

Outcome of Neonates Delivered through Meconium Stained Amniotic Fluid

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Abstract

Background: Meconium stained amniotic fluid usually associated with the significant neonatal morbidity and mortality, prevention of neonatal complications related to meconium is a major aim for obstetricians and neonatologists.

Aim: To evaluate newborn babies born with meconium stained amniotic fluid and to observe that this condition is associated with neonatal morbidity and mortality.

Method: This prospective study was conducted in the Neonatal Intensive Care Unit (NICU) at Duhok Obstetrics and Gynecology Teaching Hospital and Kurdistan Private Hospital in Iraqi Kurdistan between May 2017 to April 2020. Newborn babies born with the history of meconium staining amniotic fluid (MSAF) were selected and divided into 2 groups thick meconium and thin meconium. Baseline characteristics of these cases were recorded. risk factors and the mode of delivery were determined. Clinical outcome examined were admitted to NICU, duration of NICU stay, mortality of neonates was recorded as well as morbidity.

Results: During the study period, a total of 150 newborns had meconium stained amniotic fluid. Thick meconium stained liquor was observed in 83 cases (55.33%), while 67 cases (44.66%) had thin meconium. Eighty- one cases (54%) were male and 69 cases (46%) were female, 48 cases (59.25%) of male babies had thick meconium, while 33 cases (40.74%) stained with thin meconium. Incidence of cesarean section was more in thick meconium stained amniotic fluid (67.27%) as compared to (32.72%) with thin meconium stained amniotic fluid. Post-term pregnancy was a major risk factor for thick meconium stained liquor with an incidence of (65.38%). Eighty babies were admitted to NICU. Majority of NICU admission cases were seen among babies with thick meconium. Birth asphyxia and Meconium aspiration syndrome were the main causes for NICU admission. Incidence of neonatal death was (2%).

Conclusion: Meconium stained amniotic fluid, especially thick meconium stained liquor increases the rates of caesarean delivery, NICU admission and neonatal morbidity and mortality. Coordination of care between the obstetric and neonatal team to prevent complications related to MSAF. Advancing NICU care in order to improve fetal outcome.

Keywords: Amniotic Fluid, Meconium Stained, Neonatal Outcome

Introduction

Intra uterine passage of meconium prior to birth may be caused by increased peristalsis and relaxation of the anal sphincter due to vagal stimulation during intra-uterine stress primarily hypoxia. It may be a normal physiologic event reflecting fetal maturity. Fetuses that passed meconium had higher motilin levels, it is a regulatory intestinal peptide, were thought to be related to increased parasympathetic tone due to fetal hypoxia [1,2].

Meconium composed of accumulation of debris, including desquamated cells, gastrointestinal mucin, fatty material from the vernix caseosa, amniotic fluid, and glycoproteins [3,4]. The black-green color results from bile pigments, although it is sterile but when aspirated into the lung, it may stimulate the release of vasoactive substances that lead to inflammatory responses. A significant association has been reported between perinatal morbidity and mortality, increased rates of cesarean section and the consistency of meconium (thick or thin) [5-7].

The incidence of meconium stained amniotic fluid(MSAF) varies with gestational age and it increases with gestational age[8].Meconium aspiration syndrome (MAS) is respiratory distress and one of the life- threatening complication of newborn infants born through (MSAF) [9].

The risk of (MAS) is greatest in post-mature and small for gestational age infants. Changes in obstetric practice, especially a reduction in post mature births and prevention of intrauterine hypoxia, appear to be associated with a decrease in the incidence of (MAS) [10].

Neonates with (MSAF) who have signs of respiratory distress in the delivery room are observed in the neonatal intensive care unit (NICU) The mortality rate of (MAS) has decreased because of advances in neonatal care [9].

The management of MAS is supportive and include (Maintenance of adequate oxygenation and ventilation, extracorporeal membrane oxygenation (ECMO) may be a life-saving intervene, maintenance of adequate blood pressure and perfusion, transfusion of packed red blood to optimize tissue oxygen delivery, correction of any metabolic abnormality, administration of empirical antibiotic therapy and minimal handling of the infant to avoid agitation, which may exacerbate Persistent pulmonary hypertension of the newborn [11-15].

Methods

This prospective study was conducted in the Neonatal Intensive Care Unit (NICU) at Duhok Obstetrics and Gynecology Teaching Hospital and Kurdistan Private Hospital in Iraqi Kurdistan between May 2017 to April 2020. The study was approved by the Committee of Scientific research unit in hospital.

Newborn babies born with the history of meconium staining amniotic fluid (MSAF) were selected and taken as cases. The cases were divided into 2 groups thick meconium and thin meconium. Meconium was detected after spontaneous or artificial rupture of membranes or during cesarean.

