

MECONIUM ASPIRATION SYNDROME: AN EXPERIENCE IN NEONATOLOGY DEPARTMENT OF CHILDREN HOSPITAL LAHORE

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ABSTRACT

Objectives: To determine the frequency of complications like air leak syndrome and persistent pulmonary hypertension (PPHN) in neonates with meconium aspiration syndrome in Children Hospital Lahore.

Methods: A descriptive cross sectional study was conducted in Neonatology Department of Children Hospital, Lahore from 10th august 2013 to 10th February 2014. All patients having meconium aspiration syndrome (MAS) who survived with age <28 days were included and those patient who were having MAS but were treated in emergency or those who could not survived were excluded from the study. A total of 150 patients were enrolled in the study. Data were collected on a predesigned profarma and analyzed using SPSS software version 18. Data were then presented in the form of figures.

Results: Out of 150 patients, 63 babies (42%) developed PPHN and 22 babies (14.6%) suffered from air leak syndrome. There were 102(68%) male patients and 48(32%) patients were female patients. 88 patients (58.6%) were born at term and 62 patients (41.3%) were post term.

Conclusions: Pulmonary hypertension was the most common complication followed by air leak syndrome. It was more common in male patients as compared to females.

Key words: Meconium aspiration syndrome, Persistent pulmonary hypertension of newborn, Pneumothorax

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INTRODUCTION

Meconium aspiration syndrome (MAS) is a disease characterized by respiratory distress and cyanosis after inhalation of meconium into respiratory tract. It is commonly seen in term and post term babies. Meconium is normally stored in the neonate's intestine until after birth but sometimes during prolonged and difficult deliveries, infant often expels meconium into amniotic fluid. This decreases oxygen supply through placenta, as a result, neonate often initiates vigorous respiratory movements in-utero to overcome this problem¹.

Fetal distress during labor causes intestinal contractions, as well relaxation of the anal sphincter, which allows meconium to pass into the amniotic fluid. Factors that promote the passage of meconium in utero include placental insufficiency, maternal hypertension, diabetes mellitus, post term pregnancy, poor biophysical profile, intra uterine growth retardation, abnormal fetal heart rate pattern, eclampsia / pre eclampsia, oligohydramnios and maternal drug abuse, especially of

tobacco and cocaine. But, perhaps, the most significant factor is post term delivery. In one prospective study, a decrease in incidence of MAS from 5.8% to 1.5% over an 8 year period was attributed to a reduction in births at more than 41 weeks of gestation². After birth, rapid or labored breathing, cyanosis, slow heartbeat, a barrel-shaped chest or low Apgar score are all signs of the meconium aspiration syndrome^{1,2}.

In the presence of fetal distress, infant born with meconium, only requires oro-nasal suctioning, oxygen inhalation and monitoring. Depressed infants (those with hypotonia, bradycardia or apnea) and those delivered through thick meconium should undergo endotracheal intubation and suction should be applied to endotracheal tube to remove meconium from airway^{3,4}. At least one third of infants with MAS require intubations and mechanical ventilation⁵. Newer neonatal therapies, such as inhaled nitric oxide, high frequency ventilation, surfactant administration and extracorporeal membrane oxygenation (ECMO) are often brought into play⁶.

Meconium aspiration syndrome is one of the im-

portant causes of neonatal respiratory problems eventually leading to increased neonatal morbidity and mortality. Important complications include air leaks (pneumothorax, pneumomediastinum), persistent pulmonary hypertension of newborn (PPHN), sepsis and respiratory failure. Apart from complications of MAS, there are other co-morbid conditions like birth asphyxia and certain therapeutic interventions (mechanical ventilation) which increase the toll of morbidity.

Various studies have been performed in past to evaluate every aspect of MAS, from risk factors to morbidity patterns and from newer treatments to preventive strategies. In this study, the aim was to assess the frequency of complications like PPHN and air leak syndromes in early days of life of infant with MAS and to know the magnitude of this problem so that facilities for early detection and management may be introduced that will help in reducing the burden of disease in the form of complications and associated mortality.

