

Nursing Care in Severe Traumatic Brain Injury

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Abstract— Objective: To report the experience experienced by trainees of the 9th semester of Nursing, in assisting a patient victim of a car accident with severe traumatic brain injury (Subdural Hematoma), through the systematization of the care of Nursing. Method: A descriptive study, with a qualitative approach, of the type of experience report, performed at a referral Hospital in Trauma of Belém-PA, Brazil, in the period of November and December of 2018, during the supervised internship. Applying the systematization of Nursing Care (SAE) in a patient with severe traumatic brain injury, following the six steps of the nursing process. Results: We evidenced the priority nursing diagnoses: ineffective Cerebral tissue perfusion; Risk of electrolyte imbalance; Risk of aspiration. Related to Orotracheal tube; Hypothermia Risk of infection; Impaired physical mobility; Self-care deficit. The nursing interventions were performed for each diagnosis. Conclusion: Nursing care through the use of NCS allows care based on scientific evidence, guaranteeing quality of service that affects patient safety. In critically ill patients, nurses need specific knowledge, with the objective of restoring damage and avoiding new complications.

Keywords— Nursing Care; Craniocerebral Trauma; Nursing Process; Standardized Nursing Terminology; Hematoma, Subdural.

I. INTRODUCTION

The external causes of morbidity and mortality are among the main agents of death in the world, especially in the young, economically active and male population, resulting in millions of deaths annually, thousands of Hospitalizations and high cost to health services (Preis, Lessa, Tourinho, & Santos, 2018).

Accidents involving automobiles and motorcycles have been instituted as a serious public health problem in today's society, and are included as Morbi-mortalities by

external causes. The complications are countless to the survivor of an automobile accident, the most important and the most serious is the traumatic brain injury (TBI), having its international classification of diseases by CID-10. The TBI is characterized by any traumatic injury that affects and compromises anatomically and functionally, the Encephalon, meninges, cranial cap and scalp, and this type of trauma is responsible for large numbers of deaths caused by accidents Automobile. In Brazil, traumatic injuries caused by traffic accidents represent the major

cause of death in the age group of 10 and 29 years of age. In this way it is an important agent of morbidity and mortality in Brazil (P. F. Silva, Silva, Olegário, & Furtado, 2018).

This type of lesion can be classified as mild, moderate and severe. Among the indicators of severity are the depth and permanence of the coma evaluated by the Glasgow scale. According to this scale, patients with scores between 13 and 15 points in the scale set a mild TBI, from 9 to 12 moderate and between 3 to 8 severe (J. A. da Silva, Souza, Feitosa, & Cavalcante, 2017).

Different lesions may appear from the primary lesion, especially the intracranial hematomas that divide into: I) extradural (blood collection between the skull and dura mater by laceration of a meningeal vessel, a venous sinus or bleeding from the bone table); II) Subdurals, characterized by a blood collection between the dura mater and the brain, where the most common cause is the traumatic rupture of the cortico-meningeal veins (from the cortex to the dural sinuses); III) Intraparenchymal, where there is a dense collection of blood installed within the cerebral parenchyma. The location of this last type of hematoma is preferential in the temporal and frontal lobes (Rodrigues, Dias, Hohl, & Mazzuco, 2008).

On Subdural Hematoma (SH), it is characterized as a primary traumatic injury. It is located between the Duramaph meninges and arachnoid. They are commonly larger than the Extradural Hematoma in extension. It can overcome sutures, but not the dura mater inserts. In 85% of the cases is unilateral, with the most affected sites being fronto-parietal convexity and the middle fossa. The SH inter-hemisféricos isolated and Parafalcinos can happen, also in cases of mild traumas (Badke, Perdonssini, Dalmolin, & Sassi, 2011).

In this context, the professional nurse, is involved in the assistance from the first care to the patient with TBI, to the intensive care unit, surgical center and etc. Thus, it is noteworthy the importance of nursing team care in the specificity and complexity of the service provided to these victims, which characterize differentiated clinical conditions resulting from the severity of traumatic injuries. In neurological intensive care units, one of the main attributions of nursing routinely effected to the victims of TBI is the hemodynamic monitoring of the patient, with emphasis on the control of intracranial pressure and cerebral perfusion (Oliveira, Soares, Fontinele, Galvão, & Souza, 2018).

Nursing care is sustained as a science based on nursing theories, which allow evidence of problems related to some basic human need. Thus, an instrument was elaborated, the systematization of Nursing Care (SNC), which is nothing more than a scientific method that has

five stages, with the objective of identifying the nursing problems and tracing the nursing diagnoses (ND) for each One, with the aid of the North American Nursing Diagnosis Association (NANDA). After the ND defined, the expected results and interventions are elaborated. The evaluation should soon be carried out and if necessary to amend the (Alvim, 2013).

