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MECONIUM ASPIRATION SYNDROME AND THE HEALTH RISKS ASSOCIATED WITH IT IN INFANTS DELIVERED

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ABSTRACT:

Aim: Meconium-stained amniotic fluid was related to fetal discomfort and, if untreated, may have deadly consequences. To identify risk factors and potential therapeutic approaches, researchers examined data from hospital births.

Methods: Between June 2020 and May 2021 in Holy Family Hospital, Rawalpindi, every live birth that took place at the facility was examined for potential confounders, health results, and therapy options for meconium aspiration disorder.

Results: 173 out of 2450 live births, or 68 per 1100 live births, contained amniotic fluid that was contaminated with meconium. 23 (7.8%) of 165 patients with MSAF had MAS. Six (24.82%) of the 20 MAS patients required CPAP assistance, and five (18.05%) required mechanical ventilation. In the current investigation, there was just one fatality.

Conclusion: As per our research, several health conditions for meconium aspiration disorder include elevated maternal age, pre-term in addition post term pregnancy, oligohydramnios, small for gestational age, preterm membrane rupture, and APGAR score 8.

Keywords: Meconium-Stained Amniotic Fluid, Fetal Discomfort, Therapeutic Approaches.

INTRODUCTION:

As per Greek literature, "monoanion" means "opium like," which is a connection to the substance's tarry look as well as the assumption that it causes sleepiness in the developing baby. Aristotle made this comparison [1]. The introduction of meconium into amniotic fluid throughout labor stays considered to be one of classic signs of fetal suffering [2]. This phenomenon remains linked to a higher risk of perinatal death and mortality [3]. It is well established that MSAF is connected to a number of risk factors that are present in mothers and newborns [4]. Meconium has a long history of being regarded as an unreliable indicator of fetal fate and a contributor to meconium aspiration disorder [5]. For this reason, the treatment of newborn meconium aspiration disease is and will continue to be a primary focus for obstetricians and neonatologists. Over the course of the last few years, the management of

MSAF has undergone significant evolution in response to the findings of the national resuscitation program [6-15]. The main purpose of our current research is to gain the deeper sympathetic of maternal also newborn aspects related through meconium-stained amniotic fluid, which can ultimately result in meconium aspiration syndrome, as well as the potential treatments for this condition [17-21]. The main goals of this research were to determine occurrence of MAS in infants who were born having MSAF, to identify maternal and neonatal risk factors related wit MAS, and to assess occurrence of MAS in infants who were born through MSAF [22].

METHODOLOGY:

For the purpose of this research, researchers included all of the babies who've been delivered to moms who had meconium-discolored amniotic fluid in the labor room and operation theatre. A case series was utilized for this investigation. The study was conducted in Holy Family Hospital, Rawalpindi. The research was carried out during the course of the year beginning in June 2020 and ending in May 2021. It was necessary to get clearance from the institution's ethics committee. The criteria for eligibility were as follows: all newborn infants whose mothers had meconium-stained amniotic fluid and all newborn infants who had meconium-stained skin, nails, or cords at birth. Babies who were born with congenital abnormalities such as congenital heart disease or metabolic illnesses such as inborn errors of metabolism were not allowed to participate in research. Both the results and the variables contributing to the danger were evaluated. Only those infants who were delivered to women whose amniotic fluid was stained with meconium were given the complete prenatal and natal history, as well as a comprehensive examination findings and investigations that were carried out in accordance with a prescribed form. Newborn infants who were having trouble breathing were sent to the NICU and monitored there.

RESULTS:

