

ORIGINAL ARTICLE

NURSING INTERVENTIONS FOR NEUROCRITICAL PATIENTS* INTERVENÇÕES DE ENFERMAGEM PARA PACIENTES NEUROCRÍTICOS INTERVENCIONES DE ENFERMERÍA PARA PACIENTES NEUROCRÍTICOS

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ABSTRACT

Objective: to identify nursing interventions for neuro-critical patients in an Intensive Care Unit. **Method:** this is a quantitative, descriptive, cross-sectional study with 84 neuro-critical patients. Nursing interventions were collected through the Nursing records in the unit of Nursing Care Systematization of the unit. Statistical analysis of the data was performed. **Results:** it is revealed that the main nursing interventions identified were the Glasgow Coma Scale (87.8%), Richmond Agitation and Sedation Scale (84.3%), pupil evaluation (79.7%), headboard elevated to 30 ° (100%), monitoring of vital signs (46.4%) and evaluation of the Braden Scale (36.9%). **Conclusion:** the main nursing interventions performed are related to neurological positioning, neurological monitoring, monitoring of vital signs and the prevention of pressure injury. It is believed that the results of this study bring important contributions to the planning of care for neuro-critical patients, contributing to the practice based on scientific evidence in Nursing. **Descriptors:** Intracranial Hypertension; Nursing Care; Intracranial Pressure; Intensive Therapy; Critical Care; Craniocerebral Injuries.

RESUMO

Objetivo: identificar as intervenções de Enfermagem para pacientes neurocríticos em uma Unidade de Terapia Intensiva. **Método:** trata-se de um estudo quantitativo, descritivo, transversal, com 84 pacientes neurocríticos. Coletaram-se as intervenções de Enfermagem mediante os registros de Enfermagem no instrumento de Sistematização da Assistência de Enfermagem da unidade. Realizaram-se a análise estatística dos dados. **Resultados:** revela-se que as principais intervenções de Enfermagem identificadas foram a realização da Escala de Coma de Glasgow (87,8%), Escala de Agitação e Sedação Richmond (84,3%), avaliação das pupilas (79,7%), cabeceira elevada a 30 ° (100%), monitorização dos sinais vitais (46,4%) e avaliação da Escala de Braden (36,9%). **Conclusão:** relacionam-se as principais intervenções de Enfermagem realizadas ao posicionamento neurológico, monitorização neurológica, monitorização dos sinais vitais e à prevenção de lesão por pressão. Acredita-se que os resultados deste estudo trazem importantes contribuições para o planejamento da assistência ao paciente neurocrítico, contribuindo para a prática baseada em evidências científicas na Enfermagem. **Descritores:** Hipertensão Intracraniana; Cuidados de Enfermagem; Pressão Intracraniana; Terapia Intensiva; Cuidados Críticos; Traumatismos Craniocerebrais.

RESUMEN

Objetivo: identificar intervenciones de Enfermería para pacientes neurocríticos en una Unidad de Cuidados Intensivos. **Método:** es un estudio cuantitativo, descriptivo, transversal con 84 pacientes neurocríticos. Las intervenciones de Enfermería se recogieron a través de los registros de Enfermería en la unidad de Sistematización de Cuidados de Enfermería de la unidad. Se realizó un análisis estadístico de los datos. **Resultados:** se revela que las principales intervenciones de Enfermería identificadas fueron la Escala de coma de Glasgow (87.8%), la Escala de Agitación y Sedación de Richmond (84.3%), la evaluación de los alumnos (79.7%), cabecero elevado a 30 ° (100%), monitoreo de signos vitales (46.4%) y evaluación de la Escala de Braden (36.9%). **Conclusión:** las principales intervenciones de Enfermería realizadas están relacionadas con el posicionamiento neurológico, el monitoreo neurológico, el monitoreo de los signos vitales y la prevención de lesiones por presión. Se cree que los resultados de este estudio hacen contribuciones importantes a la planificación de la atención de pacientes neurocríticos, contribuyendo a la práctica basada en evidencia científica en Enfermería. **Descriptor:** Hipertensión Intracraneal; Cuidado de Enfermería; Presión Intracraneal; Cuidados Intensivos; Cuidado Crítico; Lesiones Craneocerebrales.

