ORIGINAL RESEARCH PAPER

Volume-8 | Issue-8 | August - 2019 | PRINT ISSN No. 2277 - 8179

INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

ROLE OF CHEST PHYSIOTHERAPY IN MECONIUM ASPIRATION SYNDROME: A CASE STUDY

Physiotherapy

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ABSTRACT

Neonate of 40 weeks of gestational age with LSCS delivery admitted with complaints of respiratory distress diagnosed as meconium aspiration syndrome. The respiratory distress was increased and lead to left side of pneumothorax. Chest physiotherapy was started including postural drainage techniques. Regular chest physiotherapy played a significant role in improving and maintaining the lung function.

KEYWORDS

Chest physiotherapy, Meconium aspiration syndrome, Respiratory distress, NICU, Neonate

INTRODUCTION:

A Neonatal Intensive Care Unit (NICU) is a specially equipped nursery where critically ill and unstable infants receive diagnostic, therapeutic and life support care for a wide range of illnesses and conditions. A NICU is for those infants, who are preterm, have low birth weight, or perinatal problems, congenital abnormalities, respiratory disorders, and neuromuscular disorders.[1] Meconium Aspiration Syndrome (MAS) is an important cause of morbidity and mortality among term newborns. It is one of the most common causes of respiratory morbidity in term newborns requiring NICU stay.[2]

Physiotherapy is a part of the services delivered by the interdisciplinary team in the NICU. Chest physiotherapy treatment mainly focused on airway clearance techniques includes techniques like percussion, vibration, positioning for postural drainage and airway suctioning. It is also useful to re-expand collapsed segments of the lungs, maintain adequate levels of oxygenation, facilitate early weaning, and reduce the chances of re-intubation.[3]

CASE DESCRIPTION:

4 hours old baby boy with 40 weeks of gestational age was born on 13th May 2019 with outside hospital LSCS delivery. The birth weight of the neonate was 3.4 kg and height was 52 cm. The head circumference was 35 cm. The APGAR score of 1 minute was 4/10 and of 5 minutes was 7/10. He was admitted to the NICU with chief complaints of respiratory distress and was diagnosed as meconium aspiration syndrome. Baby represented with the clinical features of respiratory distress with marked tachypnea, grunting, nasal flaring, and cyanosis soon after birth. He was intubated and was put on ventilator at SIMV mode. After 48 hours (2 days) of monitoring his respiratory distress was increased and lead to left side of pneumothorax. Arterial blood gas measurements typically demonstrated hypoxemia with acidosis and hypercarbia. Chest auscultation revealed rales and rhonchi. Chest x-rays (Figure 1) revealed complete opacification of left hemithorax. Bronchovascular markings were mildly prominent along with subtle diffuse reticulonodular shadows in bilateral lung fields. Soft tissue opacity was seen in bilateral upper and left mid zones suggestive of consolidation.

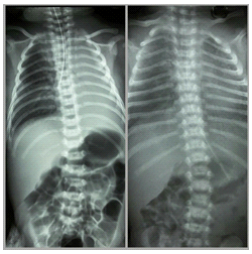

Figure 1: Chest x-rays

The pre (left) chest x-ray showed opacity of left hemithorax with subtle diffuse reticulonodular shadows in bilateral lung fields. The post (right) chest x-ray showed clear lung fields compared to pre chest x-ray

DISCUSSION:

The baby required intubation and mechanical ventilation (high frequency ventilation). Respiratory support was provided by oxygen administration by hood and nasal prongs. In this case of meconium aspiration syndrome, Chest Physiotherapy (CPT) was given in the form of chest percussions and vibrations.

TECHNIQUES:

Chest percussion: (Figure 2) was given by 3 fingers with the middle finger tented or a face mask striking repeatedly at a rate of 3 per second over that part of the bronchopulmonary segment which needs to be drained. The cupped hand tends to trap a cushion of air, which softens the blow while striking, and the air column inside the cupped hand causes effective dislodgement of the secretions in the underlying bronchus as the compression wave is presumably transmitted to the underlying bronchus and gravitational aid causes flow of secretions from the bronchus towards the glottis.[4]

Chest vibration: In this a rapid vibratory impulse is transmitted through the chest wall which helps to loosen and dislodge the airway secretions. Chest vibration is useful in pushing the loosened secretions along the bronchi to the trachea.[4] The mechanical chest vibrator was used with Neonatal AMBU face mask being the effective medium for proper intensity of vibrations. (Figure 2)

Figure 2: Chest physiotherapy treatment

The chest physiotherapy treatment included vibration with mechanical chest vibrator and chest percussion Postural Drainage Positioning: the baby was positioned in a side lying and prone position in between that employs gravity to move mucus centrally from the targeted lung unit and helps to loosen and dislodge the secretions from the bronchopulmonary segments.[5]

After the CPT treatment it was important to take out the secretions. The oropharyngeal and nasopharyngeal suctioning was done initially every 1 hour for initial 3 weeks followed by every 4 hours for next 1 week and then followed 3 times suctioning per day. The timing and the duration of the CPT was important. CPT was done twice a day preferably half an hour before meals and the total duration of the treatment was 30 minutes. Baby stayed for 40 days of duration in NICU. After the CPT and other treatment measures the lung fields were cleared in the x-rays. (Figure 1) Trachea and major bronchi appeared normal. The ABG analysis was normal and the baby was able to maintain the oxygen saturation at room air.

At the end I could conclude that the regular CPT played a significant

role in improving and maintaining the lung function of the neonate with meconium aspiration syndrome and it should be apply in clinical practice for effective treatment in respiratory distress syndrome.

Financial support and sponsorship: Nil
Conflict of interest: There are no conflicts of interest.

Acknowledgement:
I would like to thank the Neonatal Intensive Care Unit (NICU) and Physiotherapy Department of the Fortis Hiranandani Hospital, Vashi to conduct this study.

Addition of statement- A special thanks to baby boy Daivik!

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