14 - EXTUBATION FAILURE NEONATAL VERY LOW BIRTH WEIGHT IN NEONATAL INTENSIVE CARE OF A MEDIUM-SIZED CITY

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INTRODUCTION

The birth of a newborn premature is defined as delivery occurred before 37 completed weeks or 259 days of gestation, according to World Health Organization (WHO).

According to WHO definitions, the gestational age is the duration of pregnancy, which is measured in days or weeks has elapsed since the beginning of last menstrual period.

The preterm newborn according to gestational age, following the WHO criteria, can be subdivided into three groups: extremely preterm premature (26-30 6 / 7 weeks), moderately preterm (31-35 6 / 7 weeks) and borderline preterm infants (36 - 36 6 / 7 weeks).

Neonates with birth weights less than 2500g are defined as low birthweight. In the 70's and 80 due to the increase in survival of infants weighing less than 1500g the term very low birth weight infants was introduced. In the 90 new categories were added, the infant very low birth weight or "extremely low birth weight" below 1000g and microprematurity, below 800g (PAPGEORGIU et al., 2007).

The wider knowledge about the disease and neonatal physiology and scientific advances were associated with large changes in neonatal care, highlighting the surfactant replacement therapy in preterm infants, the increased use of antenatal corticosteroids and new forms of assisted ventilation. These interventions have unquestionable benefit in reducing neonatal mortality, causing increasingly extreme premature to survive and reach adulthood (SARMENTO, 2007).

The infant respiratory system has some characteristics that makes it susceptible to mechanical ventilation. Physiological and anatomical factors, such as airways of smaller caliber, ribs horizontal, cylindrical thorax, large amounts of type IIa muscle fibers, the immaturity of the central nervous system and predominance of REM (rapid eye movement) lead to an inefficient mechanical respiratory , causing a distortion chest leading to respiratory muscle fatigue and pulmonary collapse, making it more susceptible to the need for ventilatory support (PIVA, GARCIA and SANTANA et al., 1998).

Invasive mechanical ventilation is a major means used to maintain the life of Newborn that progress to respiratory failure, but this feature contributes to the onset and worsening of lung injuries, leading to increased morbidity and mortality in preterm infants. The anatomical peculiarities of the Newborn favor, during mechanical ventilation, the occurrence of volutrauma, the main trigger of ventilator-induced lung injury, which results in the development of bronchopulmonary dysplasia (SARMENTO, 2007).

Due to complications that can lead to invasive mechanical ventilation, such as nosocomial infections, airway injuries, dependence on sedatives and oxygen toxicity, one should aim for the discontinuation of mechanical ventilation, as soon as possible after the stabilization of the condition indicated that the acute (PIVA, GARCIA and SANTANA et al., 1998). extubation failure and reintubation are also associated with significant risks, including an increased incidence of nosocomial pneumonia, longer stay in the neonatal intesive care unit and the increase in mortality (ESTEBAN et al., 2002).

To date there are no studies on the prevalence of failure of extubation in very low birth weight infants in the neonatal intensive care unit at the University Hospital of the West of Paraná (HUOP). The knowledge of this indicator and of the parameters considered, should be considered in the discussion of a protocol for extubation in the neonatal unit in order to minimize the risks of prolonged mechanical ventilation and extubation.

This study aimed to determine the prevalence of extubation failure in infants of very low birth weight, neonatal intensive care unit in western regions, and to evaluate the parameters for extubation in these newborns.

This study also examined the population of internees during the period, classified by groups of weights, diagnostic, clinical and laboratory criteria at the time of indication of ventilatory support, extubation and those related to new ventilatory support, and the life to start mechanical ventilation and duration of ventilatory support.

MATERIALS AND METHODS

The study deals with a kind of retrospective quantitative research, exploratory descriptive part of the study population, infants of very low birth weight who were hospitalized in the neonatal intensive care unit of the University Hospital of the West of Paraná (HUOP) in the city of Cascavel -PR during the period 1 June 2008 to May 31, 2009.