Thus, the aim of this study is to report the experience of trainees in the 9th semester of Nursing, in assisting a patient victim of a car accident with severe traumatic brain injury (Subdural Hematoma), through the systematization of Nursing care.

II. METHOD

This is a descriptive study, with a qualitative approach, of the type of experience report, developed from the description of the experience of academics in the care of a victim of automobile accident, with severe TBI of the Subdural Hematoma type, through SNC application. This study corresponds to the experience of the hospital internship, in the urgency and emergency module, which occurred in the period from November 12th to December 10th, 2018, under the preceptorship of a nurse specializing in patient care critical residency modality Multiprofessional.

The study site was in a large Hospital in the metropolitan area of Belém, a reference in trauma and burns. The students performed in the emergency Service (yellow Room) in this period, where the patients care in urgency and emergency are attended and referenced to other sectors, consisting of 12 beds, 6 have support for treatment Intensive.

Data collection for the SNC, occurred in two stages, 1) information in the medical records, on admission, health history, mechanism of trauma and etc. 2) through the nursing evaluation, performed by anamnesis and complete physical examination. After these steps it was possible to identify the nursing problems based on the theories, and to trace the nursing diagnoses, thus elaborating the care plan.

III. RESULTS AND DISCUSSION

The victim was admitted the night before, in the Yellow Room (emergency care), the first contact of the students with the patient occurred the next day, thus was performed the first stage that consisted of obtaining information in the medical records about the history and Admission.

Individual victim of automobile accident, in which he was ejected from the vehicle. With various abrasions and lowering of the level of consciousness. Patent airways with cervical collar without rigid plank. In

pulmonary auscultation vesicular murmurs present, bilaterally, without adventitious noises, with symmetrical thorax with good expansiveness, with saturation 100%. Dry and normostained skin, blood pressure 110x60, heart rate 80, normophonetic heart sounds in two-stroke without blowing, with flat abdomen and flaccid without reactivity, stable pelvis. Glasgow Coma Scale: 2 + 1 + 5 = 8 with pupils with isophotoreactors, such as motricity and sensitivity in upper and lower limbs. Extensive scalp injury, no instability or crackling. Injuries in the limbs, with hematoma in the right eye and upper lip, abrasions on the shoulder, scalp injury in the right parietal region, food rest in the airways.

She soon performed imaging exams, such as cranial tomography, which evidenced TBI of the Subdural Hematoma Frontotemporoparietal type, with midline deviation, open base cisterns. In this way he immediately performed the Decompressive craniotomy, and followed in immediate postoperative, sedated in mechanical ventilation.

In a retrospective study on the risk factors associated with decompressive craniotomy in patients with Subdural Hematoma, it was observed that immediate and adequate procedure realization can prevent brain damage, and found a significant relationship Among the mortality rates, older patients, scores < 6 on the Glasgow Coma scale and extension of the lesion (midline deviation ≥ 10 mm and hematoma thickness ≥ 15 mm)(Yılmaz et al., 2019).

In the complete physical examination performed by the academics: Ramsay scale 6. Anisocolic pupils, mydriasis to the left, not photo reagents. Blepharhaematoma on the left. Monitored in

multiparameter, hypothermia (T: 34 ° C), normotensive, Tachycardic (P:106), saturating 96%. Intubated on controlled mechanical ventilation; Peep 7, Fo2 40%, FR: 19. Cervical region with bilateral edema. A Central venous catheter with a lumen in the right subclavian vein, maintained in occlusive dressing, receiving vasopressin at 0, 5ml/h + hydration at 120ml/h in continuous infusion pump. Symmetrical thorax, in the pulmonary Ascuta vesicular murmur present, without adventitious noises. In cardiac Ascuta, normophonetic heart sounds in two rhythmic times. Flat abdomen, tense, with hydroaerial noises present and diminished, presence of open gastric oral probe, draining bilious content in small amount. Diuresis concentrate present, by Vesical delay catheter, fixed in supra pubic, indicated to monitor urinary output. Presence of edema in the limbs. Evacuations absent at the moment. Aspiration of the airways, performed at the moment, with aseptic technique, in the tube presented mucous content in little quantity, in the nasal cavity, mucosanguinolento content in moderate amount, in the oral cavity mucoid content in small amount.

After the first stage, it was possible to identify the main nursing problems and to trace the nursing diagnoses according to NANDA (John Wiley & Sons, 2014).

The main problems were: TBI, orotracheal intubation, hypothermia, invasive devices, bed restriction and craniotomy. From these problems follows the nursing care plan, with all its stages, as a reference we sought to elaborate a proposal for nursing interventions, according to the classification of the nursing Interventions Classification (NIC)(Johnson et al., 2007).See the table below.

