion/agitation (67.2%), physical restraint (53.7%), and thirst (51.2%). Only 24.7% of participants described recollections relative to the presence of an endotracheal tube, aspiration, and extubation.

Only 15.6% of the participants did not have any recollection of their stay in the ICU. The participants subjected to deep sedation for long periods of time did not report any recollections of invasive procedures, such as the presence of an endotracheal tube, aspiration, or extubation.

Table 2 shows that the group of sedated participants were significantly different in terms of the types of memories reported compared to the non-sedated participants ($p<0.001$) and in the occurrence of agitation and confusion during their stay in the ICU. Illusory memories, amnesia as to the stay in ICU and mental confusion were more frequent among the participants who

were sedated. Table 3 describes some correlations between the types of memories reported and the participants' clinical characteristics during their stay in the ICU. Some clinical variables, such as length of stay in the ICU, the duration of MV, and agitation, were significantly different between the groups.

Table 2 - Comparison of the presence of agitation and mental confusion and the types of memories reported between sedated and non-sedated groups

Variables	Sedated (86)	Non-sedated (42)	p value
Agitation			
Yes	52 (60.5)	34 (81.0)	<0.001
No	34 (39.5)	41 (19.0)	
Mental confusion			
Yes	72 (83.7)	14 (33.3)	<0.001
No	14 (16.3)	28 (66.7)	
Real memory	21 (24.4)	29 (69.1)	
Real and illusory	42 (48.8)	9 (21.4)	<0.001
Illusory memory	7 (8.14)	0 (0)	
Amnesia	16 (18.6)	4 (9.5)	

Among the participants who were subjected to MV for more than two days, 47.7% reported recollections of their stay in the ICU (30.0% real events, 76.5% real events/illusory memories, and 100% illusory memories), while 9.4% had no recollections whatsoever. The probability of the participants to recall illusory memories was greater in those who were subjected to deep sedation. Psychomotor agitation and mental confusion occurred in more than half of the sample (56.9%); those participants more frequently reported illusory memories relative to their stay in the ICU.

DISCUSSION

The results indicate that sedation may influence the incidence of illusory memories, particularly among individuals under MV subjected to deep and prolonged sedation.

Most of the participants who were subjected to sedation recalled illusory memories, whereas few of those who were not subjected to sedation reported this type of recollection. Illusory memories are recollections of delirious and oniric formations enveloped by emotional content that are recorded upon recovery of consciousness following discontinuance of sedation.^(5,6,14)

Reports in the literature have described significant associations between sedation and the recall of illusory

Table 3 - Distribution of the types of reported memories relative to the participants' characteristics

Variables	Memory types				p value
	Real (50)	Real/illusory (51)	Illusory (7)	Amnesia (20)	
Length of stay in the ICU					
Up to 48 hours	10 (20.0)	2 (3.9)	0 (0)	3 (15.0)	<0.001
3-7 days	37 (74.0)	31 (60.8)	1 (14.3)	9 (45.0)	
>7 days	3 (6.0)	18 (35.3)	6 (85.7)	8 (40.0)	
Length of stay in the general ward after ICU (days)					
<7	21 (42.0)	17 (33.3)	3 (42.9)	4 (20.0)	0.4483
8-14	20 (40.0)	19 (37.3)	3 (42.9)	12 (60.0)	
>14	9 (18.0)	15 (29.4)	1 (14.2)	4 (20.0)	
MV length (days)					
≤2	35 (70.0)	12 (23.5)	0 (0)	8 (40.0)	<0.001
>2	15 (30.0)	39 (76.5)	7 (100)	12 (60.0)	
Presence of confusion					
Yes	27 (54.0)	36 (70.6)	7 (100)	16 (80.0)	0.2774
No	23 (46.0)	15 (29.4)	0 (0)	4 (20.0)	
Presence of agitation					
Yes	10 (20.0)	26 (51.0)	7 (100)	10 (50.0)	<0.001
No	40 (80.0)	25 (49.0)	0 (0)	10 (50.0)	

ICU - intensive care unit; MV - mechanical ventilation.

memories.^(7,14,15) For instance, Ringdal et al.⁽⁷⁾ found an association between sedation using propofol ($p<0.001$), benzodiazepines ($p<0.05$), and analgesics combined with opioids ($p<0.01$) and reports of illusory memories in 74% of the sample in their study. Weinert et al.⁽¹⁵⁾ assessed organ dysfunction, wakefulness, and sedation and found an association between levels of exposure to sedatives and increased risk of recall of a delirious memory.

However, Capuzzo et al. did not find a significant association between sedation and the incidence of various types of memories among individuals admitted to the ICU.⁽¹⁶⁾ Those results disagree with the results of the present study, most likely due to methodological differences, as Capuzzo et al. assessed individuals who were given sedation clustered according to the type of drug administered. Another likely cause for the divergence is that in their study, assessment was performed six months after discharge from the hospital. In the present study, for the purpose of analysis, the participants were divided into two groups, one consisting of the individuals who were given sedation and the other consisting of those who were not, and assessment was performed an average of three months after discharge from the ICU.

Most of the participants in this study recalled some memory of their stay in the ICU. Among them, many

reported a combination of real and illusory memories. A survey of the literature revealed that some studies reported similar rates relative to recollection of experiences in the ICU.^(6,17)

The most frequent type of memories reported corresponded to real events, such as visits from relatives, procedures, and the use of physical restraints. These memories remained consistent over time and were still present three months after discharge from the ICU. Memories of nightmares and hallucinations were described by the participants as a source of discomfort during their stay in the ICU, and most of the time, such experiences were related to situations experienced during their ICU stay.

