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Post-traumatic stress disorder in intensive care unit patients

Transtorno de estresse pós-traumático em pacientes de unidade de terapia intensiva

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ABSTRACT

Post-traumatic stress disorder has been detected in patients after intensive care unit stay. The main goal of this study was to review the psychological aspects and therapeutic interventions in patients following intensive care unit stay. Thirty eight articles have been included. The prevalence of post-traumatic stress disorder has ranged from 17% to 30% and the incidence from 14% to 24%. The risk factors were: previous history of anxiety, depression or panic, having delusional traumatic memories (derived from psychic formations as dreams and delirium), mechanic ventilation time, stressing experiences and depressive behaviors. High opiates doses, sedation or analgesia withdrawal symptoms, and use of lorazepam were related with increased delirium and delusional memory. The disorder symptoms can be reduced with hydrocortisone administration, and daily sedation interruption. No other psychological intervention effectiveness studies were found.

Keywords: Post-traumatic stress disorder/psychology; Intensive care units; Adult

During the past decade, the understanding that emotional experiences of patients staying in intensive care unit (ICU) may be stressing and traumatic has lead professionals to investigate not only the ICU curative or palliative therapies, but also interventions to prevent emotional disorders which can harm the patient's overall rehabilitation and post-hospitalization quality of life.[1-5]

Studies have shown that the experience of being in an ICU may trigger traumatic memories generated by the risk of dying experience.[2-4,6] These memories are formed during the ICU stay, and have a traumatic potential as related with risk of dying experience and being severely ill. The traumatic memory is a neurological trauma record, which is not understood as any stressing event type, but, necessarily is a cognitive record revested with the emotional contents generated by a extreme life threatening event. Some trials on post-traumatic stress disorder (PTSD) in ICU patients classified the hospitalization time memories in real memories, feelings memories and delusional memories, and delusional memories showed strong correlation with traumatic memory and PTSD formation.[1,3,7-9] Delusional memories are delirant and onirical formation memories, recorded by the time of consciousness recovery following sedation and have been associated with disease's features, drug treatment and hypnotic status from sedating drugs.[1,3,7]

The trauma concept was based on the Sigmund Freud's studies on neurosis, who initially used the word in reference to psychological reactions following railroad accidents and the death impact on war veterans, deepening the human psyche studies. Thus, the term trauma, so far used in relation with physical accidents, was used for psychological phenomena, bringing to the psychological trauma concept the notion of causality and therapy. Later, the trauma and traumatic neurosis concepts spread during the Vietnam war, finding fertile soil among the no-violence movements, and the noxious effects to the population involved in war. This movement culminated with PTSD being proposed as a diagnosis in the Diagnostic and Statistical Manual of Mental Disorders third Edition – DSM-III.[10]

Currently, PTSD most used diagnostic system is the one published in the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders fourth Edition (DSM-IV), with criteria similar to the World Health Organization's (WHO) International Classification of Diseases (ICD) tenth Edition. Thus, PTSD is defined as a set of reactions associated with traumatic event memory from a life threatening experience, such as traffic accidents, natural disasters and severe life-threatening illness. Other potentially traumatic situations are considered, as unexpected notice of death, death threat or injury experienced by a family member or close person, thus not directly experienced by the subject. The subject may experience persistent and intensively the traumatic event memories, which manifest intrusively (with no patient control) causing psychological suffering, physiological changes similar to those occurring during the event, persistent avoidance behavior and excitability, with eventual occupational impairment. The symptoms usually surge one to three months following the traumatic event, acute if the symptoms are present for two days, chronic if lasting longer than three months, or a late when the symptoms surge after six months. PTST symptoms may feature acute, chronic and late pictures.[11]

The PTST prevalence and incidence, the variables interfering with the post-traumatic stress conception, and the reasons for developing the traumatic experience in ICU admitted patients are well documented issues. PTSD impact on physical rehabilitation, mental and social health has been documented by quality of life evaluation in specific ICU patients populations. Thus, this study aims to systematically review the last 12 years relevant literature on ICU patients PTSD, focusing on psychological aspects and therapeutic interventions.