Table 1 – Care plan

IDENTIFIED PROBLEMS	HUMAN NEED PATTERN AFFECTED	NURSING DIAGNOSIS	EXPECTED RESULTS	NURSING PRESCRIPTION
TBI	Neurological regulation	Ineffective Cerebral tissue perfusion. Characterized by lowering the level of consciousness, motor response, behavioral and pupil reactions. Related to brain trauma	It is expected to maintain cerebral perfusion	Monitor vital signs every two hours. Monitor throughput and aspect of the contents of the clamp that drain present in the cerebrum, always keep the accordion below the place where it is inserted. Monitor intracranial pressure every two hours. Keep immobilized with cervical vest to avoid increased intracranial pressure. Assess neurological regulation (apply the Ramsay scale). Evaluate cutaneous-plantar, corneal-palpebral, oculocephalic and patellar reflex maintain a-caudal alignment.

				Communicating Otoliquorrhea, Rhinoliquorrhea, Hemotímpano.
TBI	Electrolytic Regulation	Risk of electrolyte imbalance related to impaired regulatory mechanism	Electrolyte levels are expected to remain in physiological patterns	Perform water balance every 1h. Monitor urinary output, volume and aspect every 2h. Check the patient's hydration conditions (mucous membranes, edema, pulse and heart rate). Monitor serum electrolytes levels. Check for bleeding
Orotracheal intubation	Oxygenation	Risk of aspiration. Related to Orotracheal tube.	It is expected to avoid accumulation of secretions in the airways	Monitor consciousness level, cough reflex, nausea and swallowing capacity. Keep Vacuum cleaner available. Perform aspiration once every shift or when necessary, with aseptic measures.
Temperature (34 ^a)	Thermal regulation	Hypothermia, characterized by decreased body temperature. TBI related	The patient's temperature is expected to increase by up to 2h	Use heated bags with the patient. Control the ambient temperature. Control temperature every 15 minutes and successively every 30 minutes. Cover the patient with blankets. Install thermal blanket, if available. Avoid discovering the patient unnecessarily. Monitor skin color, temperature and moisture. Evaluate perfusion. Infuse heated venous solutions.
Invasive devices	Mucosal cutaneous integrity	Risk of infection. Related to the presence of invasive devices	Preventable infections are expected to be prevented	Evaluate surgical incision condition, catheters every 2h. Monitor signs and symptoms of infection (edema, hyperemia, heat, flushing, hyperthermia). Sanitize hands with alcoholic gel before and after each procedure. Perform disinfection with alcohol at 70% in endovenous devices (Equipo, Bureta), before administering medications. Use aseptic technique for aspiration, vesical probing, venous puncture and in other procedures in which it is pertinent. Apply the Phlebitis scale at the time of medication administration.
Bed restriction	Body Mechanics, physical integrity	Impaired physical mobility, characterized by bed restriction, related to TBI	Prevent complications	Keep bed linen clean, dry and without wrinkles or folds. Perform decubitus change every 2 hours. Provide alignment of the patient's body. Evaluate skin conditions. Maintain prophylaxis for venous thromboembolism (elastic stockings and intermittent compressor).
Craniotomy	Body Mechanics	Self-care deficit for bathing and intimate hygiene. Characterized by the inability to perform self-care activities, related to severe clinical condition.	It is expected to maintain the patient's personal hygiene	Make Bath in bed 1x/day perform oral hygiene, with oral antiseptic. Keep care of nails, perineum, hair, eyes, ears and feet. Perform intimate hygiene 2x/day, or when necessary, change of Frada and hydration of the skin.

Source: Research authors.

The performance of the nurse in a patient with TBI is essential for the efficacy of this individual's

recovery. The SNC allows to assist in an organized and safe manner, thus guaranteeing the quality of the service

and patient safety. One study revealed that adequate nursing care to patients with severe TBI decreases the risk of secondary injury, providing a better prognosis for these subjects(Oliveira et al., 2018).

A review study evidenced the main nursing interventions provided to the victims of TBI. Among the measures instituted by nursing are: drainage and evaluation of cerebrospinal fluid as to color, clarity and quantity; intracranial pressure monitoring; Neurological assessment through the Glasgow Coma scale (GCS) including evaluation of pupils(Oliveira et al., 2018). However, in the neurological evaluation, the review refers to the use of GCS only, and does not cite that used in this study Ramsay scale.

The Ramsay scale classifies the degree of sedation of an individual based on essentially clinical criteria ranging from agitation to unresponsive coma and has simple and intuitive definitions, enabling it to be quickly applied to the bedside(Mendes et al., 2008). Although recent studies point to greater reliability and greater accuracy in the use of another scale, the scale of RASS (Richmond Agitation Sedation Scale)(Rasheed et al., 2019).