As a research instrument used was a structured form for data collection of medical records. Data were organized and analyzed using Microsoft Excel 2000 software. The research project was approved by the Ethics Committee of the Unioeste, under protocol No. 28900/2009.

The inclusion criteria for this study were all hospitalized in the neonatal intensive care unit very low birth weight who required mechanical ventilation during the study period, with the following exclusions: they were in death during mechanical ventilation, submitted to VM that required surgery; detected with birth defects at birth or during hospitalization, with typical facies of genetic disease, disease with suspected inborn error of metabolism, and records with insufficient data for analysis.

RESULTS

In the period from 1 June 2008 to May 31, 2009, were admitted to the neonatal intensive care unit HUOP in the city of Cascavel-PR, 202 newborns, and all his medical records collected by the service medical records.

The classification of this population, according to the gestational week was 100 newborn premature, 90 term and 12 post term. The reasons why the newborn were admitted to the NICU, most patients (117), had as prematurity diagnosis. Forty-four were admitted for other diseases such as respiratory distress, omphalocele, esophageal atresia and duodenal ulcer, pneumonia, jaundice, hypoglycemia, and hydrocephalus.

The premature infants hospitalized during the study period were mostly moderate prematurity group admitted with 64, followed by borderline patients and in 18 extremely premature infants with 18's. At the discretion of the newborn group weight

below 2500g are the ones who were admitted with 113 patients and infants weighing 2500g or above were 79 newborn.

Among the 100 hospitalized premature infants, 46% required ventilatory support: eight underwent CPAP, 23 required mechanical ventilation and 15 mechanical ventilation and subjected to CPAP.

The preterm infants did not require ventilatory support and those who required some form of respiratory assistance, classified by weight group. invasive mechanical ventilation occurred more often in the low birth weight group (15 cases), followed by the very low birth weight infants group with 11 cases.

A . but 17 were excluded from the study (4 died during mechanical ventilation, 12 did not require mechanical ventilation and only used a CPAP). eight very low birth weight infants infants met the requirements for inclusion in the survey. the mean weight of very low birth weight infants infants was 1158.5 ± 118.7 grams.

The mean duration of mv in very low birth weight infants group was 123.5 ± 109.8 hours.three very low birth weight infants infants had extubation failure (37.5%), and intubated again after 12h, 22h, 36h of extubation. the duration of ventilatory support after extubation failure was 70h, 24h and 244h, resulting in an average of 112.7 ± 116.0 hours.

Two very low birth weight infants infants, three of which had to be intubated again, given the application of nasal cpap after extubation second. the total number of cycles of ventilatory support for eight very low birth weight infants infants was 4 cycles (n = 3) and 2 cycles in 5 cases. Clinical signs of assessing the degree of respiratory failure, according to the bulletin Silverman and Andersen, were found in only 4 (50%) of very low birth weight group. among the signs were: audible grunting with stethoscope, cyanosis and thoraco-abdominal asynchrony.

There is no evidence of use of radiological criteria for the indication of mechanical ventilation in very low birth weight infants infants in the studies. no data on the use of laboratory parameters for mechanical ventilation. in all eight very low birth weight infants infants were not carried out blood samples for blood gases immediately before the start of ventilatory support. also, not all of these infants underwent x-rays, both at the time of intubation and extubation.

DISCUSSION

The survey data show that more than half of cases (58.9%) infants were less than 2,500 g's, which would be expected that the service is part of a teaching hospital, with high complexity in the field of Obstetrics and be the one who goes by the SUS in the catchment area of the 10th Regional Health of Paraná (which is headquartered in Cascavel with 291 000 inhabitants).

Also the criterion of gestational weeks premature group constitutes the majority of cases (49%).The difference in percentage by two different criteria, weight and gestational age can be explained by sampling in two different criteria (respectively: n = 192 n = 202). Interfered with the result the 10 cases (5%) that was not possible to obtain the birth weight and 12 cases of newborns post-term.