METHODS

The review was performed by searching electronic data base (Medline) for the last 12 years (1996-2008). The search strategy included the keywords "psychology or psychotherapy" and "post-traumatic stress disorders and intensive care", from the pediatrics- and neonatal care- related papers. The articles were included after agreement of both investigators analyzing the titles, abstracts and full articles.

RESULTS

Following the 117 articles review, 78 were excluded for (a) not involving ICU staying patients; (b) being on pediatric patients; (c) communication letters and (d) qualitative method, with one clinical case description. The 38 articles included had the following designs: 9 transversal, 15 longitudinal, 5 case-control, 8 literature reviews and 1 qualitative study.

All studies evaluated were based on the DSM - IV - Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition Revised) for disorder definition and characterization.

Post-traumatic stress disorder prevalence and incidence

Studies have shown ICU patients population PTSD prevalence between 17% and 30%,[9,12,13] a range possible attributable to the different evaluation tools. In specific patients samples, the range was narrower, 24% in secondary peritonitis patients,[14] 14% to 24% in patients with physical traumas from automotive accidents and falls[15-18] and 23% in liver-transplant patients (Chart 1).[19]

The PTSD incidence rates had small variation in the general ICU specific samples: 14% to 18% in severe heart disease patients;[20,21] 24% in trauma patients;[22] 15% to 24% after 3 months and 20% after 9 months and 12 months after general ICU discharge.[23-25] On the other hand, some studies involving general ICU patients samples have shown lower incidence. Samuelson et al. found an acute PTSD 8.5% rate and Capuzzo et al. found only 5%

Chart 1 – Studies of post-traumatic stress disorder prevalence in post intensive care unit patients

Study	Population	Aim	Design	Sample	Tools	Evaluation	PTSD rate	PTSD risk factors
Scragg et al. (2001)[9]	General ICU	Prevalence	Transversal	142 total 86 final	IES HADS TSC-33	24 months (de 1995 a 1997)	30% by discharge	Female gender, young, anxiety, and depression
Nickel et al. (2004)[12]	General ICU	Prevalence	Transversal	217 total 125 final	PTSS-10 SCID – DSM-IV	12 months (1999)	17%	Depression, alcoholism, borderline personality
Cuthbertson et al. (2004)[13]	General ICU	Prevalence	Transversal	111 total 78 final	DTS DSM-IV	3 months after ICU discharge	22%	Young patients
Schnyder et al. (2000)[15]	Severe accidental trauma patients	Prevalence	Longitudinal	106 total	IES CA PTSD Scale SCQ FQCI	Average 14 days following the accident	20%	Female gender, subjective accident severity perception, depressive strategies for stress situation confrontation.
Schnyder et al. (2001)[16,21]	Severe accidental trauma patients	Prevalence	Longitudinal	106 total	IES HADS SNI IEL SCQ FQCI	12 months	14%	Anxiety, depression, perception of death
Richter et al. (2006)[17]	Severe accidental trauma patients	Prevalence	Transversal	101 total 37 final	DSM-IV	4 years after ICU	24%	Trauma patient
Rothenhäusler et al. (2002)[19]	Liver transplantation	Prevalence	Transversal	81 total 75 final	PTSS-10 SCID – DSM-IV SKT MADRS SF-36	48 months (1996 to 1997)	23%	Depression and acute organ rejection
Boer et al. (2007)[14]	Secondary peritonitis - surgery	Prevalence	Transversal	278 total 118 alive 104 final	PTSS-10	96 months (1994 to 2000)	24%	Women older than 50 years

