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Meconium Stained Liquor in Labor and Mode of Delivery: A Time for Reappraisal

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Abstract

Background: *Meconium stained amniotic fluid (MSAF)during labor is a common almost daily encountered problem. Overall incidence of MSAF varies between 12% to 20%.*

Objective: *To determine the mode of delivery in case of meconium stained liquor in labor.*

Methodology: *This is a cross-sectional, observational study conducted in the Department of Obs. & Gynae, Shaheed Suhrawardy Medical College Hospital, Dhaka from January 2017 to June 2017. Sample size was 100 pregnant ladies who were admitted to the labor ward with ruptured membranes, are included in the study. The meconium-stained liquor was clinically assessed. Color of amniotic fluid and type of meconium was noted at the time of per vaginal examination.*

Result: *The mean age of the study group was 32.3±6.4 years mostly in between 20 to 29 years. The gestational age of the study group was 37-40 weeks (41%) and 40-42 weeks (59%). Mean gestational week was 40.12±1.43. The meconium grade of the study group, grade I (48%), grade II (32%), and grade III (20%). The time of meconium was discovered latent 1st stage of labor (17.0%)-Grade I (35%), Grade II (23.5%), Grade III (23.5%), active 1st stage of labor (41.0%)- Grade I (48.7%), Grade II (29.26%), Grade III (21.95%) and 2nd stage of labor (42%)- Grade I (52.3%), Grade II (38.09%), Grade III (9. 5%).The mode of delivery was NVD (47.0%), Instrumental vaginal delivery (14%), and emergency C/S (39.0%). The time interval of delivery after discovering MSL was 0-2hour (59.0%), 2-4 hour (24%) and 4-6 hr. (17. 0%). Apgar score at one minute was found 7-10 in 22.5%,4 – 6 in 69.4% and 3 or less in 8.1%. Apgar score at five minute was found 7 – 10 in 69.4% 4-6 in 25.8%,3 or less in 4.8%. Fetal outcome was alive 98% and FSB 2%. Immediate resuscitation was needed for 62%.*

Conclusion: *The thickly meconium stained group was significantly associated with higher cesarean rate. Delivered babies from this group need more immediate resuscitation. The thinly meconium stained group can be observed for vaginal delivery with adequate maternal and fetal monitoring.*

Keywords: *Meconium-stained amniotic fluid (MSAF), Amniotic fluid (AF), Fresh stillbirth (FSB)*

Introduction

In the practice of Obstetrics, the aim is to have a safe delivery and have a healthy mother and baby. Meconium staining of the amniotic fluid has long been regarded as a sign of fetal distress and is still conventionally taken as an indication of an urgent

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delivery[1]. Meconium is a green, viscous liquid that first appears in the fetal ileum from 10 weeks' gestation.[2] Meconium-stained amniotic fluid rarely occurs before 34 weeks of gestation and incidence increases steadily beyond 37 weeks of gestation.[3]

The passage of meconium normally occurs within the first 24-48hr after birth. In utero, the passage of meconium may simply represent the normal gastrointestinal maturation or it may indicate an acute or chronic hypoxic event, thereby making it a warning sign of a fetal compromise. According to the standard grading system for meconium, a visual inspection of MSAF can be categorized into 3 grades: Grade I (translucent, light yellow-green), Grade II (opalescent with deep green), and Grade III (opaque and deep green), and it can also be classified as thin or thick based on the different solid contents.[4]

In fetal hypoxic stress, vagal stimulation causes peristalsis of the fetal gut and relaxation of the anatomical sphincter resulting in the intrauterine passage of fecal matter.[5] It has been suggested that antepartum as well as intrapartum events might lead to meconium aspiration by the fetus. In antepartum few obstetric factors such as (prolonged labor, post-term pregnancy, low-birth weight babies, oligohydramnios, and intrauterine growth retardation, medical factors (hypertensive disorders of pregnancy, cholestasis of pregnancy and anemia) and socio-demographic and behavioral risk factors (higher maternal age, maternal drug abuse especially tobacco and cocaine use) are the major contributory factors for the passage of meconium into the amniotic fluid.[6,7]