The very low birth weight infants were the second largest (22.1%) of newborn pre-term infants (n = 113), preceded by the low birth weight group (66.4%). of these premature infants, 41.6% (n = 47) required assisted ventilation. Among very low birth weight infants included in the survey 32% (n = 8) required for survival of the VM, which is in agreement with Davis and Henderson-Smart (2003), Sinha and Donn, (2000), which put the frequent need for VM this weight range.

Among the premature infant's weighing less than 2500g mechanically ventilated, the group represented 20% of low birth weight infants (n = 15) and the group of very low birth weight infants (n = 25) hospitalized, 12 (48%) required mechanical ventilation. These results are similar to those observed in the study by Angus et al. (2001), where low birth weight and very low birth weight infants accounted for most cases of mechanically ventilated neonates.

The average weight (± SD) of neonates in the current study was 1158.5 ± 118.7 grams (n = 8). Given this, similar to the study of Barbosa et al. (2007), where 37.5% of neonates in the study weighed between 1001-1500 grams. These data suggest the association of mechanical ventilation in preterm infants weighing less than 1500 grams and immaturity.

Of very low birth weight infants, 37.5% (n = 3) had extubation failure. However the small sample does not allow definitive conclusions. Anyway, the number is higher as compared with the group of low birth weight infants with failure of 10%. These data agree with Dimitri and Grenough (2000) in their studies that verify the relationship of extubation failure with the immaturity of the newborn.

The mean mechanical ventilation in very low birth weight infants group was 123.5 ± 109.8 hours, during hospitalization. Superior to the study of Gupta et al. (2009), the very low birth weight infants in this study were divided into 2 groups to receive different modes of CPAP, there was no statistically significant differences between groups with respect to their characteristics, which saw an average of mechanical ventilation in both groups of 74.2 hours and 80.2 hours.

It was found in this study that arterial blood was not taken into account in setting up the mechanical ventilation in very low birth weight infants, because it was performed in 100% of cases. The technical difficulty of blood collection in the NICU may be related to failure to perform routine blood gas analysis, considering that the practice of umbilical artery catheterization is not part of the routine of the unit.

The same situation is assumed for situations in which they were required reintubations.

The radiological criterion was not used in 100% of cases, both the indication of the discontinuation of mechanical ventilation in very low birth weight infants infants. in the statement, may not have been possible, because 75% (n = 6) of very low birth weight infants infants were still intubated in the obstetric center. the practice of not carrying out X-ray prior to extubation, agrees with Davis and Cartwright (1997) in their studies that found a low incidence of post-extubation atelectasis.

CONSIDERATIONS

A sampling of newborns with very low weight, included in the study is small, it is not possible to provide definitive conclusions. Another limiting factor in the analysis of the results was the lack of important records by care staff. The expansion of the sample through new studies may validate the results found in this study.

BIBLIOGRAPHIC REFERENCES

ANGUS, D. C., LINDE-ZWIRBLE, W. T., CLERMONT, G., GRIFFIN, M. F., CLARK, R. H. Epidemiology of neonatal respiratory failure in the united states: projections from California and New York. **American Journal of Respiratory and Critical Care Medicine**. v. 164, p. 1154- 1160, 2001.

BARBOSA, A. L., CHAVES, E. M. C., CAMPOS, A. C. S. Caracterização dos recém-nascidos em ventilação mecânica em unidade neonatal. **Revista da Rede de Enfermagem do Nordeste**. v. 8, n. 2, p. 35-40, 2007.

DAVIS, P.G., HENDERSON-SMART, D. J. Nasal continuous positive airways pressure immediately after extubation for preventing morbidity in preterm infants. **The Cochrane Library**, 2003. Disponível em: <http://www.pubmed.com.br>. Acesso em: mar. 2010.

DIMITROU, G., GREENOUGH, A. Computer assisted analysis of the chest radiograph lung area and prediction of

failure of extubation from mechanical ventilation in preterm neonates. **The British Journal of Radiology**. v. 73, p. 156-159, 2000.

