(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 5, Issue 5 , Page No: 398-402
September-October 2022

IJMSCR

Implication of Perioral Stimulation & Intercostal Stretch On A Neonate With Respiratory Distress Syndrome: A Case Study

Rushikesh Nakhate[1a], Jeet Shailesh Kantharia[1b], Dax Vyas[2], Dr. Sabih Khan[3], Sonali Asolkar[4]
[1a,1b]IV BPT Student, [2]MPT, Student, [3]Assistant Professor, [4]Intern,
MGM School of Physiotherapy, Aurangabad, Maharashtra, India

***Corresponding Author:**
Jeet Shailesh Kantharia
IV BPT Student, MGM School of Physiotherapy, Aurangabad, Maharashtra, India

Type of Publication: Original Research Paper
Conflicts of Interest: Nil

Abstract

Introduction: Newborn respiratory distress Syndrome (NRDS) presents a diagnostic and management challenge which commonly exhibit tachypnea with a respiratory rate of more than 40 breaths per minute. NRDS occurs primarily in premature infants and it majorly contributes in the mortality rate of the preterm neonates.
Purpose of the study: To evaluate the effect of perioral stimulation & intercostal stretch on vital parameters & pulmonary function in Neonatal Respiratory Distress Syndrome.
Case Description: A Day 2 of life baby came in MGM hospital with complaint of respiratory distress and was immediately intubated in view of distress and fluctuating saturation, later was shifted to the NICU.
Method: The protocol of study includes Neuro-physiological facilitation of respiration that is perioral stimulation & intercostal stretch with body positioning for 15 days.
Result: There was a remarkable increase in the air entry in the right lower lobe on the chest X ray, increase in the oxygen saturation and the vitals showed stability after giving 15 days of treatment.
Conclusion: The study concluded that application of neurophysiological facilitation of respiration under which perioral pressure and intercostal stretch with body positioning improves vital parameters and pulmonary function.

Keywords: Neonatal respiratory distress syndrome, Neuro-physiological Facilitation, Perioral stimulation and Intercostal stretch

Introduction

Neonatal Respiratory Distress Syndrome (NRDS) is a common respiratory dysfunction seen in the neonates, mainly the preterm babies in their first 2 days of life with the prevalence of 7%[1], although there is an increment in its incidence which is parallel to the descending gestational period.[2] Pulmonary Surfactant plays a major role in the reduction of the surface tension.[3] Primarily, the surfactant prevents lung collapse or atelectasis during the end respiration as it lines the alveolar sacs that subsides the surface tension, any insult to the pulmonary surfactant or its molecular composition may lead to NRDS in neonates.[4]

NRDS presents with specific clinical signs such as expiratory grunt, nasal flaring, cyanosis, apnoea for few hours and the respiratory rate shows a remarkable rise of more than 40 breaths per min with inspiratory indrawing.[5] There are various investigatory methods for NRDS such as chest X-rays showing a peculiar opaque ground glass appearance & presence of air bronchograms, arterial blood gas analysis, also recent studies have concluded that lung ultrasound can also help in the diagnosis of NRDS.[6]

Chest physiotherapy is a vast term inclusive of various physiotherapeutic manures such as postural drainage that aims for the airway clearance by

removal of secretions consisting of chest percussion, vibration & later followed by suctioning in neonates.[7] Chest physiotherapy in preterm neonates with NRDS will help in improving the ventilatory support and is a preventive measure for the secretions to get accumulated.[8]

Premature delivery is the commonest cause of NRDS that leads to the admission in the NICU, where the body positioning is the most important technique including various positions such as supine, prone, side-lying useful for improving exchange of gases & respiratory support in the preterm neonate.[9] The improvement in the oxygen saturation and increase in the tidal volume is best seen in the prone position[10] also in an intubated preterm neonate arterial blood gas analysis enhances in the side-lying position.[11]

Neurophysiological facilitation (NPF) of respiration, a technique of pulmonary rehabilitation that consists of proprioception over the chest with the simultaneous respiration, it helps in promoting the breathing reflex with facilitation of the respiratory muscles also shows its assistance in inspiration.[12] Intercoastal stretch elicits the strength of the intercoastal muscles that majorly helps in inspiration resulting in enhancing the respiratory cycle.[13] Perioral stimulation in a preterm neonate helps in promoting the sucking reflex and the swallowing rate which will further result in an increase in the air entry and will improve the respiratory function. [14]

