Acta Scientific Women's Health (ISSN: 2582-3205)

Volume 3 Issue 3 March 2021

Case Report

Neurovigilance: Timely Detection of Neurological Alarm Data and Successful Application of Early Medical Management in Pathologies Responsible for Neurological Damage in Newborn of Intermediate and Intensive Therapy of the HGEJMR

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Received: January 15, 2021

Published: February 11, 2021

Abstract

Introduction: There are effective clinical care models to carry out neuro-surveillance in babies with biological risk factors or those who are in efficient special care services to detect neurological alterations and offer timely treatments, which avoid permanent neurological damage. Clinical models can work even without having high-tech accessories in hospitals lacking it.

Method: In order to assess the effectiveness of the clinical models, a group of nurses and doctors was prepared to be trained to perform strict neurovigilance in the absence of specific technology for it in our unit. The pathologies, which were intentionally sought were, asphyxia, hypoxic encephalopathy, neonatal seizures, metabolic imbalances, sepsis among others, all were assessed by clinical parameters defined in each of them, either as classifications, or as clinical data for children.

The clinical data were recorded in the clinical file as well as in the data collection sheet, and the management that was offered was also recorded, according to the pathology found, we monitored evolution and the risk factor was measured for the group studied.

Results: In the stipulated time, we were able to monitor a total of 205 patients, we found 130 patients with very evident clinical data of any of the mentioned pathologies, and one of the most frequent was asphyxia in 28.46%, all cases were detected and early management was installed, in addition to offering successful interventions to the rest of the patients who were found, with biological alarm data and who were successfully discharged, to later carry out follow-up as external through personnel dedicated to rehabilitation.

Keywords: Neurovigilance; Timely Detection of Alarm Data; Immediate Attention; Successful Experience; In Newborn

Background

According to Callista Roy, a person is "an adaptive system with internal processes (cognitive and regulatory), which act to maintain adaptation in its four modes: physiological, self-concept, role function and interdependence".

During pregnancy, the fetus is dependent for its metabolism and protection on the contributions of oxygen, nutrients and immune factors that reach it through the mother-fetus-placenta unit, in such a way that pathologies that affect the mother can affect the developing fetus and manifest during the immediate neonatal period.

For the application of a model of nursing care and monitoring in the newborn, it is necessary to sensitize and prepare the staff to detect clinical changes that manifest the different pathologies that are frequent in the neonatal period [12].

In several countries, including Spain, Chile, the United States, and Canada, they increasingly rely on standardized and computerized care plans; In order to use this information safely, it is necessary for nursing to be guided by reflection, rather than a task-focused nurse. Only then will you be able to think critically about how to achieve the ultimate nursing goals to:

- Prevent disease and promote, maintain or restore health (in terminal illness, to control symptoms and promote comfort and well-being until death)
- Enhance the feeling of well-being and the ability to act according to the desired roles.
- Provide effective and efficient care in accordance with the wishes and needs of the individual.
- Find ways to increase the well-being of the child and family through the management of health care.
- Take a model that at least considers this in its care methodology. The model that we are going to develop will be the Application of Roy's Adaptation Model to the newborn.

Careful prenatal care is the fundamental procedure to assess the normality of the process. At birth, the care provided to achieve the transition to the extrauterine environment is decisive so that the new being, with its biological, psychological, intellectual and spiritual potential, is holistic, to give continuity to its growth and development processes towards a mature being.

Nursing intervenes in this period through processes of a scientific and technological order, but fundamentally human.

Their training includes: identifying the stimuli and responses that lead to determining the adaptation problems of the newborn, which, based on a nursing diagnosis, allows the planning of the corresponding medical interventions.

As the changes in the newborn are extremely dynamic, at least three evaluations must be performed: Transition Period, neonatal adaptation, in the first 24 and 48 hours, and 28 days of age [1,7,9,11].

- Newborn assessment - neonatal adaptation

In human physiology, sudden changes in the environment that surrounds us are some of the most important aspects to discern in a critical state that is defined as "any situation in which there is a significant imbalance in one or more vital signs, temperature, respiratory rate, heart rate and blood pressure", such as changes in temperature, humidity, pressure; Since in these situations the homeostasis of the organism tends to equalize these imbalances with the external environment, so these gradients follow the following basic rule, the smaller the difference in changes, the faster the homeostatic adaptation will be.