PTSD – post-traumatic stress disorder; ICU – intensive care unit; IES – Impact Event Stressor; HADS – Hospital Anxiety and Depression Scale; TSC-33 - Trauma Symtom Checklist–33; PTSS – Posttraumatic Stress Syndrome 10-questions Inventory; SCID – Strutural Clinical Interview for the DSM-IV; DTS - Davidson Trauma Scale; DSM-IV, Diagnostic and Statistical Manual of Mental Disorders – IV; CA PTSD Scale - Clinical-Administered PTSD Scale; SCQ - Sense Coherence Questionnaire; FQCI - Freiburg Questionnaire of Coping with Illness; SNI - Social Network Index; ILE - Inventory for Determining Life-Changing Events; SKT - Syndrom-Kurztest; MADRS - Montgomery-Asberg Depression Rating Scale; SF-36 - Medical Outcomes Study 36-Item Short Form.

PTSD, this last excluding patients with previous depression and anxiety therapy, in use of antidepressants and neuroleptics, which are considered risk factors for PTSD (Chart 2).[26,27]

Scragg et al. reported that the prevalence and incidence rates variation may be attributed to the different evaluation tools used (Impact Event Scale Revised; SCID – Structural Clinical Interview for the DSM-IV; Structural Clinical Interview; Posttraumatic Stress Syndrome 10-Questions Inventory), which, even when proving acceptably reliable and valid for the studied samples.[9] Other studies consider that the rates variation may be also attributed to the different times the tools were applied, and the different sizes and details of the evaluated samples.[28,29] The difference in the ICU patients se-

Chart 2 – Studies on incidence of post-traumatic stress disorder in post-intensive care unit patients

Study	Population	Aim	Design	Sample	Tools	Evaluation	TPSD rate	PTSD risk factors
Capuzzo et al. (2005)[26]	General ICU	Incidence	Longitudinal	84 total 63 final	IES ICU-MT	1 week and 3 months after ICU discharge	5%	Delusional memories
Rattray et al. (2005)[23]	General ICU	Incidence	Longitudinal	109 total 80 final	ICEQ HADS IES	By the hospital discharge, 6 months and 12 months after	Avoidance: 20%- 12 months Intrusion: 18%- 12 months	Anxiety, depression and hospitalization length associated with symptoms after 12 months
Sukantarat et al. (2007)[24]	General ICU	Incidence	Longitudinal	51 total 45 final	IES HADS SF-36	3 and 9 months after discharge	24% - 3 months 20% - 9 months	Anxiety, depression and physical decadence
Samuelson et al. (2007)[27]	General ICU	Incidence	Longitudinal	313 total 226 final	IES-R HADS ICU-MT ICU-SEQ	5 days and 2 months after ICU discharge	8.5% acute PTSD	Anxiety and depression
Jones et al. (2007)[25]	General ICU	Incidence	Longitudinal	799 total 238 final	PTSS-10 ICU-MT	2 weeks, 2 months and 3 months	15% - 3 months	Delusional memories, long term sedation, physical restriction without sedation
Rothenhäusler et al. (2005)[20]	Cardiac patients	Incidence	Longitudinal	34 total	PTSS-10 SCID – DSM-IV SKT MADRS SF-36 DRS	In the ICU and 12 months after discharge	18%	Anxiety and depression
Girard et al. (2007)[21]	Cardiac patients	Incidence	Longitudinal	275 total 43 final	PTSS-10	6 months after discharge	14%	Women, young (≤50), high lorazepam dose
Matsuoka et al. (2008)[22]	Automotive vehicle accident patients	Incidence	Longitudinal	188 total 100 final	IES-R CA PTSD Scale HADS MINI	4 to 6 weeks post-accident	24%	Perception of life threat, heart rate and intrusive memory IES-R subscale