Methods

A single retrospective care was used to investigate the objectives of this study. This case report adhered to the CARE reporting guidelines.[15]

Case Description

A baby of 2 days old came to the hospital with a chief complaint of decreased respiratory functions & unstable vitals. The baby was immediately intubated in the NICU. Post-admission in NICU, various investigatory procedures such as chest X-ray that was suggesting right side lung collapse, H.R.C.T scan revealing diffused ground glass opacity in both the lungs were performed. An intercostal drain was inserted immediately. Later, the baby was stable and the culture was sent to the laboratory for further investigations. The culture came negative & the baby was shifted on a non-invasive ventilator to Continuous Positive airway pressure mode (CPAP). The intercoastal drainage was removed but the neonate's distress showed a slight increase and again the baby was immediately intubated and was kept on an invasive ventilator. The culture was again sent to the laboratory for retesting, the culture came positive with Klebsiella Pneumonia. The vital parameters of the baby were fluctuated, oxygen saturation was below 90, respiratory rate was 56 breaths per minute & the heart rate was above 160 beats per minute. After looking at the various investigatory procedures and tests the baby was given physiotherapy treatment which was for 15 days with the consent of the parents and under the observation of the doctors.

Intervention

Pulmonary rehabilitation including chest physiotherapy, neurophysiological facilitation of respiration that is perioral pressure & intercostal stretch simultaneously and body positioning was given to the patient. Before commencing the treatment protocol, pre-vitals were noted from the monitor.

Firstly, chest physiotherapy inclusive of chest percussion with finger tips and chest vibration was given for descension of the secretions.

Neurophysiological facilitation of respiration including perioral stretch that is the pressure applied by the therapist's finger on the philtrum (between nose & upper lip), pressure is maintained until the patient breathes in an activated pattern with the frequency of perioral stimulation is 10 to 15 times, simultaneously intercostal stretch that is a pressure applied over the border of the upper rib so it can stretch the downward intercostal muscle and facilitate the respiration. The pressure is applied in a downward direction during the time of exhalation for 15 to 20 minutes. The chest expansion and the respiratory rate has to be noted after this manure.

Lastly, the body positioning of the patient is done by getting the patient in side-lying (right side lobe affected) by log rolling method and was maintained for 30 minutes.

Volume 5, Issue 5; September-October 2022; Page No 398-402

Figure 1: Neonate in right side elevate position with intercostal drain & on O2 support in an intubater

Result

After the 15 days of protocol, vital parameters of the neonate showed stability and his condition was improved. The pre vitals that are SPO_2 on ventilator & heart rate were 90 & 160 respectively. Post 15 days of treatment, the vitals were SPO_2 without oxygen support was 98 & heart rate was 117. Thus, pulmonary rehabilitation including chest PT, intercostal stretch & perioral pressure simultaneously & body positioning helped in decreasing the respiratory distress and improved the pulmonary function of the baby.

Table 1: Pre & Post treatment results

Vital Parameters	**Pre - treatment vital**	**Post – treatment vitals**
Oxygen saturation	90 (ventilator)	98 (without oxygen support)
Respiratory rate	56 breaths per minute	32 breaths per minute
Heart rate	150 beats per minute	117 beats per minute

Volume 5, Issue 5; September-October 2022; Page No 398-402

Figure 2: X-ray done before treatment protocol

Figure 3: X-ray done after 15 days of treatment protocol

Discussion

This studied is carried out in order to assess the effectiveness of neurophysiological facilitation of respiration that is perioral stimulation & intercostal stretch simultaneously on a neonate with respiratory distress syndrome.

Previous studies have concluded that neurophysiological facilitation (NPF) of respiration have shown positive results in enhancing the respiratory capacity and oxygen saturation in the patients with COVID those who later developed respiratory distress syndrome as a complication.[16]

Perioral stimulation in a preterm neonate has been proved as an effective technique in improving the pulmonary function in a neonate by eliciting the sucking reflex in a neonate that later helps in the function of swallowing which increases the air entry into the upper respiratory tract and lastly enhances the pulmonary capacity of the neonate.[17]

Intercostal stretch helps in facilitating the intercostal muscles which are the prime muscles of inspiration, also helps in improving the chest expansion that later improves the respiratory vitals such as respiratory rate, oxygen saturation and lung volume and capacities.[18]

In the above case, both the facilitatory techniques were simultaneously performed on the neonate, by reviewing the previous studies and their results we hypothesized that both these techniques will help in improving the pulmonary function and stabilizing the vitals in this case as well.

