

Fetal Outcome in Cesarean Versus Normal Deliveries in Pregnancy with Meconium-stained Liquor: A Cross-sectional Study

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ABSTRACT

Background: Intrauterine meconium passage in near term or term fetuses has been associated with fetomaternal stress factors and/or infection and is contributing to the increased rate of cesarean section. This study aimed to evaluate effect of mode of delivery on fetal outcome in pregnancy with meconium-stained liquor.

Methods: A cross sectional study was done in 2019 at a tertiary care center. Data was collected from women in labor, in whom meconium was seen after rupture of membrane. Out of these, 115 cases, who underwent cesarean delivery for meconium-stained liquor were enrolled in one group; while in another group 115 cases who delivered vaginally were enrolled and the fetal outcome was compared in between these two groups.

Results: Out of 230 cases, most participants were from 21 to 25 years age group. Most of patients were primigravida accounting for 63%, and with mean gestational age of 39.4 weeks. Low apgar score at one and 5 minutes, percentage of respiratory distress, perinatal asphyxia, need of bag and mask ventilation as mode of resuscitation were associated more with vaginal deliveries. Incidence of neonatal intensive care unit admission, meconium aspiration syndrome, and neonatal death were seen more in vaginal delivery in comparison to cesarean delivery.

Conclusions: There was no much difference in apgar score at 5 minutes in either mode of delivery. Incidence of respiratory distress, perinatal asphyxia, neonatal intensive care unit admission, meconium aspiration syndrome and neonatal death were higher in vaginal delivery. Fetal morbidity and mortality were seen more in moderate to thick meconium-stained liquor.

Keywords: Cesarean section; fetal outcome; meconium-stained liquor; vaginal delivery

INTRODUCTION

Meconium passage may occur secondary to in utero stress, with resultant fetal hypoxia and acidosis producing relaxation of the anal sphincter.¹ Twelve to twenty two percent of labors are complicated by meconium. The perinatal mortality rate attributable to meconium has been found to be only one death per 1000 live births.² The most severe complication of meconium passage is meconium aspiration syndrome (MAS). However, MAS complicates only 1.8% of all deliveries.³ In Asian countries, the overall rate of cesarean section is 27.3%.⁴ Similarly neonatal mortality per 1000 deliveries is seven in case of vaginal deliveries, 2.2 in elective cesarean section and 12.4 in emergency cesarean section.⁵

We evaluated the fetal outcome in vaginal birth in comparison to cesarean birth in pregnancies with

meconium-stained liquor and also analyzed fetal outcome according to grades of meconium-stained liquor.

METHODS

This was a cross sectional study done at Paropakar Maternity and Women's Hospital (PMWH), Kathmandu, Nepal for a duration of one year from 1st October 2018 to 30th September 2019. A total of 230 women with singleton term pregnancy in labor with meconium-stained liquor admitted to emergency room, antenatal ward, labor room and maternal and neonatal service center (MNSC) were enrolled in the study employing the conventional sampling technique. In one group, 115 cases who underwent cesarean delivery for meconium-stained liquor were enrolled while in another group 115 cases who delivered vaginally were enrolled.

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Singleton term pregnancy with cephalic presentation in patients with meconium-stained liquor in labor after rupture of membrane were eligible for inclusion. Those with fetal congenital anomalies, intrauterine growth restriction (IUGR), previous cesarean section, antepartum hemorrhage (APH), maternal co-morbidities (pre-eclampsia, diabetes mellitus, eclampsia) were excluded from the study.

Detailed history, examination and grades of meconium were noted. Fetal outcome in terms of baby weight, Apgar score at 1 and 5-minute, type of resuscitation method used, presence of respiratory distress, presence of perinatal asphyxia, neonatal intensive care unit (NICU) admission along with reason for admission were noted and recorded. All cases under study were followed up till discharge for any neonatal complications including meconium aspiration syndrome (MAS) and neonatal death.

Data was primarily entered in an individual form and analysis was made using Statistical Package for Social Science (SPSS) version 16.0 and was depicted in tables, diagrams or as charts. All quantitative parameters such as age of women, birth weight of baby were described in statistical terms of mean and standard deviation. All qualitative parameters are presented in number and percentage. Chi square test and Fisher exact test were applied for depicting correlation between variables. A p-value of less than 0.05 was considered to be statistically significant.