For example: We must consider that the body surface of a newborn is four times greater than that of an adult, so the gains and losses with respect to physical homeostasis are faster. Gradient differences between vital signs and the external environment

- Functional health patterns (Gordon).
- Functional skills (McCain).
- Dependence/independence (Henderson).
- Self-care (Orem).
- Adaptation (Roy) [4-6]

Evaluation of the pediatric patient based on Callista Roy's adaptation theory where he observes:

- **Basic physiological needs:** That is, those related to circulation, body temperature, oxygen, body fluids, sleep, activity, food and elimination.
- **Self-image:** The man's ego must also respond to changes in the environment.
- **The domain of a role or role:** Each person plays a different role in society, according to their situation: mother, son, father, sick person, retired... This role changes on occasions, as may be the case of a retiree employed man and must adapt to the new role he has.
- **Interdependence:** The self-image and mastery of the social role of the child hospitalized in Critical Care interacts with the people in their environment, exercising and receiving influences. This creates relationships of interdependence, which can be modified by changes in the environment.

Basic physiological needs

Circulation	Temperature	Waking hours
Heart rate	Skin temperature	Hours of recreational activities and/or affective stimuli
Characteristics of the central and peripheral pulse	Core temperature	Hours of sleep
Hair release	Body temperature differential	Food
Oxygenation	Routes of administration	Nutritional characteristics
Breathing frequency	Liquid supply quantity	Weight
Characteristics of respiration	Characteristics of liquids	Size
Oxygen saturation	Activity/Sleep	Body mass
Differential weight	Elimination	Stool
Type of feeding	Urine	
Energy supply	Insensitive loss	

Table a

Self-image

Description of the location of the bed	Perception of the self	Psychomotor development
Description of the bed used	Overall appearance impression	Behaviors regarding their chronological age Interdependence
Description of hygiene and hygienic inspection by anatomical parts	Anthropometry	Patient/environment relationship (demonstrations)
Deterioration of the skin and mucous membranes (cures)	Bodies of inspection of the senses	Patient/nurse relationship (manifestations)
Changes in the clinical Family/personal relationship (demonstrations) [1]	Relationship tastes and preferences	Patient/staff relationship Patient/family relationship (manifestations) onstrations)

Table b

There are models of newborn care, which are defined as individualized for hospitalized babies, so that they can detect alterations over time, clinical as initial manifestations of pathologies that in the long run can become extremely serious and that put life at risk and integrity. Neurological examination of newborns treated in the neonatology services of different hospitals. To achieve a clinical basis, it is necessary to have a knowledge of the different behaviors or movements that the hospitalized newborn presents, especially in intensive care or intermediate therapy, which are affected by pathologies such as asphyxia, hemorrhage. Seizures, hypoglycemia, convulsions, etc.

In the case of suffocation, for example, it is as important as we know that there are 4 million deaths worldwide in the first 28 days secondary to this cause. Preterm births and congenital malformations cause more than a third of neonatal deaths, most of them in the first weeks of life, of which at least 26%of deaths are from suffocation | and according to the WHO more than one million survive suffocation and develop cerebral palsy, learning disabilities or other developmental problems.

In the case of suffocation as referred to in neonatology books, it can bring a significant number of deaths, however it leaves a similar number of survivors with long-term aftermath. Therefore, vigilance must be maintained not only to avoid deaths from suffocation, but also to the consequences for survivors.

To prevent neonatal death and neurological damage, it is essential to implement measures to prevent neonatal asphyxia through early diagnosis and identification of problems that affect fetal well-being. Protocols must be included to ensure that all patients with neonatal risk factors present. Any pathology that puts neurological integrity at risk is diagnosed and treated early to avoid aftermath, such is the case of pathologies such as hypoxic ischemic encephalopathy where the La procedure Resuscitation and a normal transition state are vital if we can avoid variations in temperature, imbalances of basic acids or hydroelectrolytes, hypoxia or hyperoxia of course, hypotension or hypertension as well as the timely detection of convulsive movements, hypoglycemia, jaundice that must be managed in a way intensive. With the desire to reduce the risks of damage in the long and medium term. It is important that the personnel in charge of the service

- Have clear knowledge
- Know Binomial History
- Save or archive the results

That in general the Community or group that is responsible applies an adequate Handling of the child Group all the interventions to be carried out on the newborn to prevent her sleep from being interrupted continuously

- Perform gentle cyclical caresses and according to your state of health;
- Do not wake him up abruptly, facilitating the gradual transition from sleep to wakefulness, talking to him before starting any intervention;
- Monitor your vital signs as much as possible, to avoid frequent manipulations;
- Provides individualized care, according to your needs and not on a routine basis.