Conclusion

This study conducted that Neurophysiology facilitation of respiration that is simultaneous perioral stimulation with intercostal stretch showed a positive impact on respiratory distress syndrome. The above facilitatory technique also contributed in stabilizing the vital parameters & improving the pulmonary function.

Volume 5, Issue 5; September-October 2022; Page No 398-402

References

1. Luo j, chen j, li q, feng z. Differences in clinical characteristics and therapy of neonatal acute respiratory distress syndrome (ards) and respiratory distress syndrome (rds): a retrospective analysis of 925 cases. Medical science monitor: international medical journal of experimental and clinical research. 2019;25:4992.
2. Sweet dg, carnielli v, greisen g, hallman m, ozek e, plavka r, saugstad od, simeoni u, speer cp, halliday hl. European consensus guidelines on the management of neonatal respiratory distress syndrome in preterm infants–2010 update. Neonatology. 2010;97(4):402-17.
3. Goerke j. Pulmonary surfactant: functions and molecular composition. Biochimica et biophysica acta (bba)-molecular basis of disease. 1998 nov 19;1408(2-3):79-89.
4. Bahadue fl, soll r. Early versus delayed selective surfactant treatment for neonatal respiratory distress syndrome. Cochrane database of systematic reviews. 2012(11).
5. Segal s, graham bd. Respiratory-distress syndrome in the newborn. Clinical obstetrics and gynecology. 1962 mar 1;5(1):123-40.
6. Liu j, cao hy, wang hw, kong xy. The role of lung ultrasound in diagnosis of respiratory distress syndrome in newborn infants. Iranian journal of pediatrics. 2014 apr;24(2):147.
7. Dulock hl. Chest physiotherapy in neonates: a review. Aacn advanced critical care. 1991 aug;2(3):446-50.
8. Tudehope di, bagley c. Techniques of physiotherapy in intubated babies with the respiratory distress syndrome. Journal of paediatrics and child health. 1980 dec;16(4):226-8.
9. Thabet am, zaki na. Effect of positioning on respiratory system function of preterm neonate with respiratory distress syndrome. Assiut scientific nursing journal. 2018 aug 1;6(14):160-6.
10. Gouna g, rakza t, kuissi e, pennaforte t, mur s, storme l. Positioning effects on lung function and breathing pattern in premature newborns. The journal of pediatrics. 2013 jun 1;162(6):1133-7.
11. Schlessel js, rappa ha, lesser m, harper rg. Pulmonary mechanics and gas exchange: effect of lateral positioning during recovery from respiratory distress syndrome. Pediatric pulmonology. 1993 jan;15(1):36-40.
12. Emchrc p, giri ju. Efficacy of retraining diaphragm by proprioceptive neuromuscular facilitation versus diaphragmatic breathing exercises in reducing dyspnoea in the copd patients.
13. Nitz j, burke b. A study of the facilitation of respiration in myotonic dystrophy. Physiotherapy research international. 2002 nov;7(4):228-38.
14. Amer hw, rashad hm, dabash sa, el din zm. Effect of prefeeding oral stimulation program on preterm infants' feeding performance. Journal of biology, agriculture and healthcare. 2015;5(16):14-9.
15. Riley ds, barber ms, kienle gs, aronson jk, von schoen-angerer t, tugwell p, kiene h, helfand m, altman dg, sox h, werthmann pg. Care guidelines for case reports: explanation and elaboration document. Journal of clinical epidemiology. 2017 sep 1;89:218-35.
16. Kumar s, potturi g, kushwaha a, kumar p, singh sp. Correlation of dyspnea with age and spo2 levels in covid-19 and effectiveness of neurophysiological facilitation in the management of dyspnea-a randomized clinical control trail. Egyptian journal of physical therapy. 2020 dec 1;4(1):25-31.
17. Salem es, el-tohamy ma, darwish os. Effectiveness of sensorimotor stimulation on oral feeding skills in preterm neonates. Med. J. Cairo univ. 2016 jun;84(1):493-8.
18. Ashtankar ap, kazi a. Comparative effect of proprioceptive neuromuscular facilitation (pnf) and chest physiotherapy with chest physiotherapy alone on sp02, heart rate, respiratory rate, & lung compliance in mechanically ventilated patient. J. Pharm. Sci. & res. 2019;11(10):3514-8.

Volume 5, Issue 5; September-October 2022; Page No 398-402