

Effect of Meconium Stained Liquor on Mode of Delivery and Fetomaternal Outcome at Term

ASMA QAYYUM¹, RUBINA IQBAL², HUMA MAZHER³

¹Senior Registrar, Obstetrics & Gynaecology, Fatima Memorial Hospital, Lahore

²Professor, Obstetrics & Gynaecology, Fatima Memorial Hospital, Lahore

³Post Graduate Resident, Obstetrics & Gynaecology, Fatima Memorial Hospital, Lahore

Correspondence to: Rubina Iqbal, Email: rubinat021@gmail.com, Cell: 03009453560

ABSTRACT

Background: Meconium-stained amniotic fluid is a major reason for concern for both obstetricians and pediatricians since it raises the risk of birth hypoxia, maternal-asphyxia syndrome, and hospitalizations to the neonatal intensive care unit.

Objective: To find the frequency of meconium stained liquor in females presenting in labor at term and to compare the frequency of adverse fetomaternal outcome with or without meconium stained liquor in females presenting in labor at term.

Materials & Methods

Study Design: Descriptive study

SETTING: Department of Obstetrics & Gynecology, Fatima Memorial Hospital Lahore

Duration: Six months i.e. 15-12-2020 to 15-6-2021

Data Collection Procedure: A total of 175 females fulfilled the inclusion criteria were included. Then females were followed up in labor room. If meconium stained liquor was observed, then it was noted and female were divided in two groups i.e. with meconium stained liquor and without meconium stained liquor. Mode of delivery was noted. Apgar score was noted and labeled as poor if <7 at 5 minutes. Birth asphyxia and need for NICU admission was noted. Then all these patients were followed up in gynecology wards for 3 days, neonatal mortality was noted, if occurred.

Results: In this study frequency of meconium stained liquor in females presenting in labor at term was 51(29.1%). Comparison of fetomaternal outcome in women with and without meconium stained liquor showed that C-section rate (37.3% vs. 18.5%, p-value=0.008), Poor Apgar score (7.8% vs. 1.6%, p-value=0.040), NICU admission (13.7% vs. 3.2%, p-value=0.009), Birth Asphyxia (19.6% vs. 4%, p-value=0.001) and early neonatal mortality (13.7% vs. 3.2%, p-value=0.009) was significantly higher among women with meconium stained liquor.

Conclusion: Keeping in mind the results of this study it can be concluded that positive meconium stained liquor had a significantly impact on maternal as well as neonatal outcome.

Keywords: Meconium, Stained liquor, C-section, Birth Asphyxia, NICU, Mortality

INTRODUCTION

The presence of meconium-stained amniotic fluid during spontaneous labor at term is prevalent among women and has been linked to negative consequences for both the mother and the newborn. Women in preterm labor with intact membranes who have amniotic fluid that is stained with meconium are at increased risk for microbial invasion of the amniotic cavity and premature delivery.¹ Fetal hypoxic stress brought on by umbilical cord compression triggers vagal activity, which in turn increases peristalsis and relaxes the anal sphincter, allowing the meconium to flow through the uterine wall. Predisposing variables of in utero transit of meconium include placental insufficiency, maternal hypertension, pre-eclampsia, oligohydramnios, and maternal drug usage (tobacco, cocaine). Babies born with meconium stains in their umbilical cord fluid are more likely to have respiratory difficulty.^{2, 3} Meconium and its impact on the fetus and newborns continue to be a major source of concern for both obstetricians and neonatologists, despite fast developments in diagnostic and treatment approaches over the last decades. Meconium-stained alcohol has a mysterious origin. Previous research has shown that the prevalence of Meconium-stained fluid increases as maternal age increases.²⁻⁵