Few participants recalled memories associated with respiratory therapy, such as the presence of an endotracheal tube, aspiration, and extubation. These findings disagree from with a report by van der Luer et al., in whose study 54% of the participants recalled the presence of an endotracheal tube, intravenous medication, noise, and hallucinations as sources of discomfort.⁽¹⁰⁾ That divergence in the results may be due to differences in the structural characteristics of the ICUs, and more particularly to differences in the strategies and management of sedation.

Approximately 15.6% of participants in the present study did not have any recollection of their stay in the ICU. This rate disagrees with those reported by other authors, which were higher (34%,⁽¹⁶⁾ 30%,⁽¹⁸⁾ and 40%).⁽¹⁹⁾ This divergence was most likely due to differences in the methods used for the assessment of participants. The instrument used in the present study has a checklist design, and the participants were requested to report their memories based on reading a list of items related with intensive care, which may have facilitated recollection compared to other instruments consisting of open-ended questions that request respondents to describe their recollections relative to their stay in the ICU. In studies that used methods similar to the ones used in the present study, the rates of amnesia were close to ours (18%⁽¹⁵⁾ and 19%).⁽⁶⁾

The ICU where the present study was conducted does not have a routine protocol for sedation, and there is no common recommendation for sedation and weaning. Recent studies^(20,21) have been conducted to improve the plans for sedation and analgesia for individuals subjected to MV. The results of those studies showed that simple strategies, such as daily interruption of sedative infusions, associate with shorter lengths of MV and shorter stays in the ICU.^(21,22)

In addition to changes in the clinical parameters of patients, analgesia and sedation may have adverse consequences, such as longer durations of MV and longer stays in the ICU.⁽²³⁾ In addition to these effects, which are widely acknowledged in the literature, the present study found that the participants subjected to deep sedation exhibited amnesia relative to their stay in the ICU and that a significant number of those who had recollections reported illusory memories.

Therefore, the results of this study indicate that the use of sedation in the ICU played an important role in the formation of illusory memories three months after discharge (Table 1), although the occurrence of psychological disorders was significant in the patients subjected to deep sedation only (Table 1). However, it may be inferred that such an effect on memory was, at a minimum, the effect of the sum of various other conditions related to the use of sedation (greater severity, intensity of respiratory dysfunction, complications in the ICU, etc.) in addition to the intensity of sedation itself.

Other events seem to contribute to the occurrence of illusory memories. The length and level of sedation were significant factors for the occurrence or total lack of

recollections relative to the stay in the ICU. Factors such as gender, age, cause of admission, and length of stay at the hospital did not exhibit associations with the recall of illusory memories.

This study had limitations, some of which were intrinsic to its nature and the methods used. Because this study was an observational cohort study, although statistical methods were used, one can only make inferences relative to the influence of sedation on short-term outcomes, whereas causal relationships cannot be established, as multivariate analysis was not performed. In addition, the sample consisted of participants admitted to a single ICU, although the unit is a regional reference for high-complexity care and outpatient follow-up. The detected effects of sedation on the participants' memories may have been affected by the interference of variables that were not assessed, such as differences in the participants' medical conditions or the influence of medical procedures. The presence of delirium and the participants' quality of life after discharge from the ICU were not assessed in this study.

CONCLUSION

The factors related with the presence and type of memories relative to the participants' stays in the intensive care unit were closely related to the daily care. The results of this study indicate that the frequency of illusory memories was higher among the participants subjected to deep sedation. Thus, sedation may be a significant additional factor that contributes to trigger such emotional experiences.

Authors' contributions

Jaquiline Barreto da Costa participated in the study planning, data collection, data analysis, and manuscript writing. Sonia Silva Marcon participated in the elaboration, revision, and approval of the final version of the present manuscript. Claudia Rejane Lima de Macedo participated in data collection, manuscript revision, and approval of the final version of the manuscript. Amaury Cesar Jorge participated in the revision of the present manuscript, elaboration of the instrument for the collection of clinical data, and approval of the final version of the manuscript. Péricles Almeida Delfino Duarte participated in the elaboration of the instrument for collection of clinical data, data analysis, organization of tables, and approval of the final version of the present manuscript.

RESUMO

Objetivo: Investigar a relação entre sedação e as memórias relatadas por pacientes submetidos à ventilação mecânica após a alta da unidade de terapia intensiva.

Métodos: Estudo de coorte prospectivo, observacional, realizado com pacientes submetidos à ventilação mecânica e que permaneceram por mais de 24 horas na unidade de terapia intensiva. Dados clínicos e de sedação foram pesquisados em prontuários, e os dados referentes às memórias do paciente foram coletados por meio de um instrumento validado para esse fim. As avaliações foram realizadas 3 meses após a alta da unidade de terapia intensiva.

Resultados: Dos 128 pacientes avaliados, a maioria (84,4%) relatou lembranças do período de internação na unidade de

terapia intensiva, prevalecendo uma combinação de eventos reais e ilusórios. Pacientes que permaneceram sedados (67,2%), com sedação profunda (RASS -4 e -5) durante um período maior do que 2 dias e que apresentaram agitação psicomotora (33,6%) foram mais suscetíveis a apresentarem memórias ilusórias ($p > 0,001$).

Conclusão: A probabilidade de os pacientes apresentarem memórias de ilusão foi maior naqueles com sedação profunda. A sedação, portanto, parece ser um fator adicional que contribuiu para o desenvolvimento de memórias ilusórias em pacientes gravemente enfermos e submetidos à ventilação mecânica.

Descritores: Memória; Amnésia; Sedação profunda; Adulto; Unidades de terapia intensiva

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