36 - OXYGEN MONITORING IN NEWLY BORN IN INPATIENT NEONATAL INTENSIVE CARE UNIT

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INTRODUCTION

Oxygen therapy is a treatment method in which there inhalation of oxygen (O2), where a pressure less than the ambient air facilitates gas exchange in the lungs, thereby reducing the work of breathing. It is defined as need for oxygen administration through devices, aiming to promote the maintenance of adequate tissue oxygenation while minimizing cardiopulmonary work. Its beneficial effects correction of hypoxemia by increased levels of blood and alveolar O2, reduced lung disorders, improving mental function, reducing the workload of the cardiopulmonary system, pulmonary arterial vasodilation, decreased resistance and pulmonary arterial pressure lung, improves cardiac output and systemic vasoconstriction (LORENA et al, 2009; MARTIN, 2003; Ribeiro et al, 2003; ROCHA et al, 2006). Thus, attention should be given to the cause of hypoxemia and seek proper treatment for the oxygen to be suspended as soon as possible. His administration must be made by means comfortable that enable it to supply flow to a minimum possible to correct hypoxemia, preventing the deleterious effects to the respiratory system (CAMARGO et al, 2008; Jubran et al, 1990; MACHADO et al, 2008).

The oxygen in the newborn as any human being is vital, however its misuse can lead to toxic effects, particularly in the retina and lungs. Its use should be made wisely, always observing their indications and contraindications before administering it (Araújo, 2007; CAMARGO, et al, 2008; MARTIN, 2003).

In neonatal intensive care units (ICU-Neo) is used routinely to oxygen, so the RN undergoing this treatment are subjects can suffer complications from prolonged use of O2. (Araújo, 2007; CAMARGO, et al, 2008; MARTIN, 2003).

To NICOLAU, (2007) the inappropriate administration of oxygen may be iatrogenic for RN and may result in brain damage, lung, eye, and even death. So beware of oxygen is essential because it is the setting of pulmonary gas exchange in order to maintain proper cellular metabolism, ensuring arterial blood oxygenation and ensuring the elimination of carbon dioxide (GARIJO, 2000).

To RODRIGUES, (1998) the toxicity of O2 is attributed to the free radical reactions of O2 in cellular components, even if they have key roles in normal development processes and in biological oxidation and reduction reactions at the cellular level. These reactions can rupture the membrane lipoprotein, destroying the cellular enzymatic functions, changing the DNA and leading to cell death. The definition of a free radical when there is one or more unpaired electrons in the outer orbit, making it extremely reactive, because when a free radical reacts with a non-free radical, the product is another free radical, yielding chain reactions. This chain ends when the encounter occurs between two free radicals that produce a link between two electrons, or the meeting with a substance antioxidant.

It is extremely important for physical therapists to evaluate these patients newborns, such as monitoring the amount of oxygen being supplemented, the measurement of blood gases and also oversee the fraction of inspired O2 (FiO2) by O2 analyzers or specific query tables, the mixture is made of compressed air and O2. Still, the oxygen is used as a treatment by physiotherapists, so its evaluation should be rigorously. (SARMENTO, 2011).

According BAJAY, (1991), oxygen therapy is a systematic and rational therapeutic oxygen, administered at concentrations or pressures higher than the ambient atmosphere, more than 21%, to correct or mitigate deficiencies O2 or hypoxia (insufficient oxygen in blood). In practice the amount of oxygen should be provided to maintain the minimum required PaO2 50-80 mmHg and / or hemoglobin saturation between 90 and 95%.

This paper aims to describe the use of oxygen therapy, method of application, device supply and FiO2 of newborns who are in the NICU.

MATERIALS AND METHODS

It is a descriptive quantitative and qualitative, so direct, and field epidemiology, which evaluated all patients who received newborn indication of oxygen in the Neonatal Intensive Care Unit (ICU-N) of the Local Hospital in the period February to August 2013, regardless of sex. Were excluded from the study infants who were ICU-N without the oxygen supply.