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INTRODUCTION

It is known that nursing care for neuro-critical patients is essential in the Intensive Care Unit (ICU). It was observed, in a study, that nursing interventions are considered indispensable in the face of neuro-critical patients, which can promote a positive or negative evolution.¹

It was observed that neuro-critical patients may have changes in Intracranial Pressure (ICP), which is the pressure exerted inside the skull, determined by its content, that is, cerebrospinal fluid (CSF), blood and cerebral parenchyma, being, in adults, its physiological value less than 15 mmHg. It is informed that, when there is an increase in the volume of one of these intracranial contents, Intracranial Hypertension (ICH) occurs, which must be treated if it persists above 20mmHg.²

It was identified, in a study, that the main causes of ICH are due to Cranioencephalic Trauma (TBI), Subarachnoid Hemorrhage (SAH), intracranial hemorrhage and Ischemic Stroke (IS), which demands assistance in a specific intensive care unit with a nursing team trained to detect changes and act efficiently.³

It is noteworthy that the main nursing interventions for these patients include insightful assessment with the collection of accurate information, monitoring of hemodynamic, ventilatory function and proper patient positioning, collaborating, together with the interdisciplinary team, in order to guarantee beneficial results to the patient and evidence-based.⁴

It is noted that the neurological monitoring of the neuro-critical patient is complex and fundamental, requiring the performance of a neurological examination and, if possible, with the help of multimodal monitoring that has as its main objective the management of secondary brain injury, which is an extension primary lesion and has a lot of prognostic influence.⁵

It was observed, in a study carried out with 18 patients with neurosurgical diagnoses, that aimed to identify the amount of secondary insults related to Nursing interventions, that the most common type of secondary insult was the increase in ICP, low cerebral perfusion and systolic arterial hypotension caused by repositioning interventions, oral hygiene, endotracheal aspiration and other simultaneous interventions, concluding that nursing care must be carefully planned.⁶

It is noteworthy, therefore, that research involving Nursing care for neuro-critical patients is fundamental for choosing appropriate interventions, as it is the Nursing team that provides care and implements most interventions for these patients. It is revealed that, although the interventions aim to reduce the ICP, they can,

directly or indirectly, increase it, such as, for example, an inappropriate change in decubitus, bed bath and endotracheal aspiration. Thus, all interventions must be carried out with foundation, scientific evidence and rigor.⁷

It is emphasized that this study can contribute to instigate nurses to be prepared to act accurately and work with priorities in the face of a neuro-critical patient, in addition to contributing with knowledge, filling in the gaps and strengthening this assistance specialty, being essential that the teams improve knowledge about assessment and care for neurological patients.⁸

OBJECTIVE

- To identify nursing interventions for neuro-critical patients in an Intensive Care Unit.

METHOD

This is a quantitative, descriptive, cross-sectional study. Data were collected from February to December 2017 in an ICU in the city of Rio Branco, Acre, which has 18 beds, being a reference for critically ill patients across the State of Acre, in addition to providing care to some municipalities in the States of Rondônia, Amazonas and municipalities in countries like Bolivia and Peru. It is attended by the Unified Health System, the main causes of hospitalization being traumatic brain injuries, stroke, among others.

The study includes all eligible neuro-critical patients, that is, with a medical diagnosis of ischemic and hemorrhagic, TBI, hydrocephalus, brain tumor, aneurysm and SAH on admission or during ICU stay, totaling 84 neuro-critical patients above 18 years.

A specific instrument was developed to collect data from this study in the form of a form. In the first part, the variables were (i) sociodemographic gender and age and (ii) clinical: type of neurological surgery; medical diagnostic; presence; pressure injury site and category, neurological sequelae and outcome (discharge or death). In the second part, nursing interventions were recorded by the researchers at the time of collection, which were noted in the Nursing Care Systematization (NCS) instrument used in the unit by nurses. Data collection was performed from the first 24 hours of hospitalization after confirmation of the neurological diagnosis by the on-duty doctor.