RESULTS

Out of 230 cases, most of participants ranged from 21 to 25 years age group, with mean age of 24.5 years (SD 4.4). Only 106 (46%) participants were booked. Most of patients (n=145; 63%) were primigravida. About 52.2% (n=120) patients were of gestational age 40 to 42 weeks, with mean gestational age of 39.4 weeks. Light meconium-stained liquor (LMSL) was seen in 15 (6.5%) patients, moderate meconium-stained liquor (MMSL) was seen in 113 (49.1%) and thick meconium-stained liquor (TMSL) were seen in 102 (44.3%) patients. In 54 (23.4%) patients meconium was seen in second stage of labor, in 85 (36.9%) patients meconium was seen in active phase of labor, and in 91 (39.5%) patients it was seen in latent phase of labor.

Most cases of vaginal delivery in meconium-stained liquor were observed when meconium was seen in second stage of labor or active phase of labor, while rate of cesarean section increased in early phase of labor (Table 1). Light meconium-stained liquor mostly delivered vaginally.

Table 1. Association between meconium seen in different phase of labor and mode of delivery (n=230).

Meconium seen in	Mode of Delivery	
	Vaginal	Cesarean section
Second Stage of labor	51 (44.3%)	3 (2.6%)
Active phase of labor	56 (48.7%)	29 (25.2%)
Latent phase of labor	8 (7%)	83 (72.2%)

Table 2. Relation between grades of meconium-stained liquor and mode of delivery (n=230).

Grades of meconium-stained liquor	Mode of Delivery	
	Vaginal	Cesarean section
Light meconium stained liquor	11 (73.3%)	4 (26.7%)
Moderate meconium-stained liquor	46 (40.7%)	67 (59.3%)
Thick meconium-stained liquor	58 (56.9%)	44 (43.1%)

Apgar score at 1 minute and at 5 minutes in different modes of delivery has been shown in Table 3 and Table 4 respectively.

Table 3. Apgar score at 1 minute according to mode of delivery (n=230).

Apgar score at 1 min	Mode of Delivery	
	Vaginal	Cesarean Section
1	1(0.9%)	1(0.9%)
2	1(0.9%)	0
3	3 (2.6%)	0
4	8 (7%)	1(0.9%)
5	14 (12.2%)	31(37%)
6	45 (39.1%)	76 (66.1%)
7 and above	43 (37.4%)	6 (5.2%)

Table 4. Apgar at 5 minutes according to mode of delivery (n=230).

Apgar score at 5 min	Mode of Delivery	
	Vaginal	Cesarean Section
1	0	1 (0.9%)
2	1 (0.9%)	0
3	2 (1.7%)	0
4	2 (1.7%)	0
5	8 (7%)	2 (1.7%)
6	23 (20%)	35 (30.4%)
7 and above	79 (68.6%)	77 (67%)

Respiratory distress was seen in 14 (12.2%) patients

in vaginal delivery while 11 (9.6%) had it in cesarean delivery. Perinatal asphyxia was present in 10.4% (n=12) of vaginal delivery while it was only in 1.7% (n=2) of cesarean delivery. More neonates required bag and mask ventilation for resuscitation in vaginal delivery (n=6; 5.2%) in comparison to delivery through cesarean section (n=1; 0.9%). NICU admission was 8.7% (n=10) in vaginal delivery and 5.2% (n=6) of delivery by cesarean section. Meconium aspiration syndrome was present in 4.3% (n=5) of vaginal delivery and 0.9% (n=1) of delivery by cesarean section. There was no still birth in either mode of delivery but 4.3% (n=5) of neonatal death was present in vaginal delivery, while only 0.9% (n=1) of neonatal death was present in delivery by cesarean section.

DISCUSSION

In our study, MSAF was seen mostly in age group 21-30 and was 68.7%, with mean age of 24.5 years (SD 4.4). In a similar study conducted by Bogaert et al⁶ the mean age of participants was 25.6 years, which is similar to our study. Khazardoost et al⁷ had mean age of presentation at 25.97 years, while Sandu et al⁸ noted 80% of cases with MSAF belonged to the age group of 21-30 years. In the present study the incidence of meconium-stained amniotic fluid was found to be 63% (145 out of 230 cases) in primigravida, and only 37% in multigravida. Mundhara et al⁹ found 48.8% cases of MSAF were primiparous while 36.37% cases with gravida between 2-5. Meydanli et al¹⁰ found it in 52.9% cases in primigravida and 47.1% cases in multigravida.

