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RELATION BETWEEN PULMONARY AIR LEAK AND MECONIUM ASPIRATION SYNDROME IN HEALTH CENTRES OF KARAIKAL

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ABSTRACT

Air leak syndrome is the overarching diagnosis for one or more pathologic air collections present outside of the respiratory tract. Air leak occurs in approximately 10% of neonates with MAS for many presumed reasons including ball-valve effect of the meconium, ventilation-perfusion mismatch, surfactant inactivation, and parenchymal injury. In this study we planned to evaluate the prevalence of air leak syndrome in meconium aspiration syndrome.

KEY WORDS - Air leak syndrome, meconium aspiration syndrome, Surfactant therapy

INTRODUCTION

Respiratory failure is a major cause of morbidity and mortality in neonatal critical care. During the past several decades, there has been substantial advancement in the area of neonatal respiratory care. The use of nasal continuous positive airway pressure (NCPAP), conventional mechanical ventilation (CMV), exogenous surfactant supplement, high-frequency oscillatory ventilation (HFOV), high-frequency jet ventilation (HFJV), and inhaled nitric oxide have improved the general outcome for neonates with severe respiratory failure of different causes. However, air leak syndrome is still present in critical neonates, even those neonates who have already undergone these advanced ventilatory techniques [1].

Air leak syndrome is defined as that phenomenon when air escapes from the tracheobronchial tree and collects in various body spaces where it is not normally present[2]. The escaping air

tracks along various pathways and localizes in different body spaces leading to different types of air leaks, including pulmonary interstitial emphysema (PIE), pneumothorax, pneumomediastinum, pneumopericardium, pneumoperitoneum, subcutaneous emphysema, and systemic air embolism[3].

Air leak occurs in approximately 15% - 30% of neonates with MAS for many presumed reasons including ball-valve effect of the meconium, ventilation-perfusion mismatch, surfactant inactivation, and parenchymal injury[4].

In recent studies, the risk of pneumothorax among ventilated babies during resuscitation with mechanical ventilation and positive pressure ventilation in meconium aspiration syndrome ranges between 10% and 24%[5].

Meconium can inactivate endogenous surfactants and can cause directdamage to the lung parenchyma, including necrosis and bleeding.

Risk factor for pneumothorax in preterm includes respiratory distress syndrome and pneumonia, risk factors in term babies are meconium, blood , pneumonia and congenital malformation leading to lung hypoplasia.

Spontaneous pneumothorax occurs in 0.07% of healthy newborns, and babies may present clinically from insidious change in vitals to cardiovascular collapse that accompanies a tension pneumothorax. Pneumothorax can be treated conservatively by oxygen supplementation in case of hypoxemia though unnecessary oxygen can leads to free radical damage. Also treated by needle aspiration and by chest tube drainage[6].

Surfactant therapy in nicu setting has markedly decreased the incidence of pneumothorax.

METHODS:

This study conducted in Paediatric Hospitals in Karaikal for period of 15 months between March 2021 to May 2022 in 30 meconium-stained babies presented as meconium aspiration syndrome.

It is a Hospital based cross sectional study done to study relation of pneumothorax in meconium aspiration syndrome babies

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Inclusion criteria

- Term babies delivered with meconium-stained amniotic fluid with respiratory distress (retraction or grunting).
- Babies showing features of meconium in respiratory tract on examination or on Chest x-ray with respiratory distress

Exclusion criteria

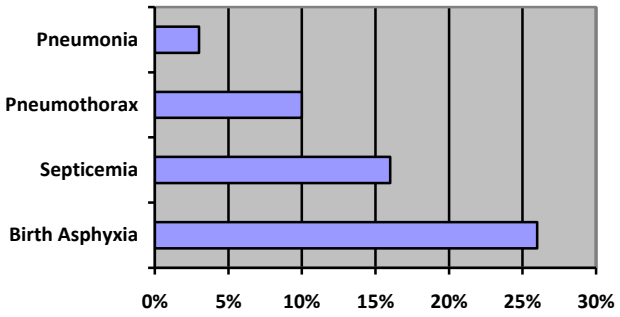
- Babies with congenital anomalies (anorectal anomalies, tracheoesophageal anomalies).
- Babies with clinically identified chromosomal anomalies (Meconium plug syndrome, Hirschsprung disease).
- Respiratory distress due to other etiology (Diaphragmatic hernia,
- Cardiopulmonary, hyaline membrane disease, Transient tachypnea of newborn)

METHODOLOGY:

At the time of birth examined colour of amniotic fluid if meconium-stained babies were included in study and graded the severity of MSL

Neonatal resusitaion were given according to Neonatal Resusitation Programme and monitored babies' vitals, APGAR, if presented with distress DOWNE score. Managed in NICU with oxygen through CPAP, ventilator according to requirements, IV fluids, IV antibiotics. 30 babies presented as MAS were analysed for complications.

STATISTICALANALYSIS:



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COMPLICATIONS	F	Percentage
Birth Asphyxia	8	26%
Septicemia	5	16%
Pnemothorax	3	10%
Pulmonary Hypertension	-	-
Pneumonia	1	3%

RESULTS

In our study out of 30 babies, 8 were assessed with complication of Birth Asphxia(26%), 5 (16%) patients were assessed with complication of Septicemia, 3 (10%) babies were assessed with complication of Pnemothorax, 1 (2%) baby was assessed with complication of Pneumonia. Thus finally, out of 30 MAS babies, 3 babies presented with complication of pneumothorax which accounts for 10%. Thus, there is relation of pulmonary Airleak with meconium aspiration syndrome

DISCUSSION: Pneumothorax most often occurs in newborns with stiff lungs, such as newborns who have respiratory distress syndrome (especially if due to prematurity) or meconium aspiration syndrome.

Infrequently, it occurs as a complication resulting from the use of continuous positive airway pressure (CPAP a technique that allows newborns to breathe on their own while receiving slightly pressurized air or oxygen) or a ventilator (a machine that helps air get in and out of the lungs). A pneumothorax can result in the collapse of the lung and difficulty breathing. If air collects in the space between the lung and the chest wall, the veins that bring blood to the heart gets compressed. As a result, only less blood fills the chambers of the heart, cardiac output decreases, and the newborn's blood pressure decreases [6].

Pneumothorax can occasionally happen spontaneously in newborns who do not have underlying lung disorders or who do not need breathing support.

Air can leak out of the lungs and into other tissues. These disorders are called air-leak syndromes[7].

Air that comes out from the lungs into the tissues in the centre of the chest is called pneumomediastinum. Distinguishable pneumothorax, this condition usually does not affect breathing and does not require treatment. Different air-leak syndromes include pulmonary interstitial emphysema (air in the tissues of the lungs between the air sacs), pneumopericardium (air in the sac which surrounds the heart), and occasionally pneumoperitoneum (air in the abdominal cavity) and subcutaneous emphysema (air under the skin) [8].

Early detection is the best defence in preventing MAS. Fetal monitoring before delivery can determine whether your baby is experiencing stress. Your doctor can take steps to alleviate fetal distress during labour and reduce the potential for MAS to develop. And if your baby is undergoing stress, your doctor will be prepared to evaluate and treat your baby right away if there exist signs of MAS.

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