The study was approved by the Ethics Committee in Research of Institution Faculty Assisi Gurgacz - FAG and the industry Neonatal Intensive Care Unit (ICU-N) of the Local Hospital. Newborns study participants did not experience any kind of stress or exposure to risk factors during the data collection.

We selected 30 patients, 15 females and 15 males with a mean age of 2.6 ± 3.1 days and ICU neonatal indicating oxygen presenting O2 saturation below 90% and respiratory signs such as frequency upper respiratory, respiratory effort accented or labored breathing (intercostal retractions, nasal flaring), the progressive cyanosis, perioral, extremities, generalized (late). Then, the researcher filled out a form containing the values of FiO2 and saturation which appeared on the monitors. The use of oxygen was evaluated basing on literature as SARMENTO, (2011). The following parameters were evaluated: personal data of the newborn (name, age, sex), so supply of oxygen supply device, FiO2 and oxygen saturation. The results were tabulated in Excel spreadsheets, normality was tested according to the Shapiro- Wilk and described as mean and standard deviation (SD) as shown in Table 1.

RESULTS

In the period from February to September 2013 were conducted in 50 admissions to RN Neonatal Intensive Care Unit, including 30 newborns were selected, as did the use of oxygen during the hospitalization period. Of that number selected, 50% were female and 50% male, mean age of 2.6 days.

The results obtained through the collection of data show that 100% of patients were in the network, the devices used 23.3% were on mechanical ventilation, 10% used catheter O2 and 56.6% were doing to support the use of the halo.

Still, comparing the devices with the amount of FiO2 supplied and saturation, we observed that infants with nasal catheter were average with a FiO2 of 0.43 ± 0.15 and saturation of 96 ± 3.4%. Individuals who were doing stand with halo had a

FiO2 of 0.36 ± 0.11 and saturation of 96 ± 2.1% and those who were on mechanical ventilation, mean FiO2 and saturation were 0.37 ± 0 21 ± 2.5 and 97%, respectively. In total the average FiO2 supplied and saturation were 0.38 ± 0.11 and 96.13 ± 2%, respectively.

Table 1 - Distribution of the forms of administering oxygen, FiO2 and saturation according to age in days

Device administration	Mode	N	FiO2 (mean ± SD)	Saturation % (mean ± SD)	Old days (mean ± SD)
Nasal catheter	Network	3	0,43±0,15	96±3,4	6,3±7,5
Halo	Network	18	0,36±0,11	96±2,1	1,5±1,06
TOT	Network	9	0,37±0,21	97±2,5	3,4±2,4
Total		30	0,38±0,11	96,1±2,1	2,6±3,16

DISCUSSION

In the present study, we observed that the oxygen was not used in the correct way, and the values of FiO2 offered than necessary to ensure a saturation between 88% and 92%. The average saturation of all 30 infants enrolled in the study, they were doing support with oxygen, was 96.1 ± 2.1%.

According to the study CAMARGO, (2007) which aimed to evaluate the oxygen inhalation in children admitted to a university hospital it was found that all patients who required oxygen therapy had lower respiratory diseases and indications for use were oxygen saturation in air less than 90%, in addition, increased respiratory rate, tachypnea, cough, cyanosis and apnea. The fractional inspired oxygen most used were 24% and 28% oxygen and was suspended when the oxygen saturation in room air reached values greater than 90%.

In the study of CHOW, (2003) was adopted a protocol narrower oxygen saturation in newborns where it should remain 85% -95% saturation for infants> 32 weeks and 85% -92% saturation for infants <32 weeks. With this decreased the incidence of retinopathy of prematurity from 4.5% to 1.5% in a year. Furthermore, in the delivery room and transport of these infants were used blenders and pulse oximeters. The goal of saturation in the NICU increased to 85% - 93%, calibrating the monitor O2 between 80% and 95% and no more 100%. This change resulted in a dramatic drop of any retinopathy or retinopathy of prematurity with laser surgery.