During intrapartum stage, in some critical conditions, meconium can be found in liquor amni like uterine hyper stimulation by injudicious administration of oxytocin resulting in prolonged and obstructed labor, cord prolapse, maternal hypotension as in epidural analgesia.[8]

Infants born through meconium-stained amniotic fluid are about 100 times more likely to develop respiratory distress than those who are born through clear fluid.[7] Even in women who are at very low risk for obstetric complications, meconium-stained amniotic fluid is common and it is associated with a five-fold increase in perinatal mortality as compared with low-risk patients with clear amniotic fluid.[9]

Presence of meconium below vocal cord is known as meconium aspiration and it is seen in around 20-30 % of all infants with meconium-stained amniotic fluid.[10] Aspiration can occur in utero with fetal gasping, or after birth, with the first breaths of life Meconium aspiration syndrome (MAS) is defined as respiratory distress that develops shortly after birth, with radiographic evidence of aspiration pneumonitis and the presence of meconium-stained amniotic fluid.[11] MAS occurs in about 5% of deliveries with meconium-stained amniotic fluid and death occurs in about 12% of infants with MAS.[10,12]

The study has been conducted to determine the significance of meconium staining of the amniotic fluid and find out an appropriate mode of delivery in women with meconium-stained liquor in labor.

Methodology

This is a cross-sectional, hospital-based observational study. This study was conducted on 100 patients admitted to the labor ward with meconium-stained liquor during labor in the Department of Obstetrics and Gynecology at Shaheed Suhrawardy Medical College Hospital, Dhaka from January 2017 to June 2017.

Single alive Term pregnancy (>37 weeks gestation), Cephalic presentation in labor who progressed normally and amniotic membranes were spontaneously ruptured with meconium-stained amniotic fluid during per vaginal examination were included in the study.

Pregnant women in labor without knowing their last menstrual date, pregnancy with medical diseases like PE, GDM, etc., Antepartum hemorrhage, Intrauterine fetal death, Congenital malformation, Pregnancies with IUGR babies, Presentations other than cephalic were excluded.

Following the selection of cases, a detailed history was taken and general and systemic examinations were done. A detailed obstetrical examination was undertaken noting the presentation, position, height of fundus, amount of amniotic fluid, fetal heart rate, and uterine contractions. On Pelvic examination: The position of the cervix, dilatation, the presence or

absence of membranes, the level of presenting part, and type of pelvis were noted down.

The use of medications like oxytocin, sedatives, and analgesics were also noted. Detailed follow-up of the progress of labor was done using a partograph. Patients whose progress is smooth according to the partograph were allowed to progress for normal vaginal delivery.

Meconium staining of amniotic fluid was noted during per vaginal examination. and its consistency was noted, whether it is thin, moderate, or thick. A correlation between cervical dilatation and the appearance of meconium in amniotic fluid was noted. Fetal heart rate pattern was also noted and accordingly, the mode of delivery was decided. After birth, the newborn was examined by the obstetrician and neonatologist with continuous follow-up daily till discharge from the hospital and re-examined after 15 days in OPD. The fetal outcome was measured by APGAR scores at 1st and 5th minutes, weight, sex, the requirement of neonatal resuscitation, and admission in the neonatal ward and intensive care unit. Relevant investigations including chest X-rays were carried out if needed.

Data analysis: After getting ethical clearance, Data was collected. Then Data was analyzed by SPSS-22 version software. The results were presented in tables and figures. The statistical terms included in the study were mean, standard deviation, frequency, and percentage.