Take special care with interventions related to nursing procedures such as:

- Washing of arterial and venous catheters: respect the principles of handling and maintenance.
- Do not compress the bladder;
- Special care with endotracheal intubation and aspiration of the airway;
- Management of apnea;
- Transfusions;
- Hypotension
- Among others

The monitoring of vital signs is a key factor in the strict monitoring of the clinical situation of the critical patient, although the level of severity will force us to monitor more or less invasively, we will focus on non-invasive monitoring.

The main vital parameters in non-invasive monitoring are heart rate, respiratory rate, blood pressure, oxygen saturation, and peripheral body temperature.

There are different types of monitors that will show us the digital value of each parameter and its graphic representation by waves.

Other tools to monitor the process that can be used if they exist in hospitals are: Ultrasound, trans fontanels, Electroencephalograms and this in real time, measurements of electrolytes, cardiac enzymes, blood gases and levels of bilirubin in blood.

The fact that it is a non-aggressive procedure does not exempt the nurse from exhaustive knowledge of the equipment used, its utilities and applications. All this, together with the exploration and observation of the child, will help us to make a good reading of the alterations that may occur, and to act appropriately knowing how to identify false positive alarms and recognize the real ones.

Little emphasis has been placed on neonatal health in relation to improving survival and neurological integrity, using a team that cares specifically for a seriously ill patient or one at high risk of morbidity and mortality, when, as has been partly expressed, surveillance should begin with adequate monitoring of fetal well-being [5,9-11].

Issue

In the case of neonatal care units like ours, the presence of newborns with a high degree of complexity; Neurological complications occur very frequently within the first hours of life or days, which requires having staff who are increasingly better prepared to detect abnormalities early, allowing us to make immediate decisions to ensure the neurological well-being of newborns, therefore this is essential to have a high response - Technological equipment to monitor vital signs preferably in a non-invasive way. Other tools can be trans-fontanelle ultrasound, real-time EEG, serum electrolytes, cardiac enzymes, blood gases, bilirubins, Etc. that will be in charge of the medical staff for their interpretation and decision-making. We must consider that the fact of having measurement

instruments such as those described above does not exempt from a strict conviction to carry out a strict clinical surveillance, to be detected by nurses who identify in a timely manner the neurological alarm signs according to each pathology listed in the antecedents, so that the doctor can dedicate himself to giving specific management, for seizures, hypoglycemia, jaundice, encephalopathy, etc. Intended to reduce collateral damage, at the neurological level generated by delay in diagnosis. In the development of this work, we form a care group with a neurovigilance approach.

Delimitation

The lack of measurement devices such as those mentioned does not exempt us from carrying out strict and continuous neurological surveillance in our special care units, in times of crisis where resources are decreasing at an alarming rate and where measurement devices are not available for we, perhaps require more human vigilance and improvement in the diagnostic care of newborn patients with complex pathologies such as those we usually handle in our unit.

Justification

Currently, there is no evidence that we have a specific neurological surveillance system to prevent long-term damage to the newborns in our unit.

Overall objective

- To sensitize the nursing staff and train them to carry out neurological surveillance in newborns with a risk approach.
- To form a work team of doctors and nurses that allows a rapid response for neuroprotection in newborns.

Specific goal

Measure the impact of direct surveillance in patients at risk of neurological damage.

Delimitation

The lack of measurement devices such as those mentioned does not exempt us from carrying out strict and continuous neurological surveillance in our special care units, in times of crisis.

Exposed Not exposed

- New cases to - b
- Healthy control- c and d

We will also try to calculate the exposure factor by subtracting the unit from the final RR result.

Type of study

Original cross-sectional observational clinical study, to be carried out with investigator resources. To be carried out in a period from October 2016 to June 2017. Taking patients who present neurological alarm data and who require immediate medical management to detection with seizures, data on encephalopathy, depression due to anesthetic, asphyxia. Hypo calcemia, hypoglycemia.

Material

Patients studied, office supplies.