A study proposed observatory for TIN, (2001), in five neonatal intensive care units, aimed to compare the different monitoring practices oxygen with the outcome of patients hospitalized newborns. In one unit, the target of fractional oxygen saturation was 80-90% with minimum alarm set to operate only if the saturation fell below 70% (restrictive approach). In another unit, the functional oxygen saturation target was 94-98%, with the lowest alarm set to operate at 88% (liberal approach). The other three units had intermediate policies. As ophthalmologic evaluation of all survivors retinopathy needed treatment in 6.3% of infants treated with the restrictive approach, and 27.7% with liberal approach, and no child of the first unit became blind, against four of second unit that eventually progressing to blindness. It appears that oxygen administered and monitored incorrectly can progress to irreversible sequelae in newborns who are doing the same supplementation.

In the study of SUN, (2002) that compared the survival, chronic lung disease and ROP of 1,544 babies who were treated in units that aim to maintain oxygen saturation below 95% with units that remained above 95%. There was a significantly lower incidence of chronic lung disease in 27% versus 53%, as well as ROP 10% versus 29% among babies accompanied with target oxygen saturation below 95%. In addition, the survival rate was slightly higher in the group of low saturation, but this was not significant.

According to the study by CHOW, (2003) observed that applying clinical practice and control of oxygen was associated with a significant reduction in the incidence of ROP stage from 12% to 2.5%, and the need for surgery of the retina 4.5% to 0% in newborns. Still, the research proposed by Anderson (2004) also showed significantly decrease in ROP of 2.4% versus 5.5%, and retinal surgery of 1.3% against 3.3% in infants in neonatal units, where the upper alarm limit for oxygen saturation less than 92%.

According to what it says in the study of MED, (2010), the incidence of retinopathy is lower in preterm infants with exposure to low levels of oxygen than those exposed to high levels of oxygenation. We conducted a randomized study to compare target ranges of oxygen saturation 85-89% or 91-95% among children in 1316. The primary outcome was composite of severe retinopathy of prematurity, death before discharge, or both. The rates of severe retinopathy or death did not differ significantly between the group with lower oxygen saturation at highest oxygen saturation. Death before discharge occurred more frequently in the lowest oxygen saturation, whereas severe retinopathy among survivors occurred less in this group.

In contrast to the report of the observational studies, POETS, (2003) reported their observations in 891 infants admitted to neonatal units using two different limits oxygen saturation (80-92% vs. 92-97%). The incidence of ROP was significantly higher where the apparatus used had a lower alarm limit, however requiring any surgical procedure.

While it is easy to use, supplemental oxygen should be used cautiously and their monitoring should be done judiciously. Furthermore, it is important for physical therapy in their clinical practice, monitor and observe the values of saturation and FiO2 administered as well as part of the routine in the ICU, oxygen is also used as a treatment. Therapy should be closed gradually, controlling the reaction of the individual and the arterial blood gases. It is also worth mentioning that the attention to other needs of the child as mobility (changing position), comfort, maintenance of body integrity, demonstrations of affection through procedures like giving lap, talking, playing, among others, are essential for success therapy.

CONCLUSION

According to this study it was observed that in the intensive care unit neopediátrica oxygen therapy was administered oxygen via network, the devices used were mostly the mechanical ventilator, the halo and nasal catheter. Among the values found, highlighted the presence of inspired oxygen concentrations above recommended, and PaO2. The use of therapy was inadequate necessitating training routines and suitability of staff to avoid possible deleterious effects of the abuse.

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OXYGEN MONITORING IN NEWLY BORN IN INPATIENT NEONATAL INTENSIVE CARE UNIT