Result

Table-I shows sociodemographic distribution of the study population(n=100). In this study, the age distribution was less than 20 years old 8(8.00%), between the age group of 20-29 years old 48 (48.00%), between the age group of 30-39 years old 32 (32.00%), 40 or more than 40 years old 12(12.00%). Mean ±SD age was 32.3±6.4 years. In the obstetrical score, 36(36.00%) were primi's and 64(64.00%) were multi's (64.00%). The Levels of education of the study population were illiterate12(12.00%), primary school 21(21.00%), SSC 33 (33.00%), HSC 20(20.00%) and graduation 14(14.00%) and the occupations of the study patients were housewife65(65.00%), service10(10.00%), business14(14.00%) and other profession11 (11.00%)

Table-I

Sociodemographic Distribution of study population (n=100).

Age	Frequency	Percentage
Less than 20	8	8.00
20-29	48	48.00
30-39	32	32.00
40 or more	12	12.00
Gravida	Frequency	Percentage
Primi	36	36.00
Multi	64	64.00
Education	Frequency	Percentage
Illiterate	12	12.00
Primary School	21	21.00
SSC	33	33.00
HSC	20	20.00
Graduate and above	14	14.00
Occupation	Frequency	Percentage
House Wife	65	65.00
Service	10	10.00
Business	14	14.00
Other	11	11.00
Total	100	100.00

Figure 1 shows Distribution of study population according to gestational age n-100,37-40 weeks 41% and 40-42 weeks 59%. Mean gestational week was 40.12 ±1.43

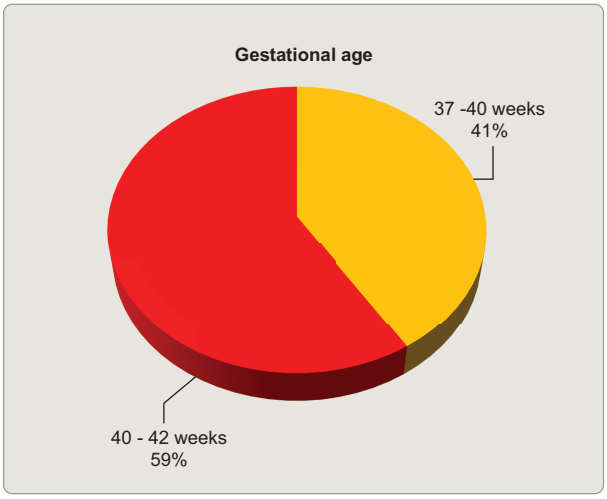

Figure -1. *Pie diagram showing the gestational weeks of the study population.*

Table-II shows the meconium grade of the study group, grade I (48%), grade II (32%), and grade III (20%).

Table-II

Distribution of study population according to meconium grading (n=100).

Meconium grade	Frequency	Percent
Grade I	48	48.0
Grade II	32	32.0
Grade III	20	20.0
Total	100	100.0

Table-III shows the time of meconium discovered, latent 1st stage of labor (17.0%)-Grade I (35%), Grade II (23.5%), Grade III (23.5%), active 1st stage of labor (41.0%)- Grade I (48.7%), Grade II (29.26%), Grade III (21.95%) and 2nd stage of labor (42%)- Grade I (52.3%), Grade II (38.09%), Grade III (9.5%).

Figure 2 shows the mode of delivery, NVD (47.0%), Instrumental vaginal delivery (14%), and emergency C/S (39.0%).

Table-IV shows the meconium grade of the study group and their mode od delivery. In Grade I- NVD 70.83%, Instrumental delivery 8.3%, LUCS 20.83%. In Grade II-NVD 34.37%, Instrumental delivery 21.87%, LUCS 43.7%. In Grade III-NVD 10%, Instrumental delivery 15%, LUCS 75%.

Table-III

Distribution of study population according to stage of labor(n=100).