METHODOLOGY

A descriptive cross sectional study was conducted in neonatology ward of Children Hospital Lahore from 10th August 2013 to 10th February 2014. The study was conducted after taking approval from the hospital research and ethical committee. MAS was diagnosed if patient was having respiratory distress (respiratory rate >60/min) and cyanosis ($S_pO_2 < 87\%$). PPHN was diagnosed as patient with MAS and loud 2nd heart sound supported by echocardiography. Similarly air leak syndrome was diagnosed if a neonate with MAS having decreased air entry on one or both sides of chest and supported by x-ray chest having lung collapse and tracheal deviation. All the patients having MAS who survived and <28 days of age and patients of either sex were included in the study. All those patients having meconium aspiration syndrome who could not survive and age above 28 days were excluded from the study. A total of 150 patients were enrolled in the study with 95% confidence level, 5% margin of error and taking expected percentage of airleak syndrome as 9.6% during this period fulfilling the inclusion and exclusion criteria.

Patients fulfilling the inclusion criteria were enrolled in the study. After taking informed consent from parents, the neonates were examined for meconium staining, tachypnea and cyanosis. Chest X-Ray and echocardiography were performed to look for complications of MAS. Oxygen saturation were checked by oxygen saturation probes and arterial blood gases. All this information was recorded on a pre designed proforma. The data was entered into computer and analyzed using statistical package for social sciences (SPSS) 18. The data was described in terms of mean \pm SD (standard deviation) for quantitative variables like age. Frequencies and percentages were given for qualitative variables like

air leak syndrome and pulmonary hypertension. Graphs were presented for both qualitative and quantitative variables.

RESULTS

Out of 150 patients, there were 102(68%) male patients and 48(32%) patients were females. A total of 118 (78.6%) babies were discharged and 32 babies (21.4%) expired. 88 patients (58.6%) were born at term and 62 patients (41.3%) were post term.

Caesarean section was the most frequent mode of delivery in patients with MAS (56%). Other modes are shown in Figure 1.

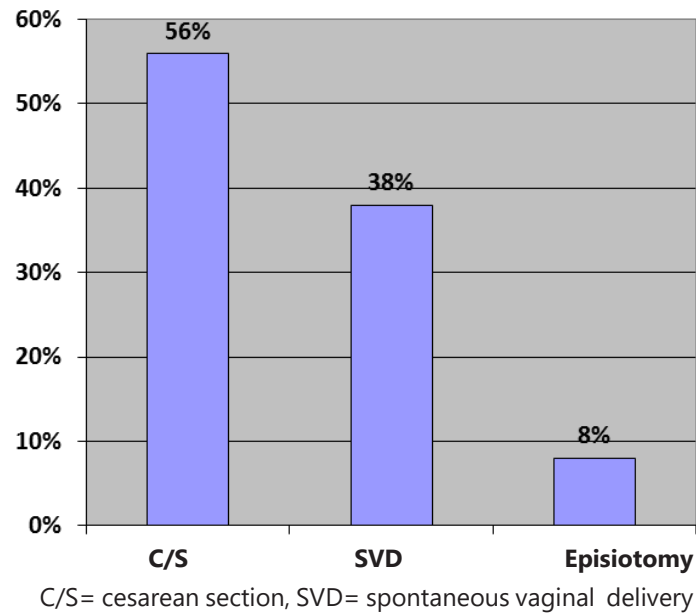
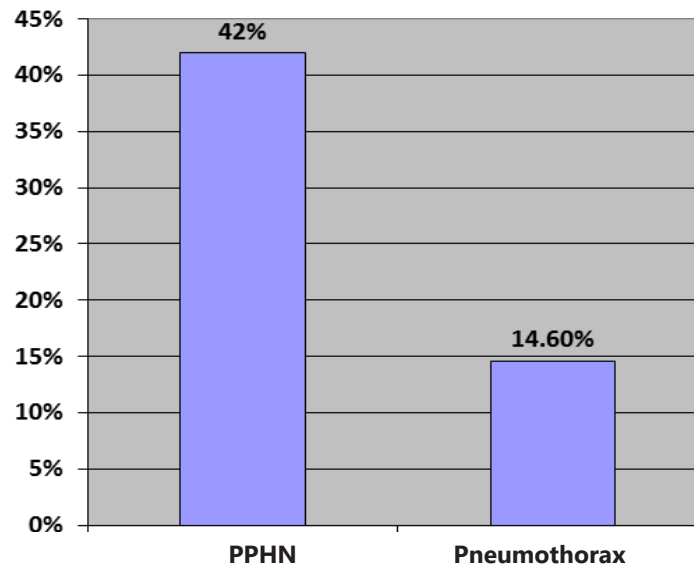
Persistent pulmonary hypertension (PPHN) developed in 63 (42%) babies. Complications in patients with MAS are shown in Figure 2.