The form was filled out with Nursing interventions - Nursing Interventions Classification (NIC) classified by researchers, based on Nursing Diagnostics (ND), according to the taxonomy of the North American Nursing Diagnosis Association-International (NANDA-I), namely: decreased intracranial adaptive capacity; risk of ineffective cerebral tissue perfusion; aspiration risk; risk of ineffective breathing pattern and risk of impaired

skin integrity, according to the higher frequency of occurrence in previous studies.⁹⁻¹⁰ All records of interventions were evaluated as to their performance, classifying them as present or absent.

For each Nursing Diagnosis, the respective expected interventions were identified. The following Nursing interventions were listed for the ND, with reduced intracranial adaptive capacity: neurological positioning (head position in neutral midline, head of the bed at 30°); neurological monitoring - Glasgow Coma Scale (GCS) assessment, Richmond agitation and sedation scale (RASS) and pupils; monitoring of vital signs (blood pressure, heart rate, respiratory rate, axillary temperature, saturation and capnometry); monitoring of ICP (using a ICP catheter, assessing whether ICP <20mmHg and Cerebral Perfusion Pressure (CPP) > 70 mmHg are maintained, ICP and CPP measurements are recorded, lidocaine is administered before aspiration); drain care (records CSF characteristics, records drainage, performs dressing at the insertion site); medication administration (check for signs of infiltration and phlebitis); sensitivity control (monitors paresthesia and hemiplegia); water control (records intake and elimination in the water balance, monitors central venous pressure, inserts urinary catheter to control diuresis, administers prescribed diuretics); control of cerebral edema; hydro-electrolytic control (monitors manifestations of electrolyte imbalance, administers prescribed supplementary electrolytes).¹¹⁻²

For the ND risk of ineffective cerebral tissue perfusion, the following Nursing interventions were listed: acid-base control (monitors arterial blood gas levels if using mechanical ventilation); seizure control (anticonvulsant medications are administered as prescribed by a doctor); shock control (administers vasoactive drugs, monitors kidney function).¹¹⁻²

The following nursing interventions were raised for the risk of aspiration ND: airway aspiration (check probe positioning, check gastric residue); control of artificial airways (performs pulmonary auscultation, performs oral hygiene care); vomiting control (administers anti-emetics according to medical prescription).¹¹⁻²

For the ND risk of ineffective breathing pattern, the following nursing interventions were verified: airway control (administer bronchodilators as prescribed); oxygen therapy (gives supplemental oxygen according to prescription).¹¹⁻²

For the ND risk of impaired skin integrity, the following Nursing interventions were listed: pressure control over body areas (using air, pyramidal or pneumatic mattresses); skin care,

topical treatment (applies moisturizer and essential fatty acids); injury care (bandages with coverings, if necessary); positioning (performs decubitus changes, sits patient in the armchair); pressure injury prevention (evaluates Braden Scale) and exercise therapy (promotes walking).¹¹⁻²

Data was typed in Microsoft Excel, version 2010 (Microsoft, USA) and the descriptive analysis of the data was performed with absolute (n) and relative (%) frequencies, as well as the correlation of the data with neurological sequelae, leading to into consideration, for analysis and discussion, the physical, cognitive and behavioral sequelae. Pearson's chi-square test or Fisher's exact test was used, considering $p < 0.05$ using the SPSS program, version 20.0 (SPSS Corp, Chicago, USA).

The legal ethical precepts of Resolution 466/2012 of the National Health Council were respected, and the study was approved by the Research Ethics Committee of Hospital das Clínicas do Acre, under opinion 1,336,173 and CAAE No. 47577215.2. 0000.5009, respecting the required ethical standards. The Free and Informed Consent Term (FICT) was signed by the patient when in clinical conditions or by the responsible family member who received a copy of it.

RESULTS

84 neuro-critical patients were evaluated according to table 1.