ABSTRACT

Objective: Oxygen therapy in newborns is a systematic and rational therapeutic oxygen, administered at concentrations or pressures higher than the ambient atmosphere, more than 21 %, to correct or mitigate deficiencies O2 or hypoxia. In practice the amount of oxygen given to an RN should be the minimum necessary to maintain 50-80 mmHg PaO2 and/or hemoglobin saturation between 90 and 95%. Methods: This is a study of cause and effect of quantitative and qualitative, so direct, and field epidemiology, which evaluated mode, device supply, FiO2 and saturation of all patients who received newborn indication of oxygen in Neonatal Intensive Care Unit (ICU - N) of the Local Hospital in the period from February to September 2013. Results: The results obtained through the collection of data show that 100 % of patients were in the network, the devices used were 23.3 % with TOT, 10 % used catheter O2 and 56.6 % were doing stand with halo. Still, comparing the devices with the amount of FiO2 supplied and saturation infants with nasal catheter were average with a FiO2 of 0.43 ± 0.15 and saturation of 96 ± 3.4 %. Individuals who were with Halo had a FiO2 of 0.36 ± 0.11 and saturation of 96 ± 2.1 % and those who were with TOT, mean FiO2 and saturation were 0.37 ± 0.21 and 97 ± 2.5 % respectively. In total the average FiO2 supplied and saturation were 0.38 ± 0.11 and 96.13 ± 2.19 % respectively. Conclusion: The oxygen was administered via a network of oxygen, the devices used were mostly the mechanical ventilator, the halo and nasal catheter. Among the values found, highlighted the presence of inspired oxygen concentrations above recommended, and PaO2 .

KEYWORDS: oxygen; oxygen therapy; neonates; intensive care unit.

RÉSUMÉ

Objectif: Oxygénothérapie des nouveau-nés est un oxygène thérapeutique systématique et rationnelle, administré à des concentrations ou des pressions supérieures à l'atmosphère ambiante, plus de 21%, pour corriger ou atténuer les manquements O2 ou hypoxie. En pratique, la quantité d'oxygène donné à un RN devrait être le minimum nécessaire pour maintenir 50-80 mmHg PaO2 et / ou de la saturation de l'hémoglobine entre 90 et 95%. Méthodes: Il s'agit d'une étude des causes et des effets de l'épidémiologie quantitative et qualitative, si directe, et sur le terrain, le mode évaluée, alimentation de l'appareil, FiO2 et la saturation de tous les patients qui ont reçu l'indication du nouveau-né de l'oxygène dans Unité néonatale de soins intensifs (USI-N) de l'hôpital local dans la période de Février à Septembre 2013. Résultats: Les résultats obtenus par la collecte de données montrent que 100% des patients étaient dans le réseau, les appareils utilisés étaient de 23,3% avec TOT, 10% de O2 de cathéters utilisés et 56,6% faisaient stand avec halo. Pourtant, en comparant les dispositifs avec le montant de FiO2 fourni et les nourrissons de saturation avec cathéter nasal était moyenne avec une FiO2 de 0,43 ± 0,15 et la saturation de 96 ± 3,4%. Les personnes qui étaient avec Halo avaient une FiO2 de 0,36 ± 0,11 et la saturation de 96 ± 2,1%, et ceux qui étaient avec TOT, signifie FiO2 et la saturation ont été de 0,37 ± 0,21 et 97 ± 2,5% respectivement. Au total, la FiO2 moyenne fournie et la saturation sont de 0,38 ± 0,11 et 96,13 ± 2,19% respectivement. Conclusion: L'oxygène a été administré par un réseau d'oxygène, les appareils utilisés étaient pour la plupart le ventilateur mécanique, l'auréole et le cathéter nasal. Parmi les valeurs trouvées, mis en évidence la présence de concentrations d'oxygène inspiré dessus de recommander et PaO2.

MOTS-CLÉS: l'oxygène, l'oxygénothérapie, les nouveau-nés; unité de soins intensifs.