ESTEBAN, A.; FRUTOS, F.; ALIA, I.; BROCHARD, L.; STEWART, T.E.; Characteristics and outcomes in adult patients receiving mechanical ventilation. A 28-day international study. **JAMA**, v.287, p.345-355, 2002.

GUPTA, S., SINHA, S. K., TIN, W., DONN, S. M. A Randomized controlled trial of post-extubation bubble continuous positive airway pressure versus infant flow driver continuous positive airway pressure in preterm infants with respiratory distress syndrome. **The Journal of Pediatrics**. v. 154, p- 645- 650, 2009.

PAPGEORGIU, A., PELAUSA, E., KOVACS L. O recém- nascido de extremamente baixo peso ao nascer. In: MCDONALD, M. G., SESHIA, M. K. M., MULLETT, M. D. **Neonatologia: fisiopatologia e tratamento do recém- nascido**. 6. ed. Rio de Janeiro: Guanabara Koogan, 2007.

PIVA, J.P; GARCIA, P. C. R; SANTANA, J. C. B; BARRETO, S. S. M; Insuficiência respiratória na criança: **Jornal de pediatria**, v. 74, supl. 1, 1998.

SARMENTO, J.V. **Fisioterapia respiratória em pediatria e neonatologia**, 2007, Manole, São Paulo.

SINHA, S. K., DONN, S. M. Weaning newborns from mechanical ventilation. **Seminars in Neonatology.** n. 7, p. 421-428, 2.

EXTUBATION FAILURE NEONATAL VERY LOW BIRTH WEIGHT IN NEONATAL INTENSIVE CARE OF A MEDIUM-SIZED CITY

Advances in neonatal medicine has provided a significant increase in survival of newborns. Invasive mechanical ventilation is a key feature for these newborns, but it has contributed to the aggravation of pulmonary lesions, increasing morbimortatidade in premature newborns. The discontinuation of mechanical ventilation should be sought as soon as possible in order to minimize potential damage, and indicators used to evaluate lung mechanics, gas exchange and respiratory muscle strength, but no index is sensitive and specific enough to be predictive. This study aimed to determine the prevalence of extubation failure in infants of very low birth weight, neonatal ICU care center in western regions, and to evaluate the parameters for extubation in these newborns. Most patients (57.9%) had a diagnosis of prematurity. Among the 202 newborns, 25 newborns were very low birth weight, however due to exclusion criteria, data were considered only 8 cases. The mean (± SD) of mechanical ventilation in the study group was 123.5 ± 109.8 hours, during hospitalization. Three newborn very low birth weight had extubation failure, requiring new support invasive.

KEY WORDS: Neonatal intensive care unit. Mechanical Ventilation. Extubation.

ÉCHEC DE L'EXTUBATION POIDS NEONATAL DE NATALITE TRES BAS EN SOINS INTENSIFS NEONATALS D'UNE VILLE DE TAILLE MOYENNE

Les progrès de la médecine néonatale a fourni une augmentation significative de la survie des nouveau-nés. Envahissantes ventilation mécanique est un élément clé pour ces nouveau-nés, mais il a contribué à l'aggravation des lésions pulmonaires, augmentant morbimortatidade chez les prématurés. L'arrêt de la ventilation mécanique doit être recherchée dès que possible afin de minimiser les dommages potentiels, et les indicateurs utilisés pour évaluer la mécanique pulmonaire, les échanges gazeux et la force des muscles respiratoires, mais aucun indice n'est suffisamment sensible et spécifique pour être prédictive. Cette étude visait à déterminer la prévalence de l'insuffisance extubation chez les nourrissons de poids à la naissance très faible, néonatale des soins intensifs du centre dans les régions occidentales, et d'évaluer les paramètres d'extubation chez ces nouveau-nés. La plupart des patients (57,9%) avaient un diagnostic de la prématurité. Parmi les 202 nouveau-nés, 25 nouveau-nés avaient un poids de naissance très faible, mais en raison de critères d'exclusion, les données ont été considérés comme seuls 8 cas. La moyenne (± SD) de la ventilation mécanique dans le groupe d'étude a été 123,5 ± 109,8 heures, pendant l'hospitalisation. Trois nouveau-nés de poids de naissance très faible eu échec de l'extubation, nécessitant un soutien de nouveaux envahissantes.