Method

A list of signs and symptoms of different pathologies will be prepared and it will be made known to the nurses and doctors who want to participate in the neurological surveillance project in different shifts. The above with the idea that all participants have the same information to carry out detection and surveillance, the nurse is trained to know how to detect neurological data and different neonatal seizures, among other topics. They will receive the information in writing and will sign the receipt. We use and emphasize methods such as asphyxia classification, hypoxic encephalopathy clinical classification, seizure clinical classification, acidosis clinical data and kramer parameters for jaundice, among others.

The registry is carried out and in case of seizures, encephalopathy data, imbalances we give the task of carrying out the therapeutic intervention immediately, clinically monitoring the progress of the patient so as not to have to perform electroencephalograms in real time, statistical analysis of the cohort in exposed and unexposed population; including healthy and unhealthy to be analyzed and calculate the relative risk.

Results

Below is a table with the pathologies detected as well as the number of cases treated successfully.

In the stipulated time, we were able to detect 130 newborns with some symptoms of any of the pathologies that were to be monitored to avoid neurological damage. It draws our attention that of the pathologies found, the most frequent is asphyxia (present in 28.46%). And 75 patients were found with biological alarm or alert data, which could be channeled to rehabilitation and their follow-up before being discharged, ensuring their neurological integrity either by neurostimulation or by rehabilitation.

Table of pathologies detected and number of successful cases detected and managed.

Pathology Number of cases

Neonatal Seizures	1	ECN	18
Suffocation	37	Dehydration	3
Jaundice	15	Depression by anesthetics	
EHI	5	Hypocalcemia	2
Deep thrombosis	1	Col stasis with NPT and suspend	4
Heart disease	2	Cardiomyopathy	2
Endocarditic	1	Shock	6
Meconium plug	2	OLigohydramnios	3
Laryngomalacia	1	Intubations	10
Hypoglycemia	2	Sepsis	5
SIRI Application of surfactant	3	Tanned child	2
Hypernatremia		NPT pass 80 ML as adverse event	1
Death cerebral hemorrhage	1	Intracranial hemorrhage	2
			Total 130

Table c

Analysis

RR = Cumulative incidence exposed to + (b + d) (130) (615) = 0.205136

Cumulative incidence of unexposed b (a + c) (610) (4637)

To calculate the exposure factor, we will subtract 1 from the RR and the result = .7948632

Where:

	Exposed	Not exposed
New cases	130	615
Well Child Check	4507	3885

Table d

Clarifying: a = new cases found with problems; b = patients admitted for observation; c = total number of patients born during period d = healthy patients in a room with unexposed joints.

Conclusion

As can be seen during the analysis of all hospitalized patients, a RR of 0.205136 was studied at risk of disease with neurological deterioration and could be classified as problem cases and that presented some potential damage generating a clinical picture, it was also estimated that the Exposure factor was presented at 0.794832 for the unexposed population knowing that less than 1 is a protection factor.

The objective of training staff was achieved, and sensitizing parents to continue surveillance at home.

Observationally, we were able to verify that conducting a targeted follow-up helped specifically detect 130 highly complex patients before they became complicated, in addition to being able to perform interventions that were successful in patients who were discharged with improvement and without apparent neurological evolution, or hurt. Defining himself as subject to neurological monitoring. We were able to verify that not only with high-tech equipment can this follow-up be carried out, in fact, the clinic continues to be a fundamental pivot for the well-being of newborns with alert and/or biological alarm data.

As a consequence, a project was started to start early stimulation in hospitalized babies, this project was presented to the University and we started in 2018 in September with activities aimed at improving the health status of vulnerable R/N babies. The results will be exposed in a future project.

Recommendations

- Carry out neuro-surveillance in R/N in a targeted manner and accordingly.
- Offer specific management in order to avoid permanent neurological damage.
- Promote the formation of groups trained for the timely detection of these pathologies.
- Promote neuro stimulation, rehabilitation, and monitoring of these patients to ensure their integrity once they go home
- Avoid with these actions omitting the detection of pathologies susceptible to neurological damage
- Extend neurovigilance to 100% of exposed patients at the hospital level and reduce monetary as well as human costs.

Ethical Implications

With the present, according to the Helsinki agreements, they are not violated, since the integrity or the life of the patients is not affected, only a follow-up with early intervention that shortens the response time in care, with which we hope to improve quality of functioning and life of the patients who are detected Intentionally.

Conflict of Interests

The researcher declares that this document has no conflict of interest and that its sole purpose is medical research for the benefit of patients.

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