PTSD – post-traumatic stress disorder; ICU – intensive care unit; IES - Impact Event Stressor; ICU-MT- Intensive Care Unit – Memory Tool; ICEQ - Intensive Care Experience Questionnaire; HADS - Hospital Anxiety and Depression Scale; SF-36 - Medical Outcomes Study 36-Item Short Form; ICU-SEQ - Intensive Care Unit, Stressful Experience Questionnaire; PTSS – Posttraumatic Stress Syndrome 10-questions Inventory; SCID – Structural Clinical Interview for the DSM-IV; SKT- Syndrom-Kurztest; MADRS - Montgomery-Asberg Depression Rating Scale; DRS - Delirium Rating Scale; IES-R - Impact Event Stressor-Revised; CA PTSD Scale - Clinical-Administered PTSD Scale; MINI - Mini-International Neuropsychiatric Interview.

dation procedures, variable between countries and services, was also highlighted as an important PTSD risk variable, possibly influencing the rates.[26,30]

Risk factors

The risk factors associated with PTSD reported were (a) previous history of anxiety, depression or panic,[12,31] (b) delusional memories[3,12,31,32] (c) beliefs and depressive behaviors impairing the threat situation confrontation,[15] (d) stressing experiences with nightmares and fear feelings,[27,33] and (4) the mechanic ventilation time.[13,31]

The presence of anxiety and depression symptoms has shown strong correlation with avoidance behaviors and intrusive memories (PTSD symptoms).[23,24,31] Delusional memories from ICU admission has shown a significant correlation with increased acute and chronic PTSD, anxiety disorder, phobic behaviors and panic disorder, independently of the evaluation tool and the evaluation time.[3,5,12,13,27,32]

Sedating drugs and their respective dosages were studied as risk factor for delirium development, and consequent formation of delusional memories in ICU patients. Those more prone to delirium were (a) patients receiving high daily opiates doses (median dose 88 mg/daily vs 43 mg/daily; P=0.039) and (b) patients with sedation and analgesia withdrawal symptoms (78% of the sample; P<0.0001).[25] The patients receiving high propofol doses as sedative had no delirium.[25] The total lorazepam dose received in ICU was also associated with PTSD; for each 10 mg lorazepam dose increase, a 0.39 total score increase was found in the PTSD (Post-Traumatic Stress Syndrome 10-Questions Inventory) symptoms evaluation tool score (95%CI 0.17-0.61; P=0.04).[21]

Still regarding sedation, the procedures continued or daily sedation (daily sedation withdrawal) were reported as risk and protection factors, respectively. Patients receiving continued and deep sedation experienced delusional memories and little real memories about their sedation time, and thus were susceptible to develop PTSD symptoms.[3,9] The opposite was seen when the patients underwent the daily sedation procedure.[26,30] The variables (a) ICU stay length, (b) admission diagnosis, (c) disease severity and (d) delirium duration, did not show association with the overall anxiety, depression, stress or PTSD scores.[3,5,12,13,21,23,32,34]

The association between age and gender with PTSD was controversial. Regarding the gender, some studies failed to show a relationship with the PTSD symptoms.[3,5,12,13,32,32] On the other hand, other trials showed a gender association with the PTSD symptoms, more frequent in women.[21,26,27,34] The patients' age showed no association with PTSD in some trials.[3,5,12,32] In other studies, PTSD inversely correlated with age;[13,31] patients older than 50 years had less PTSD symptoms;[21] young patients had increased anxiety and depression scores 6 and 12 months after the hospital discharge, as well as increased levels of behavioral avoidance symptoms and intrusive memories by the discharge, and 6 and 12 months later;[23] and severe PTSD was seen in young patients.[27]

Impact of post-traumatic stress disorder in the overall health

The PTSD impact on physical rehabilitation, mental and social health, were studied using quality of life and qualitative study in patients who were in ICU.