Thick meconium was characterized by deep green coloured liquor, while thin meconium was characterized by light yellow green coloured amniotic fluid. All deliveries were attended by pediatrician on call.

The inclusion criteria were, singleton pregnancy in cephalic presentation with meconium stained amniotic fluid. Babies with congenital anomalies, breech or other abnormal presentation were excluded from the study.

Detailed history and clinical examination for both mother and babies delivered with MSAF were taken. Baseline characteristics of these cases were recorded, including sex, birth weight, gestational age and condition of baby at delivery.

The mode of delivery was depend upon the progress of labour plotting the partogram as well as maternal and fetal condition both during antenatal period and intra-partum period.

Clinical outcome examined were admitted to NICU, duration of NICU stay, mortality of neonates was recorded as well as morbidity such as meconium aspiration syndrome (MAS), respiratory distress syndrome (RDS), birth asphyxia and sepsis.

Statistical analysis

The data were statistically analyzed, descriptive statistics for nominal variables were expressed as number and percentage.

Results

During the study period, from May 2017 to April 2020, a total of 150 newborns had meconium stained amniotic fluid. Thick meconium stained liquor was observed in 83 cases (55.33%), while 67 (44.66%) cases had thin meconium.

Newborn characteristics at delivery

The characteristics of the newborns at delivery are summarized in table 1. Out of 150 newborns, 81 cases (54%) were male and 69 cases (46%) were female, 48 cases (59.25%) of male babies had thick meconium, while 33 cases (40.74%) stained with thin meconium. Out of 69 female babies, 25 cases (36.23%) stained with thick meconium and 44 cases (63.76%) had thin meconium. The gestational age at delivery was between 37 and 40 weeks in 84 cases, while in 66 cases was between 40+1 and 42 weeks, incidence of thick meconium was more in post date cases, while thin meconium was more in gestational age between 37 and 40 weeks. Among 150 newborns delivered with MSAF, thick meconium was more among babies having birth weight between (3501 - 4700 kg). While thin meconium was more in babies having birth weight between (1500 - 2500 kg). Among 150 newborn, 80 cases were vigorous babies. Thick meconium was more detected in non vigorous babies (68.57%).

Newborns Characteristics	Thick Meconium (n = 83)	Thin Meconium (n = 67)
Sex		
Male (81)	48 (59.25%)	33 (40.74%)
Female (69)	25 (36.23%)	44 (63.76%)
Gestational age (weeks)		
37-40 (84)	15 (17.85%)	69 (82.14%)
4+1-42 (66)	48 (72.72%)	18 (27.27%)
Birth weight range		
1500-2500 (kg) (53)	29 (54.71%)	24 (45.28%)
2501-3500 (kg) (40)	19 (47.5%)	21 (52.5%)
3501-4700 (kg) (57)	34 (59.64%)	23 (40.35%)
State of newborn babies		
Vigorous (80)	26 (32.5%)	54 (67.5%)
Non-vigorous (70)	48 (68.57%)	22 (31.42%)

Table 1: Newborn characteristics at delivery with MSAF.

Mode of delivery

The mode of delivery among the studied cases with MSAF summarized in table 2. Vaginal delivery was seen in 6 cases (15.7%) of thick meconium stained amniotic fluid, while in thin meconium stained amniotic fluid was 32 cases (84.21%). Incidence of cesarean section was more in thick meconium stained amniotic fluid (67.27%) as compared to (32.72%) with thin meconium stained amniotic fluid. Out of the cases with meconium stained amniotic fluid, two cases had instrumental delivery.

Mode of Delivery	Thick Meconium (n = 83)	Thin Meconium (n = 67)
Vaginal delivery (38)	6 (15.7%)	32 (84.21%)
Spontaneous (34)	3 (8.82%)	31 (91.17%)
Induction (4)	3 (75%)	1 (25%)
Cesarean Section (110)	74 (67.27%)	36 (32.72%)
Elective (74)	48 (64.86%)	26 (35.13%)
Emergency (36)	24 (66.66%)	12 (33.33%)
Instrumental (2)	1 (50%)	1 (50%)

Table 2: The mode of delivery among the studied cases with MSAF.

Antenatal and intrapartum risk factors for MSAF

Antenatal and Intrapartum associated risk factors for MSAF are summarized in table 3. Post-term pregnancy was a major risk factor for thick meconium stained liquor with an incidence of (65.38%).