Time	Frequency	Grade I	Grade II	Grade III
Latent 1st stage of labor	17	6 (35%)	4(23.5%)	7(41.1%)
Active 1st stage of labor	41	20(48.7%)	12(29.26%)	9(21.95%)
2nd stage of labor	42	22(52.3%)	16(38.09%)	4(9.5%)
Total	100	48	32	20

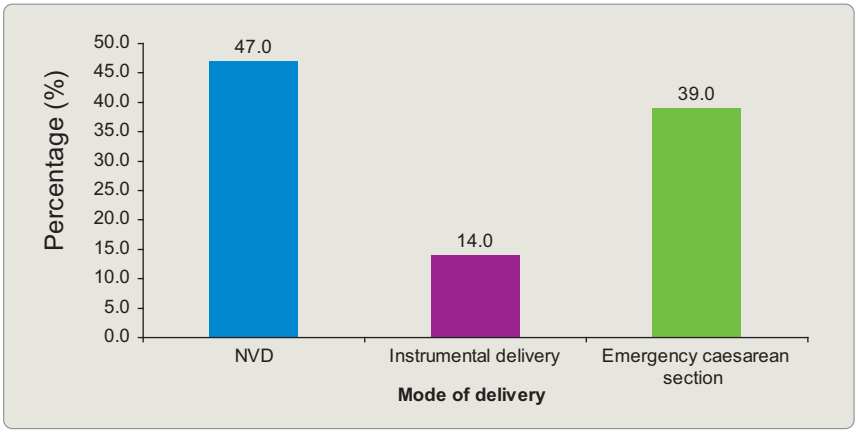

Figure-2: *Bar diagram showing the mode of the delivery*

Table-IV

Distribution of study population according to meconium grade and mode of delivery (n=100).

Meconium grading	Mode of delivery		
	NVD	Instrumental delivery	LUCS
Grade I (48)	34(70.83%)	4(8.3%)	10(20.83%)
Grade II (32)	11(34.37%)	7(21.87%)	14(43.7%)
Grade III (20)	2(10.0%)	3(15.0%)	15(75.0%)
Total-100	47	14	39

Table-V shows time interval of delivery after discovering MSL, 0-2 hr. (59%), 2-4 hour (24%), and 4-6hr (17.0%).

Table-V

Distribution of study population according to delivery interval from time of discovering MSL (n=100).

Delivery interval	Frequency	Percent
0-2hour	59	59.0
2-4 hour	24	24.0
4-6hours	17	17.0
Total	100	100.0

Table -VI shows Apgar score at 1min 3 or less in 5 (8.1%),4-6 in 43 (69.4) %,7-10 in 14(22.5%). Apgar score at 5min 3 or less 3(4.8%),4-6 in16(25.8%) 7-10 in 43(69.4%)

Table-VI

Distribution of The Apgar score at 1 and 5 min of newborn of the mother having meconium stained liquor(n=62).

Apgar score at 1 min	Frequency	Percent
3 or less	5	8.1
4-6	43	69.4
7-10	14	22.5
Apgar score at 5 min	Frequency	Percent
3 or less	3	4.8
4-6	16	25.8
7-10	43	69.4

Table VII shows need for immediate resuscitation (63.3 %), not need (36.7%).

Table-VII

Distribution of study population according to need for immediate resuscitation (n=98)

Need resuscitation	Frequency	Percent
Yes	62	63.3%
No	36	36.7%
Total	98	100%

Figure 3: shows fetal outcome, alive (98.0%) and FSB (2%)