A study with acute respiratory syndrome patients sample evaluated the quality of life using the Medical Outcomes Study 36 Item Short Form (SF-36) and found significant difference between the groups with and without PTSD in the dimensions mental health (F=54.11 df=2; P=0.0001), physical aspects (F=36.81; df=2; P=0.0001), functional ability (F=17.92; df=2; P=0.0001), pain (F=35.81; df=2; P=0.0001) and general health status (F=37.52; df=2; P=0.0001).[34] Similar findings were reported by Schelling et al.(1998) and Kapfhammer et al in the following dimensions, respectively: mental health (-20%; P=0.001); H=11.92; P=0.003); vitality (-17%; P=0.002); social aspects (-13%;P=0.046), (H-10.75; P=0.005) and increased pain frequency (+27%; P=0.002) and general health status (H=12.11; P=0.002).[5,35] A study with post-heart surgery patients showed decreased mental health (R=0.52; P<0.01).[2] These data evidence the PTSD impact on chronic patients rehabilitation (Chart 3).

Other clinical trials and literature reviews showed that critically ill patients with corticosteroid insufficiency, with septic shock and heart surgery, benefited from hydrocortisone therapy, and the treatment group showed significant improvement of PTSD symptoms, quality of live and rehabilitation compared to the control group.[4,5,36]

Post-traumatic stress qualitative phenomenology study in patients following ICU stay has shown that the hospitalization was lived as an out-of-control life situation, where impotence and fear of the unknown feelings created deep impact experiences, never experienced before, and repercussions throughout rehabilitation. The phenomenology variations were related to the traumatic effects memories as (a) being haunted by the trauma, (b) urge to escape, (c) affliction and tension regarding the life situation and (d) possibility to be transformed and affected by the memory contents.[37]

Chart 3 – Studies on the impact of post-traumatic stress disorder on post-intensive care unit patients' quality of life

Study	Population	Design	Sample	Tools	Evaluation times	PTSD rates	PTSD quality of Life
Schelling et al. (1998)[5]	Acute respiratory syndrome	Transversal	192 total 80 final	DSM – III SF-36 PTSS-10	Patients from 1985 to 1995	41% by discharge	Mental health decline, physical functioning, social functioning, and increased pain frequency
Kapfhammer et al. (2004)[35]	Acute respiratory syndrome	Transversal	80 total	PTSS-10 MADRS STAI X1 SSD SKT SAQSS SF-36	Average 8 years post ICU	43% by ICU discharge; 14% 8 years post ICU	Mental health decline, social functioning, overall health perception
Deja et al. (2006)[34]	Acute respiratory syndrome	Transversal	263 total 65 final	SF-36 PTSS-10 F-Sozu SC-90-R	Patients from 1991 to 2000 – data collection started in 2002	29% by discharge	Mental health decline
Schelling et al. (2003)[2]	Cardiac patients	Longitudinal	387 total 148 final	DSM – IV SF-36	Before surgery, 1 day following surgery, 1 week and 6 months after ICU discharge	18,2% after 6 months	Mental health decline without perception of physical health gain after surgery

PTSD – post-traumatic stress disorder; ICU – intensive care unit; DSM – III - Diagnostic and Statistical Manual of Mental Disorders – III; DSM – IV - Diagnostic and Statistical Manual of Mental Disorders – IV; SF-36 - Medical Outcomes Study 36-Item Short Form; PTSS - Posttraumatic Stress Syndrome 10-questions Inventory; MADRS - Montgomery-Asberg Depression Rating Scale; STAI X1 - State-Trait Anxiety Inventory X1; SSD - Screening Somatoform Disorders; SKT - Syndrom-Kurztest; SAQSS - Self-Assessment Questionnaire on Social Support; F-Sozu - Questionnaire for Social Support; SC-90-R - Symptom Checklist-90-R.