Risk Factors	Thick Meconium (n = 83)	Thin Meconium (n = 67)
Postdate (52)	34 (65.38%)	18 (34.61%)
Oligohydramnia (28)	19 (67.85%)	9 (32.14%)
Preeclampsia (21)	8 (38.09 %)	13 (61.90%)
IUGR (18)	6 (33.33%)	12 (66.66%)
Fetal distress (12)	10 (83.33%)	2 (16.66%)
No progress of labour (10)	2(20%)	8 (80%)
Anemia (6)	2(33.33%)	4 (66.66%)
Cholestasis (3)	2 (66.66%)	1 (33.33%)

Table 3: Risk factors for MSAF.

Neonatal outcome

Admission to neonatal intensive care unit and Neonatal outcome among newborns delivered with AMSAF are summarized in table 4. Eighty babies were admitted to NICU. Majority of NICU admission cases were seen among babies with thick meconium with an incidence of (67.5%). The duration of NICU stay was between (4 - 15) days. Birth asphyxia was the main cause for NICU admission while Meconium aspiration syndrome was the second cause and seen in 21 cases, both complications were higher in thick meconium group.

Among 80 cases of admission to NICU two deaths were occurred in thick meconium both due to (MAS) and one in thin meconium group due to birth asphyxia, incidence of neonatal death was (2%).

Neonatal Outcome	Thick Meconium (N=83)	Thin Meconium (N=67)
Admission to NICU (80)	54 (67.5%)	26(32.5 %)
Death (3)	2 (66.66%)	1 (33.33%)
Birth asphyxia (27)	19 (70.37%)	8 (29.62%)
MAS (21)	20 (95.23%)	1 (4.76%)
RDS (18)	14 (77.77%)	4(22.22%)
Sepsis (11)	10 (90.90%)	1 (9.09%)

Table 4: Neonatal outcome among studied cases with MSAF.

Discussion

The presence of (MSAF) is a warning sign of fetal hypoxia, prevention of complications such as (MAS) had been studied by many authors.

Several studies have demonstrated high prevalence of MSAF seen in male neonates [16,17]. Similar results were noted by our study. As the gestational age increases, the incidence of MSAF also increases which was very clear in our study. All of the cases had gestational ages of more than 37 weeks, same results were noted in one study [18].

The difference in incidence of thick and thin (MSAF) observed by many studies [19]. In the present study we found more cases having thick meconium stained fluid than thin meconium, these results was similar with one study.[20], but in contrast with another study that thin meconium cases was more than thick meconium [21].

Our study showed that thick meconium was more in postdated pregnancy which is consistent with one study [22], because the motilin levels are highest in this period [23].

In one study concludes that majority babies were good weight and weighing more than 2.5 Kg [24]. In our study, majority had birth weight between 3501 Kg and 4700 Kg, but some studies reported its higher prevalence in pregnancies associated with fetal growth retardation [25].

In our study babies delivered through (MSAF) were born more through cesarean section than normal vaginal delivery similar result was reported by one study [22].

In the present study, more number of women with thick meconium underwent cesarean section as compared to thin, similar result was observed by one study in which incidence of cesarean delivery was more in thick meconium stained amniotic fluid as compared to with thin meconium stained amniotic fluid [19], while our results were comparable by one study in which cesarean delivery was higher in thin meconium in contrast to thick meconium [26].

Among the various antenatal risk factors for (MSAF), our study showed that incidence of postdate was higher than other risk factors in contrast with one study that showed post-term pregnancies were not significantly associated with (MSAF) [27]. In other study they found maternal anemia and PIH one of the commonest antenatal risk factors for MAS [28].

In our study (NICU) admission and stay was higher in thick meconium stained babies than thin meconium stained babies, and most of birth asphyxia and (MAS) cases were seen in thick meconium babies, as the consistency of the meconium has a significant effect on the neonatal outcome. In present study birth asphyxia was main cause for NICU admission, similar findings was seen in one study [29], also in one study they found that incidence of birth asphyxia was significantly higher in thick meconium as compared to thin meconium[7]. In the present study incidence of neonatal death was (2%), in one study it was (9%) [30]. In another study incidence was (5.5%) [31].

Conclusion

Meconium stained amniotic fluid, especially thick meconium stained liquor increases the rates of cesarean delivery, NICU admission and neonatal morbidity and mortality. Coordination of care between the obstetric and neonatal team to prevent complications related to MSAF. Early identification of risk factors for MSAF. Reduction in post -term births. Advancing NICU care in order to improve fetal outcome.

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Authors' Contributions

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Availability of Data and Material

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Ethics Approval

The ethical approval from scientific committee was obtained.

Consent for Publication

'Not applicable' for that section.

Competing Interests

There are no conflicts of interests to declare.

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