Table 1. Sociodemographic and clinical characteristics of neuro-critical patients in an ICU. Rio Branco (AC), Brazil, 2017. (n=84)

Variables	n	%
Sex		
Male	57	67.9
Female	27	32.1
Age		
Young people(15 to 24 years)	22	26.2
Adults (25 to 64 years)	35	41.7
Elderly (≥ 65 years)	27	32.1
Surgical patient		
Yes	47	56.0
No	37	44.0
Medical diagnostic		
TBI	43	51.2
H Stroke	17	20.2
SAH	8	9.5
Others	6	7.1
I Stroke	4	4.8
Hydrocephalus	2	2.4
Brain tumor	2	2.4
Aneurysm	1	1.2
SAH + aneurysm	1	1.2
Pressure ulcer		
No	51	60.7
Yes	33	39.3
Pressure ulcer site (n=33)		
Occipital	18	54.5
Sacral	7	21.2
Heels	3	9.1
Sacral and occipital	3	9.1
Malleolus	2	6.1
Pressure ulcer category (n=33)		
Category 2	15	45.5
Category 1	10	30.3
Category 3	8	24.2
Neurological sequelae*		
No	41	61.2
Yes	26	38.8
Indication of ICP catheter		
Yes	33	39.3
No	51	60.7
Outcome		
Discharge	68	81.0
Death	16	19.0
Total	84	100.0

*Missing: a patient not evaluated due to hospital transfer. **h Stroke: Hemorrhagic stroke; i Stroke: Ischemic Stroke; SAH: Subarachnoid Hemorrhage; ICP: Intracranial pressure; TBI: Cranioencephalic Trauma.

The main Nursing Interventions (NICs) were identified in the Nursing record, as shown in Table 2.

Table 2. Evaluation of the record of the main nursing interventions prescribed for the neurocritical patient. Rio Branco (AC), Brazil, 2017. (n=84)

Nursing Interventions	N	%
Maintained elevated headboard at 30°	84	100.0
Evaluated the level of consciousness using the GCS (n=33)	29	87.8
Applied RASS scale (standardized by the institution) in cases of sedation (n=51)	43	84.3
Evaluated pupil shape, symmetry and photoreaction	67	79.7
Kept neck in neutral position (n=58)	32	55.1
Monitored vital signs	39	46.4
Monitored EtCO2 if using capnometry (n=27)	06	22.2
Monitored ICP by intracranial pressure catheter (n=51)	00	0.0
Reviewed Braden scale	31	36.9
Performed decubitus change (n=54)	28	33.3
TOTAL	84	100.0

* RASS: Richmond Agitation and Sedation Scale; PIC: Intracranial Pressure; EtCO₂: carbon dioxide concentration or tension.

Table 3 shows the association test between patient characteristics / Nursing intervention and neurological sequelae, and the variables that

showed an association were: RASS scale (0.047) and length of hospital stay (<0.001).

Table 3. Association between neurological sequelae and nursing characteristics / interventions. Rio Branco (AC), Brazil, 2017.

Nursing Characteristics / Interventions	Sequelae		p-value*
	Yes	No	
	n (%)	n (%)	
Sex			
Male	16 (38.1)	26 (61.9)	0.87
Female	10 (40.0)	15 (60.0)	
Age			
< 40 years	15 (41.7)	21 (58.3)	0.60
> 40 years	11 (35.5)	20 (64.5)	
Surgical patient			
Yes	15 (44.1)	19 (55.9)	0.36
No	11 (33.3)	22 (66.7)	
RASS scale applied (n=51)*			
Yes	19 (55.9)	15 (44.1)	0.02
No	00 (0.0)	05 (100.0)	
Rated pupils*			
Yes	23 (43.4)	30 (56.6)	0.13
No	03 (21.4)	11 (78.6)	
Evaluated vital signs			
Yes	14 (41.2)	20 (58.8)	
No	12 (36.4)	21 (63.6)	
Length of hospital stay			
7 days	2 (10.5%)	17(89.5%)	<0.001
14 days	8 (29.6%)	19(70.4%)	
> 14 days	16 (76.2%)	05(23.8%)	

*p-value: Fisher's exact test; ** RASS: Richmond Agitation and Sedation Scale

DISCUSSION

In this study, nursing interventions carried out for neuro-critical patients in this ICU were identified. The sample was composed, mostly, by young men, diagnosed with TBI, with pressure lesion stage 2. The main Nursing interventions were carried out: neurological positioning; neurological monitoring; monitoring of vital signs; as well as the prevention of pressure injury using the Braden Scale, essential interventions for the neuro-critical patient.