Treatments

The ICU PTSD treatment studies described that hydrocortisone administration may result in reduced PTSD or chronic stress symptoms manifestations; however, this therapy had no effects on the formation or number of traumatic memories. Preoperative hydrocortisone administration in heart surgery was according to the schedule: 100 mg in 10 minutes hydrocortisone before anesthesia; continued infusion 10 mg/hours for 24 hours in the first postoperative day; 5 mg/hour during the second postoperative day; 20 mg 3 times daily during the third postoperative day; 10 mg 3 times daily during the fourth postoperative day. The authors have shown that hydrocortisone inhibited intrusive memories formation, but this effect mechanisms were not evidenced.[1,4,6-8,36,38]

The use of beta-adrenergic blockers reduced the frequency of traumatic memories in post-heart surgery patients, however this result was not statistically significant.[2] Treatment group patients receiving norepinephrine during the heart surgery showed significant PTSD symptoms reduction and improved quality of life compared with the control group.[6] The use of epinephrine, conversely, increased the traumatic delusional memories and increased stress and PTSD rates.[2]

Kress et al. investigated the psychological effects of the daily sedation withdrawal, and found that patients not submitted this procedure had increased delusional memories and PTSD symptoms reduction (11.2 vs 27.3; P=0.02). The authors suggest that the real ICU experience memory provided by the daily sedation withdrawal may be a protective factor.[30] The daily sedation has shown beneficial to the patients, by changing the memorization processes, reducing the drug amount and the mechanic ventilation time, while these factors may be involved in the PTSD symptoms development.[39]

A cognitive behavioral intervention was performed by an educative manual sent to the patients after the hospital discharge. The manual had information and suggestions for confronting anxiety, depression, and post-traumatic stress disorder symptoms, and physical recovery symptoms.

Depressive symptoms were reduced (F=10.47; df=1; P=0.004), however with no differences regarding anxiety and PTSD symptoms.[39]

FINAL REMARKS

The studies show that ICU patients have a huge potentially traumatic experience, and an relevant portion of these patients develop severe emotional disorders, including post-traumatic stress disorder. These experiences are accompanied by psychological suffering with harmful effects on the patient's rehabilitation. However, PTSD prevalence and incidence rates are controversial, as there are some deficiencies on studies methodological standardization, among them, the different diagnosis methods and a large number of patients samples with specific specialty ICUs diseases. All these factors make difficult to analyze comparative results. Thus, it is currently little known regarding factors associated with PTSD development, and ICU patients treatments.[28]

Studies recommend drug interventions by hydrocortisone use for chronic stress and PTSD prophylaxis. Hydrocortisone inhibits the intrusive memories manifestation, but has no interference on traumatic memories formation.

The need of care to the critically ill patients and supportive strategies is highlighted in the literature. These aim to prevent and relieve the suffering from the PTSD experience, thus, health care teams training on PTSD identification and development of global interventions is recommended.[32,40]

There is no evidence for psychotherapy treatment effectiveness on ICU patients PTSD prevention. Only a psychological intervention trial, using the cognitive-behavioral reference, was conducted, and failed to show effectiveness for relieving PTSD symptoms.[32] New psychotherapy effectiveness evaluations on PTSD prevention and treatment are recommended.

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RESUMO

O transtorno de estresse pós-traumático tem sido descrito em pacientes após tratamento em unidade de terapia intensiva. O objetivo foi revisar estudos sobre os aspectos psicológicos e as intervenções terapêuticas destes pacientes após internação em unidade de terapia intensiva. Trinta e oito artigos foram incluídos. A prevalência de transtorno de estresse pós-traumático variou de 17% a 30% e a incidência de 14% a 24%. Os fatores de risco foram: história prévia de ansiedade, depressão ou pânico, ter memórias traumáticas ilusórias (memórias derivadas de formações psíquicas como sonho e delirium), presença de crenças, comportamentos depressivos, experiências estressantes e tempo de ventilação mecânica. Doses altas de opióides, sintomas na retirada da sedação ou analgesia e o uso de lorazepam foram relacionados ao aumento de delirium e de memória ilusória. A sintomatologia do transtorno pode ser reduzida com a administração de hidrocortisona, com a interrupção diária da sedação e não foram encontrados estudos de efetividade de intervenção psicológica.

Descritores: Transtornos de estresse pós-traumático/psicologia; Unidades de terapia intensiva; Adulto

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