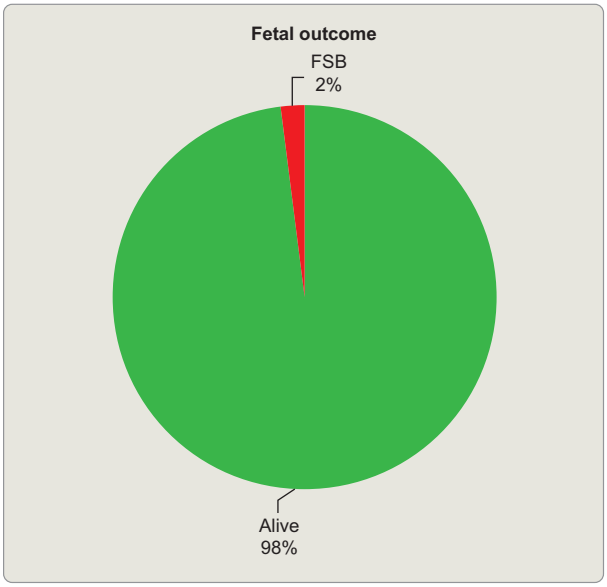

Figure 3: *Pie diagram showing fetal outcome*

Discussion

The passage of fetal colonic contents in the amniotic cavity causes the MSAF and is a commonly encountered finding in obstetric practice with an overall frequency between 12% and 19%.[14,15] It is more common in post-dated pregnancies and with intrauterine growth restriction.[16] The MSAF is associated with a lot of adverse outcomes and has long been considered to be a bad predictor of fetal outcomes.[17,18] The MAS is the most common cause of respiratory disease in terms of newborn babies[19] and has been reported in 6.6% to 30% of cases of MSAF, and 1% to 3% of live-born newborn babies.[20] The MSAF causes low Apgar score at birth, fetal academia, and hypoxia.[21]

We found that a maximum of 48.0% of the patients were within 20 to 29 years and the mean age was 32.3 (±6.4) years which is quite similar to Parvin et al.[22] that showed a maximum 52.0% of patients were also within 25 to 30 years' age group and mean age was 27.06 (±3.85) years. Educational status of the patients revealed illiterate 12.0%, primary school 21.0%, SSC 33.0%, HSC 20.0% and graduation 14.0%. This finding was also similar to Parvin et al.[22] that also revealed maximum 48.0% were educated up to secondary level, 24.0% up to higher secondary, 18.0% primary and 10.0% graduate and above level.

The incidence of meconium passage during labor increases with gestational age 30% at 40 weeks and 50% at 42 weeks in a study by Steer et al.[13]

In comparison to this finding, our study also revealed that 41% of the patients were within 37-40 weeks of gestations and 59% of the patients were within 40-42 weeks of gestations. The mean gestational age in our study group was 40.12±1.43 weeks and this is similar to Khazardoost et al.[23] which also revealed mean gestational age 39.00±1.56 weeks.

In the study by Khazardoost et al.[23] 10.6% of patients presented with thin meconium and 89.4% of patients presented with thick meconium. It is in contrast to our study, as only 20% of patients presented with grade three liquor. In women who had early thick MSL, most of them are delivered by LSCS.

59.0% of deliveries occurred mostly within 0-2 hr which is similar to a study by Bhutt et al.[24]

In our study, 47.0% of patients were delivered through normal vaginal delivery,14% by instrumental delivery, and 39.0% through emergency C/S which is much less than a study by Shaikh et al,[25] but comparable to a study by Karim et al.[26]

In this study, the fetal outcome FSB of 2% is comparable to Karim et al. study where the FSB is 6%. In our study, live birth was 98%. Among them 63.3% needed immediate resuscitation. This result is similar to that of the Karim et al study where 69.6% needed resuscitation. Vigilant and careful monitoring of high-risk pregnancies can reduce perinatal morbidity and mortality.

Conclusion:

Controversy still exists regarding the significance of meconium stained amniotic fluid. This study suggests that The thickly meconium stained group was significantly associated with higher cesarean rate. Delivered babies from this group need more immediate resuscitation and increases the risk of adverse neonatal outcome. The thinly stained group can be observed for vaginal delivery with adequate maternal and fetal monitoring. Appropriate intrapartum care with early detection and management of fetal hypoxia is important in minimizing the risk from meconium staining of the amniotic fluid.

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