It is noted that the medical diagnosis of TBI constitutes a major public health problem,

affecting, in its majority, men in the young adult population. In Brazil, it is revealed that about 65.7% of hospital admissions per 100 thousand inhabitants per year are patients with TBI, with a mortality rate of about 5.1 per 100 thousand inhabitants per year. The main causes are related to falls and car accidents, affecting individuals under 40 years of age and male, characteristics that corroborate this study.¹³

In relation to nursing interventions, neurological positioning, neurological monitoring and monitoring of vital signs stand out, reaching frequency of performance above 50%, which corroborates results found in another study with

intensive care patients whose interventions presented a frequency greater than 50%, namely: keep headboard elevated; pupil assessment; assessment of the level of consciousness (Glasgow) and assessment of vital signs (heart rate, respiratory rate, blood pressure and oxygen saturation).¹⁴

It is possible to monitor the ICP invasively through the ICP catheter and, according to the results, monitoring with the ICP catheter is not a practice in the unit, however, there was no impact on the outcome of the patients, as it did not present statistical significance to association between indication for ICP catheter and outcome, because of the 60.7% (51) patients who had indication for use of ICP catheter, 82.9% (42) were discharged from the hospital, however, it is a fundamental practice in patients with altered ICP. It was concluded, in a retrospective and observational study conducted in a trauma center in São Paulo, that there were no survival advantages on the part of the patients in which there was monitoring of the ICP in relation to the group in which the ICP was not measured.¹⁵

It is known that neurological assessment includes GCS, widely used to assess the severity of brain injury in patients with TBI, which was assessed in 87.9% of the patients in this study. A similar study was carried out in Europe, which identified that 95% of nurses applied GCS as the main Nursing intervention to assess the level of consciousness of patients with brain injuries.¹⁶

Pupil assessment is considered to be the standard procedure for assessing neuro-critical patients and was performed in 79.7% of the patients in this study. In a study with 76 individuals with neurological injury admitted to an ICU, pupillometry readings hourly, identifying that pupillometer values correlated significantly with ICP values, concluding that routine pupillometric assessments in care neuro-critical patient is a valuable complement to the monitoring of ICP, as it reflects a balance of intracranial contents and a good indicator of increased ICP.¹⁷

In sedated patients, the level of sedation should be assessed by applying appropriate scales. RASS is used as a standard in the study ICU. It is pointed out, in this study, that there was a statistically significant correlation between the application of the RASS scale and neurological sequelae ($p = 0.047$), and more severe patients, who were under sedation and who were evaluated by the RASS scale (55.9%), evolved with neurological sequelae, as shown in table 3. It should be noted, however, that the application of this scale cannot be considered a predictor of sequelae, but rather the score that the patient obtains when applying the scale, demonstrating its severity. It was pointed out, in another study, that the application of this scale is associated with

better outcomes, contributing to the reduction of mechanical ventilation time and ICU stay.¹⁸

It is emphasized that the hemodynamic management in the neuro-critical patient is effective to maintain an adequate CPP, for this reason, it is essential that the evaluation of vital signs reaches 100% frequency, which did not occur in this study, as it must be prioritized and recorded in the systematization instrument used to evaluate this parameter. It is evident, in a study carried out in a neurological ICU, that the monitoring of hemodynamic parameters is one of the main nursing interventions performed and requires most of the professional's time in care.¹⁹