Nursing care is characterized in preventing complications, restoration of damage and intensive monitoring of vital signs, control of hemorrhages, shocks, intracranial pressure, level of consciousness. Another important factor is the monitoring of the hydroelectrolytic balance every hour, and it is necessary to maintain a calibrosus venous access, bladder probing and verification of serum electrolytes, due to the cerebral trauma being able to cause hormonal dysfunctions and Metabolic, which is the case of electrolytic regulation(Pereira et al., 2011).

For the diagnosis of aspiration risk related to Orotracheal tube, the measures taken are aimed at decreasing the risk of developing infections related to health care, such as ventilator-associated pneumonia. The indication of airway aspiration follows the criteria indicated in the literature according to the need of each patient from the pulmonary auscultation, which should be performed every 2 hours. The presence of adventitious noises (snoring, inspiratory wheezing or rales) or reduction of the physiological vesicular murmur associated with other signs, such as dyspnea, accessory musculature use, visible presence of secretion in the oro-tracheal tube, decreased partial oxygen saturation (SPO2) < 92%, for example, is indicative of the need for aspiration(K. R. A. Ribeiro, Lima, & Brito, 2018).

In the case of hypothermia, there are some strategies of passive and active heating to prevent loss of heat such as the use of blankets, sheets or quilts, or the use of mattresses or blankets with water circulation or even

electric blankets. The infusion of heated liquids can also reduce the drop in body core temperature(D. R. Ribeiro & Longo, 2011).

It is known that the use of invasive devices causes an increase in the risk of triggering infections related to health care. As for example the oro-tracheal tube, central venous catheter (CVC), delayed and nasoenteric bladder probe are some of the main causes of infections related to health care, and the length of stay of these devices is crucial for the emergence of Infections, for this reason, control and prevention measures are indispensable(Cardoso et al., 2018).

Care with the CVC goes from the identification of signs and symptoms suggestive of bloodstream infection such as hyperemia, drainage of exudate at the catheter insertion site, fever, malfunction of the device, bradycardia, Oliguria and others, Through the care of the insertion ostium, until the manipulation and maintenance of the catheter. It is noteworthy as one of the main recommendations the hand sanitization with antiseptic solution, preferably alcohol(Almeida et al., 2018).

Bed restriction predisposes risk factors to the development of pressure injuries and thromboembolic events. Critical patients have greater chances of developing pressure injuries in the sacral, trochanteric and calcaneal areas, prominent regions of the body's support with the surface in contact, due to positioning (dorsal or lateral decubitus) (Borghardt, Prado, Bicudo, Castro, & Bringuento, 2016).

The most frequent nursing interventions faced by this problem include: Change in decubitus every 2 hours (except if there are contraindications); Use of emollients in dry skins, such as essential fatty acids for hydration; Use of comfort cushions in bony prominences; Keep skin clean and without moisture, as well as constant exchange of diapers and bed linens that are damp; Skin inspection and risk assessment for the development of pressure injuries on admission and daily assessment of clients, such as the application of scales in order to prevent this problem; Etc.(Mendonça, Loureiro, Frota, & Souza, 2018).

Bed restriction is related to the patient's clinical picture, including the performance of the Decompressive craniotomy, which leads to their confinement in bed and the loss of their ability to perform daily life activities, such as their own hygiene, High degree of dependence on the team. Thus, based on Dorothea Elizabeth Orem's self-care deficit theory, it is possible to offer assistance based on the nursing needs presented by the individual in everyday practical situations(Neto et al., 2017).

Bed bathing is one of the nursing assignments performed with patients with physical limitations due to their critical condition. This procedure provides individual

comfort and maintains the integrity of the skin, because it favors the physiological circulation and hydration, besides being an important measure of prevention against infections, such as the bloodstream by the use of CVC, the urinary tract Bladder catheter, and ventilator-associated pneumonia (Costa, Souza, Diaz, Toledo, & Ercole, 2018). It is also necessary to perform oral hygiene that is associated with this last type of infection (K. R. A. Ribeiro et al., 2018).

IV. CONCLUSION

Nursing care to patients with TBI demands critical and clinical reasoning, are measures that should be evaluated and decision-making quickly. The SNC provides the nurse to identify the priority problems in a systematic way, guaranteeing quality in the service provided by the nursing team.

Thus, nursing care to patients with TBI needs qualification, because it is very complex and individualized cases. Thus, having such a function of monitoring, treating and preventing problems related or not to the TBI. The nurse operates from the first care, until the patient's discharge, then the knowledge of the pathophysiology, interpretation of laboratory and imaging exams and the SNC are essential for quality care, preening patient safety.

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