DISCUSSION

Despite so much obstetrical and neonatal care, MAS continues to be neonatal respiratory disorder with high morbidity and mortality in Pakistan. Meconium aspiration syndrome (MAS) is a problem found all over the world, irrespective of race and ethnicity. MAS is a major issue regarding respiratory morbidity in neonatal intensive care units (NICU) everywhere in the world but has been efficiently dealt, with proper antenatal obstetrical care and better facilities available for post-natal management of newborns like extracorporeal membrane oxygenation (ECMO). In Pakistan, it has been a leading cause of admissions in NICU, found to be the 5th in list in a study done by Parkash et al¹⁰ in Karachi after infections, asphyxia, jaundice and prematurity. In Pakistan, health facilities are still not enough and limited only to developed cities so there is substantial morbidity and mortality caused by this condition.

In this study, the objective was to assess the spectrum of complications, which arise in newborns admitted with MAS particularly PPHN and pneumothorax. Most common complication observed was persistent pulmonary hypertension of newborn (PPHN) 42% in babies admitted. According to study by Razaq⁷ in Multan Children Complex, the frequency of PPHN was 35.5% where as another study by Dargaville et al¹¹ showed that the frequency of PPHN is 47.5%.

Pneumothorax was found to be the 2nd most arisen complication, seen in 14.6% of babies, which is close to a study done by Razaq⁷, where it was 13.3%. However in a study done by Greenbough et al⁹, it was shown to be 15-33% in infants with MAS. Our study differs from this international study, perhaps due to less use of mechanical ventilation, as this is an important risk factor for development of pneumothorax, and our unit does not have enough ventilatory support for these babies.

Figure 1: Case distribution regarding mode of delivery In MAS**Figure 2: Frequency of complications in MAS**

Mortality was found to be 21.4% in this study; it was very high as compared to 5% mortality shown by Velaphi et al⁸ in their study, and 20% by Razzaq⁷. Again it might be due to insufficient facilities for managing these babies, and also due to a large burden of neonates which our nursery is receiving apart from MAS.

This study also highlighted some other important variables like risk factors for MAS. The most common

was postmaturity (41.3%) which was similar to other studies which show an increase incidence of MAS after 40 weeks of gestation¹. It is important to note that avoidance of post mature pregnancy is a preventable factor in MAS. As far as good outcome is concerned, combined obstetric and paediatric care can lead to prevention and reduced severity of meconium aspiration syndrome with low complication rate and decrease mortality.

CONCLUSION

Pulmonary hypertension was the most common complication followed by air leak syndrome. It was more common in male patients as compared to females.

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CONTRIBUTORS

IK conceived the idea, planned the study, and drafted the manuscript. HG helped acquisition of data, did statistical analysis and critically revised the manuscript. All authors contributed significantly to the submitted manuscript.