Approximately 2,380 of the live births that were documented at the facility between June 2020 and May 2021 have been taken into account, and none of the babies born during that time period had any congenital abnormalities or inborn metabolic problems. There were 172 cases of meconium-stained amniotic fluid among 2450 live births, which is equivalent to 69 cases for every 1100 live births. MAS was present in 23 of the 165 patients who were diagnosed with MSAF (7.8%). There were 95 male cases and 71 female cases, with male cases representing for 58.3% of the total and female cases representing for 44.6% of the total. According to the findings of our research, 7.8% of patients had MSAF. According to the findings of this research, term newborns seem to have a significant advantage. There have only been four documented examples of after term deliveries. According to the findings of this research, 3.6% of infants born beyond their due date have MSAF. This is likely the result of an increase in the number of cases that have been scheduled, as well as frequent prenatal checkups and prompt care in the event that the amniotic fluid is stained with meconium. The occurrence was seen more often in the small for gestational age group as well as the suitable category, while the big for gestational age category did not have any occurrences. According to the findings of our research, the most common maternal factors associated with MAS are

post term pregnancy (51%), followed by oligohydramnios (26%). There was a total of 22 patients diagnosed with MAS, of whom 6 (24.82%) required CPAP assistance and 5 (18.05%) required mechanical breathing. There was a total of 24 instances of MAS, and 21 (or 94.23%) of those patients were released. Within the scope of this particular investigation, there was only one fatality. This is likely the result of a small sample size and the use of institutional care.

Table 1:

	Post-term	Pre-term	Total
AGA	0	55 (34.38%)	55 (34.38%)
LGA	0	0	0
SGA	4(2.5%)	101 (63.12%)	105(65.62%)

Table 2:

Oligohydramnios	MAS		Total
	No	Yes	
No	120	16	136
Yes	23	9	32
Total	143	25	168

DISCUSSION:

MAS has an increased incidence among term and near-term newborns, and it is linked to a large amount of respiratory discomfort in premature children [23]. In a medical setting, the first signs of respiratory depression include decreased lung compliance and hypoglycemia. On a radiographic image, the first signs of respiratory distress appear as patchy pacification and lung hyperinflation [24]. Changes are brought about in the fetal muscular medium of the pulmonary arteries as a result of this factor. A third of babies and children who have MAS needs respiratory aid in form of intubation in addition mechanical ventilation, as well as fresher newborn treatments, including very high-frequency ventilation, inhaled nitric oxide, also surfactant administration. Those forms of provision are provided through medical professionals [25]. Meconium aspiration disorder remains the complicated condition that most often affects newborns who are tiny for their gestational age, who were born post-dates, or who experienced fetal discomfort. Previous research has shown that MSAF affects 11-17% of all births [26-32].

It is estimated that MAS causes delays in around 6% of these deliveries. Extremely few premature newborns are diagnosed with MSAF every year. The majority of children with meconium staining are post mature and have a modest size for their gestational age. Many babies having MSAF are at least 38 weeks old. The presence of MSAF is linked to an increased risk of respiratory problems, and roughly 53% of newborns diagnosed without MSAF need mechanical ventilation [33]. Babies born have MAS have a significantly increased risk of both morbidity and death. In a tertiary care center, the consequences of this

condition claim the lives of around 6% of newborns who have been diagnosed with it, and the same amount endure to require supplementary oxygen after 28 days [34]. The dearth of population-based research and the challenges of collecting large cohorts of newborns with proven illness have made it impossible to get a comprehensive picture of the epidemiology of MAS. In research conducted the biggest research that has been completed to this point and reported on 178,500 newborns who were cared for at military medical facilities between the years 2018 and 2020 [35]. During these 14 years, there were between 4 and 9 percent of newborns who had meconium-stained amniotic fluid. In addition, there have been about 5 and 10 per 1100 live births of infants who had MAS. The total frequency of MSAF has been shown to vary from 6.7% to 25.7% (with 15% as the median) among all deliveries in more recent research [36-38]. MSAF may be regarded as a distinct marker of fetal distress because that can anticipate a worse postpartum result even in pregnancies that are considered to be at a low level of risk overall [39].