RESUMEN

Objetivo: La terapia de oxígeno en los recién nacidos es un oxígeno terapéutico sistemática y racional, administrada en concentraciones o presiones superiores a la atmósfera ambiente, más de 21%, para corregir o mitigar deficiencias de O2 o hipoxia. En la práctica, la cantidad de oxígeno dado a un RN debería ser el mínimo necesario para mantener 50-80 mmHg PaO2 y / o la saturación de hemoglobina entre 90 y 95%. Métodos: Se trata de un estudio de la causa y el efecto de la epidemiología cuantitativa y cualitativa, de modo directo, y el campo, que el modo de evaluación, el suministro de equipo, FiO2 y la saturación de todos los pacientes que recibieron la indicación de oxígeno en recién nacidos Unidad Neonatal de Cuidados Intensivos (UCI-N) del Hospital local en el período de febrero a septiembre de 2013. Resultados: Los resultados obtenidos a través de la recolección de los datos muestran que el 100% de los pacientes se encontraba en la red, los dispositivos utilizados fueron el 23,3%, con TOT, 10% O2 catéteres usados y 56,6% estaban haciendo pie con halo. Sin embargo, la comparación de los dispositivos con la cantidad de FiO2 suministrada y bebés saturación con catéter nasal eran de la media con una FiO2 de 0,43 ± 0,15 y la saturación de 96 ± 3,4%. Las personas que estaban con halo tenían una FiO2 de 0,36 ± 0,11 y saturación del 96 ± 2,1% y los que estaban con TOT, significa FiO2 y saturación fueron 0,37 ± 0,21 y 97 ± 2,5%, respectivamente. En total, la FiO2 promedio suministrada y la saturación fueron 0,38 ± 0,11 y 96,13 ± 2,19%, respectivamente. Conclusión: El oxígeno se administra a través de una red de oxígeno, los dispositivos utilizados eran en su mayoría el ventilador mecánico, el halo y el catéter nasal. Entre los valores que se encuentran, destacó la presencia de concentraciones de oxígeno inspirado encima de las recomendadas y PaO2.

PALABRAS CLAVE: oxígeno; terapia de oxígeno; neonatos; unidad de cuidados intensivos.

MONITORAMENTO DA OXIGÊNIOTERAPIA EM RECÉM NASCIDOS HOSPITALIZADOS NA UNIDADE DE TERAPIA INTENSIVA NEONATAL

RESUMO

Objetivo: A oxigenoterapia em recém-nascidos é uma terapêutica racional e sistematizada com oxigênio, administrada em concentrações ou pressões maiores que a da atmosfera ambiental, ou superiores a 21%, para corrigir ou atenuar deficiências de O2 ou hipóxia. Na prática a quantidade de oxigênio oferecida a um RN deve ser mínima necessária para manter a PaO2 entre 50-80 mmHg e/ou saturação de hemoglobina entre 90 e 95%. Métodos: Trata-se de um estudo de causa e efeito do tipo quantitativo e qualitativo, de modo direto, de campo e epidemiológico, que avaliou modo, dispositivo de oferta, FiO2 e saturação de todos os pacientes recém nascidos que receberam indicação de oxigenioterapia na Unidade de Terapia Intensiva Neonatal (UTI-N) do Hospital Local, no período de fevereiro a setembro de 2013. Resultados: Os resultados obtidos através da coleta dos dados mostram que 100% dos pacientes estavam em rede, dos dispositivos utilizados 23,3% estavam com TOT, 10% utilizavam o cateter de O2 e 56,6% estavam fazendo suporte com halo. Ainda, comparando os dispositivos utilizados com a quantidade de FiO2 ofertada e a saturação periférica os RN com cateter nasal estavam com uma FiO2 média de 0,43±0,15 e saturação de 96±3,4%. Já os que estavam com halo tiveram uma FiO2 média de 0,36±0,11 e saturação de 96±2,1% e os que estavam com TOT, a média da FiO2 e saturação foram de 0,37±0,21 e 97±2,5% respectivamente. No total a média de FiO2 ofertada e a saturação foram de 0,38±0,11 e 96,13±2,19% respectivamente. Conclusão: a oxigenoterapia foi administrada através de rede de oxigênio, os dispositivos empregados na sua maioria foram o ventilador mecânico, o halo e cateter nasal. Dentre os valores encontrados, destacou-se a presença de frações inspiradas de oxigênio acima do recomendado, assim como valores de PaO2.

PALAVRAS-CHAVE: oxigenio; oxigenoterapia; neonatos; unidade terapia intensiva.