It is known that neuro-critical patients require specific interventions in order to avoid secondary injuries. Keeping the bed head elevation at 30 ° is a simple intervention that contributes to the decrease in ICP and reached 100% frequency in all patients evaluated in this study. It was pointed out, in a study carried out with neurosurgical patients with a score of three to eight in the GCS assessment, when the headboard was positioned at 15° and 45°, that there was significant variation in the ICP, and this demonstrates the importance of maintaining an adequate positioning of the headboard.²⁰

It is noted that patients with neurological impairment admitted to intensive care units are more susceptible to developing Pressure Injury (PU) due to reduced mobility and decreased level of consciousness. It is understood that the application of the Braden Scale is a tool that helps nurses in the prevention of PU, and only 36.9% of the patients in this study were evaluated by this scale, which reflected in the number of patients with PU.

There was a high prevalence of occipital PU (54.5%) due to the 30-degree supine position. In a descriptive study with 59 patients admitted to an ICU, 48.2% of pressure injuries in patients with trauma were obtained, and one of the most frequent areas was the occipital region, with 21.8%, which indicates that this public is vulnerable to this complication and, being a place of bone prominence,²¹ PU prevention measures should be taken.

It should be noted that changing the decubitus position is an intervention that should be performed with great discretion to a patient with brain injury. The clinical condition of the patient must be evaluated, because, in case of hemodynamic instability, this intervention can contribute to severe ICH.²² was held in this study, the changing positions in 33.3% of patients. It was concluded, in a cross-sectional study in two intensive care units, the changing positions is considered one of the main preventive measures to PU and found in 82.7% of nursing prescriptions.²³

In this study, it was found that there was statistical significance between the length of hospital stay and neurological sequelae, as patients who stayed more than two weeks in hospital evolved with some type of neurological sequelae. This is due to the fact that they are more severe patients, restricted to early mobilization and who needed more time for monitoring and treatment. In a retrospective study, it was shown that patients affected by cerebrovascular diseases have a significant increase in the length of stay in the ICU, with an average length of stay of 10.2 ± 25.2 days.²⁴

In this study, the underreporting of data was identified in the patient's medical record, observing the absence of the Nursing annotation in the systematization instrument. The patient was monitored 24 hours a day in this unit, however, there was no record of interventions in the instrument. The importance of the Nursing record is emphasized, as it is the professional's duty to record the activities provided in the care process and work management, ensuring continuity, quality of care and the guarantee that care was provided.²⁵

It is assessed that this study has the limitation of identifying, in the literature, approaches with this theme for the discussion of Nursing interventions in neuro-critical patients, especially with ICH, and it is suggested that more work be developed with this theme.

CONCLUSION

In this study, the main nursing interventions carried out by the Nursing team in neurocritical patients in the studied ICU were identified, which were neurological positioning (head of the bed at 30°) and neurological monitoring (evaluation of GCS, RASS and pupils), however, interventions with low frequency of performance were the monitoring of vital signs (blood pressure, heart rate, respiratory rate, axillary temperature, saturation and capnometry), as well as the prevention of pressure injury and the use of ICP catheters.

It is emphasized that efforts should be directed towards the performance of the nursing interventions necessary for the prevention and control of ICH in this ICU. The use of the Braden Scale should be optimized, as well as the rigorous and daily assessment of the level of consciousness, pupils and vital signs, to reach 100% frequency, and the effective monitoring with the ICP catheter.

It is concluded that the results of this study bring important contributions to the planning of assistance to the neuro-critical patient, contributing to the practice based on scientific evidence in Nursing, guiding the points to be improved in the daily care of the neuro-critical

patient and also evidencing the importance of the evaluation of the activity of caring for nurses, which provides changes in clinical practice in nursing care for these patients. It should be noted that the lack of use of the ICP catheter is a reality in many Brazilian ICUs, which warns of the need for structure and material resources to offer the best nursing care to patients with ICH. However, this does not exempt the nursing team from providing quality care, performing basic care in the face of neuro-critical patients and contributing to a better outcome of the clinical condition in these patients.

Furthermore, it is awakened to the need for management actions in the units, promoting training actions for the Nursing team that provides assistance to neuro-critical patients.

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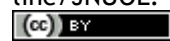
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