In the present study number of cases in gestational age group 37-39 weeks was 46.9% (108/230), in gestational age group 40-42 weeks it was 52.17% (120/230), in gestational age group above 42 weeks it was only 0.86% (2/230). The mean weeks of gestation was 39.4 weeks (SD of 1.1). In a study conducted by Hirsch et al¹¹ mean gestational age was 39.6 weeks, while it was 40 weeks in a study conducted by Wong et al.¹² Similarly, Maymon et al¹³ found mean gestational age of 39.6 weeks.

In present study light meconium-stained liquor (LMSL) was seen in 6.5% (15/230), moderate meconium-stained liquor (MMSL) was seen in 49.1% (113/230) and thick meconium-stained liquor (TMSL) was seen in 43.1% (102/230). For LMSL cases 73.3% (11/15) delivered vaginally and 26.7% (4/15) by cesarean section. For MMSL cases, 40.7% (46/113) delivered vaginally while 59.3% (67/113) were delivered by cesarean section. For TMSL cases, 56.9% (58/102) delivered vaginally (including 2 instrumental deliveries) but in most of cases TMSL was seen in late active phase of labor or in second stage of labor, while 43.1% (44/102) was delivered by cesarean section. In study of Khazardoost et al⁷ LMSL was present

in 9.9% cases and moderate-thick meconium were present in 90.1% of cases. In a study of Ziadeh et al¹⁴ in thin meconium group 85.7% delivered by spontaneous vaginal delivery, 4.5% by instrumental delivery and 17% by cesarean section. In moderate to thick meconium group, 80.9% had spontaneous vaginal delivery, 5% had instrumental delivery and 14% were by delivered by cesarean section.

In present study in vaginal/instrumental deliveries, Apgar score at 1 minute was less than 7 in 62.6% (72/115), in cesarean deliveries Apgar score <7 was in 0.9% (1/115). Overall AS < 7 at 5 minutes was 11.3% (13/115) in vaginal/instrumental deliveries and it was 2.6% (3/115) in cesarean deliveries. In study of Bogaert et al⁶ Apgar score at 1 and 5 minutes was > 7 for all cesarean deliveries done for MSL. AS at 1 minute was < 7 in 2 cases of vaginal delivery with TMSL, while AS AT 5 minutes was > 7 in all cases of vaginal delivery. These findings show no significant difference in fetal outcome depending on mode of delivery.

In present study respiratory distress was seen in 12.2% (14/115) of neonates born through vaginal/instrumental deliveries while in cesarean deliveries respiratory distress was seen in 9.6% (11/115). Perinatal asphyxia was seen in 10.4% (12/115) of vaginal/instrumental deliveries and 1.7% (2/115) of cesarean deliveries. Bag and mask ventilation was needed in 5.2% (6/115) cases of vaginal deliveries and 0.9% (1/115) case of cesarean deliveries. NICU admission was 8.7% (10/115) in vaginal / instrumental deliveries and 5.2% (6/115) in cesarean deliveries. In our study MAS was seen in 4.3% (5/115) cases of vaginal/instrumental deliveries. While 0.9% (1/115) case of MAS was seen in cesarean delivery. There were 4.3% (5/115) cases of neonatal death in vaginal /instrumental deliveries and 0.9% (1/115) case of neonatal death in cesarean delivery. There was no still birth in both modes of delivery. In a study by Bogaert et al⁶ there were two fresh still births and one neonatal death in deliveries through cesarean section done for non-reassuring fetal condition, other than meconium stained liquor. There was no still birth, neonatal death in deliveries with meconium-stained liquor in different modes of deliveries.

CONCLUSIONS

In comparison to cesarean delivery of neonates with meconium-stained amniotic fluid, in vaginal delivery there was higher incidence of neonatal resuscitation, respiratory distress, birth asphyxia, neonatal intensive care unit admission, meconium aspiration syndrome and neonatal mortality. However, Apgar score at 5 minutes was not affected by mode of delivery in most

of cases. Therefore correct diagnosis of fetal distress and causative factor associated with its increasing rate should be looked for and decision of mode of delivery should be taken carefully for better fetomaternal outcome.

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