11.6% of newborns who were born having MSAF had MAS, and there was a death incidence of 13% in this group. On the other hand, the prevalence is between 3 and 5% in newborns in whom urgent endotracheal suctioning is conducted. The rate of death associated with MAS has been observed to range anywhere from 0% to 33%. The broad range of outcomes may be attributed to the care provided in delivery rooms. Newborns born having MSAF have a greatly increased risk of developing serious mental impairment and cerebral palsy compared to other infants [40]. Recently, there has been a focus on the critical need to enhance the standard of care provided to newborns by primary care providers. Further research into intrapartum and postnatal treatment methods might benefit from the advance screening of babies who are at danger for meconium aspiration syndrome (MAS). There have been quite a few discoveries made on intrapartum lifestyle factors for meconium aspiration disorder; however, no instrument that is accurate or sensitive enough to estimate danger has been established [41]. There is a number of different variables that contribute to an increased probability of meconium expulsion in pregnancy. The following conditions are included: hypoxia, placental inadequacy, preeclampsia, maternal hypertension, parental DM, maternal smoking, post term pregnancy, oligohydramnios, and intrauterine restriction of growth. The likelihood of a newborn born via MSAF having MAS is raised when the newborn has a heavy MSAF, is an only child, has fetal heart rate irregularities, was delivered through caesarean section, or has a poor Apgar score [42].

The prevalence of meconium in the amniotic fluid of neonates, both preterm and full-term, is thought to enhance the likelihood that the fluid may yield positive cultures. It is noteworthy that research that evaluated the evolution of sepsis in infants having MSAF failed to reveal a link between the two conditions [43]. There have been at least three randomized control trials that have concluded that regular antibiotic prophylaxis is not something that should be administered to patients without any prenatal lifestyle aspects in treatment of MAS. Antibiotic treatment did not have any effect on the diagnostic workup or outcome associated with an infection in MAS patients who did not have any prenatal health conditions. There is a possibility that the use of antibiotics in the treatment of MAS has to be reevaluated in studies

that are more comprehensive. The prophylactic usage of antibiotics in MAS did not assist lower the number of infections, unless there was a considerable risk for infection. If there is a suspicion of infection and antibiotic treatment is begun as a consequence of perinatal health conditions, you may want to think about stopping the antibiotic treatment after the findings of the blood culture are negative [44].

Extracorporeal Membrane Oxygenation has been utilized as the last resort rescue treatment for newborns diagnosed having MAS who have extreme hypoxemia that is resistant to other treatments. Because HFV and iNO are now readily available, the number of patients requiring ECMO in industrialized nations has considerably dropped. Approximately 37 percent of infants in the general population of neonates who need ECMO are infants who have MAS. The survival rate has gotten close to 96% for babies who've been treated with ECMO after being diagnosed having MAS. People diagnosed having MAS who were deemed eligible for ECMO had the best survival rates (almost 91%), according to the ECMO registry [45].

The inhibitory action of meconium varies in intensity according to the dosage. Consequently, low quantities of surfactant are substantially more susceptible to inhibition compared to large amounts of surfactant. In animal models of MAS, the administration of surfactant has been shown to have some positive benefits that have been reported. In new babies and adolescent rats having experimental meconium aspiration, therapy with the medically advised dosage of Cur surf enhances lung compliant, gas exchange, and alveolar expansion. However, it does not help to restore lung physiology [46].

Since the intricate changed pulmonary physiology that results from atelectasis also regions of hyperinflation, in conjunction through airway concession also ventilation perfusion mismatch, mechanical care of the newborn through MAS may be difficult. Babies diagnosed have MAS almost always need mechanical ventilation, and an extra 13% of these infants also require continuous positive pressure. The degree of assistance provided by the ventilator is related to the extent of the patient's respiratory distress. There are some babies who merely need oxygen supplements. In babies diagnosed having MAS, applicants for mechanical ventilation assistance are often thought to be children who have hypercarbia, hypoxemia, or acidosis in an oxygen-enriched atmosphere through an inspired oxygen fraction of more than 0.7 [47].

CONCLUSION:

At the time of birth, the presence of amniotic fluid that is stained with meconium is a possible indicator of fetal impairment. MSAF remains recognized to remain related through a variety of maternal and newborn adverse outcomes, including hypoxia, placental weakness, preeclampsia, maternal hypertension, maternal diabetes mellitus, maternal smoking, institutional reforms pregnancy, oligohydramnios, and intrauterine growth restrictions. Meconium aspiration sickness remains very dangerous illness that may sometimes be avoided by taking precautions. It most often affects term and post-term infants. Utilization of tadalafil, ventilators, antibiotics, and extracorporeal membrane oxygenation have all contributed to significant shifts in MSAF management during the last many years.

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