MOTS CLÉS: Unité de soins intensifs néonatals .ventilation mécanique. L'extubation.

FRACASO DE LA EXTUBACIÓN NEONATAL NACIDOS DE MUY BAJO PESO NEONATAL DE CUIDADOS INTENSIVOS DE UNA CIUDAD DE TAMAÑO MEDIO

Los avances en medicina neonatal ha proporcionado un aumento significativo en la supervivencia de los recién nacidos. Ventilación mecánica invasiva es una característica clave de estos recién nacidos, sino que ha contribuido a la agravación de las lesiones pulmonares, aumento de morbimortatidade en recién nacidos prematuros. La interrupción de la ventilación mecánica se debe buscar lo más pronto posible con el fin de minimizar los posibles daños, y los indicadores utilizados para evaluar la mecánica pulmonar, el intercambio de gases y la fuerza muscular respiratoria, pero no hay un índice sensible y específica como para ser predictivo. Este estudio tuvo como objetivo determinar la prevalencia de fracaso de la extubación en recién nacidos de muy bajo peso, centro de cuidados intensivos neonatal en las regiones occidentales, y para evaluar los parámetros para la extubación en los recién nacidos. La mayoría de los pacientes (57,9%) tenían un diagnóstico de la prematuridad. Entre los 202 recién nacidos, 25 fueron recién nacidos de peso muy bajo al nacer, sin embargo debido a los criterios de exclusión, los datos se consideraban sólo 8 casos. La media (± DE) de la ventilación mecánica en el grupo de estudio fue 123,5 ± 109,8 horas, durante la hospitalización. Tres recién nacidos de peso muy bajo al nacer tenían fracaso de la extubación, lo que requiere el nuevo soporte invasivo.

PALABRAS CLAVE: Unidad de cuidados intensivos neonatales.La ventilación mecánica. Extubación.

FALÊNCIA DA EXTUBAÇÃO EM RECÉM-NASCIDOS DE MUITO BAIXO PESO NUMA UTI NEONATAL DE UMA CIDADE DE PORTE MÉDIO

O avanço da medicina neonatal tem proporcionado um aumento significativo na sobrevida de recém-nascidos. A ventilação mecânica invasiva é um dos principais recursos para estes recém-nascidos, porém isto tem contribuído para o agravamento de lesões pulmonares, aumentando a morbimortatidade em recém-nascidos prematuros. A descontinuidade da ventilação mecânica deve ser buscada na maior brevidade possível, a fim de minimizar os potenciais danos, sendo utilizados indicadores que avaliam a mecânica pulmonar, as trocas gasosas e a força da musculatura respiratória, porém nenhum índice é sensível o suficiente e específico para ser preditivo. A presente pesquisa teve por objetivo determinar a prevalência da falência de extubação em recém-nascidos de muito baixo peso, na UTI neonatal do Hospital Universitário do Oeste do Paraná, bem como avaliar os parâmetros utilizados para a extubação nestes recém-nascidos. A maioria dos pacientes (57,9%) tiveram o diagnóstico de prematuridade. Dentre os 202 neonatos, 25 eram recém-nascidos de muito baixo peso, porém devido aos critérios de exclusão, foram considerados dados de somente 8 casos. O tempo médio (±DP) de ventilação mecânica no grupo estudado foi de 123,5 ± 109,8 horas, durante a internação. Três recém-nascidos muito baixos peso tiveram falha na extubação, sendo necessário novo suporte invasivo.

PALAVRAS CHAVE: Unidade de Terapia Intensiva Neonatal. Ventilação Mecânica. Extubação.