The first bowel movement of a baby is meconium, the material that forms in the growing fetus' intestines. There are a variety of colors in meconium, including green, brown, and yellow. Meconium is often passed by full-term, healthy newborns during the first 48 hours of life. Delayed transit is a common symptom of prematurity.⁶⁻⁹ Fetal and neonatal effects, in addition to maternal concerns, are associated with intrauterine meconium emission.^{2, 3} In a study, Patients with meconium-stained amniotic fluid had a cesarean delivery at a rate of 99/149 (66.4%). Furthermore, low birth weight was identified in 9/149 infants, NICU hospitalization was seen in 25/149 patients, and 14/149 babies had low APGAR scores.¹⁰ Rationale of this study is that to determine the frequency of adverse fetomaternal outcome with meconium stained liquor is important as literature has showed that the

complications of meconium stained liquor are high. But varied data has been observed in literature. Moreover, there is very few work done in this regard as well as few local studies found, but they have varied results, which makes it important to conduct this study in local population. After finishing this research, we'll have proof for the locals and can put the findings into practice.

Objectives

1. To find the frequency of meconium stained liquor in females presenting in labor at term.
2. To compare the frequency of adverse fetomaternal outcome with or without meconium stained liquor in females presenting in labor at term.

MATERIAL & METHODS

Study Design: Descriptive Cross sectional study

Venue: Department of Obstetrics & Gynecology, Fatima Memorial Hospital Lahore

Study Period: 6 months i.e. from 15-12-2020 to 15-6-2021

Sample Size: Sample size of 175 females is calculated with 95% confidence level, 7% margin of error and taking expected percentage of meconium stained liquor i.e. 33.33% in female presenting in active labor at term.

Sampling Technique: Non-probability, consecutive sampling

Selection Criteria: Females of age 18-40 years, with any parity <5 presenting at gestational age >37weeks in active labor (>3 contractions in 15 minutes, Bishop score >4, cervical dilation >4cm) were enrolled. Females with multiple pregnancy, non-cephalic presentation, still birth, congenital fetal abnormalities, ruptured membrane, renal disease or pulmonary disease, pregnancy induced hypertension, eclampsia, gestational diabetes mellitus, previous caesarean section were excluded.

Data Collection Procedure: After approval from hospital ethical committee 175 females fulfilling the inclusion criteria were included through labor room. Informed consent was obtained. Demographic data including name, age, parity, gravidity, gestational age and BMI was recorded. Then females were followed up in labor room. If

meconium stained liquor was observed, then it was noted and female were divided in two groups. i.e. with meconium stained liquor and without meconium stained liquor.

Meconium stained liquor was defined as presence of meconium in the amniotic fluid (amniotic fluid was tinted green or yellow, instead of being clear). Mode of delivery was noted as cesarean if delivery required through incision in lower abdomen due to any reason. Apgar score was noted and labeled as poor if <7 at 5 minutes. Birth asphyxia and need for NICU admission was noted. NICU admission was done if neonate required admission in NICU for more than 6 hours due to poor APGAR score, birth asphyxia (oxygen saturation <90%, wheezing, chest in drawing, poor sucking). Than all these patients were followed up in gynecology wards for 3 days. If neonate died within 3 days, neonatal mortality was labeled. All this data was recorded in a specially designed proforma. All patients and neonates were efficiently managed according to standard protocols.

Data Analysis: The data was entered and analyzed through SPSS version 20. Adverse outcome was compared in groups with or without meconium stained liquor by applying chi square test. p-value<0.05 was taken as significant.

RESULTS

Mean age of women was 29.64±3.64. Among women 31(17.7%) women were primary parous and the remaining 144(82.28%) were multiparous. Among women 9(5.1%) had normal BMI, 65(37.1%) were overweight and 101(57.7%) were obese. Mean duration of gestation was 37.76±0.90. Meconium stained liquor was present in 51(29.1%) women. Among women 42(24%) underwent C-section, 6(3.4%) neonates had poor Apgar score, 11(6.3%) neonates were admitted to NICU, 15(8.6%) neonates were diagnosed with birth asphyxia and 11(6.3%) neonates had early mortality. Table 1

C-section rate (37.3% vs. 18.5%, p-value=0.008), Poor Apgar score (7.8% vs. 1.6%, p-value=0.040), NICU admission (13.7% vs. 3.2%, p-value=0.009), Birth Asphyxia (19.6% vs. 4%, p-value=0.001) and early neonatal mortality (13.7% vs. 3.2%, p-value=0.009) was significantly higher among neonates with meconium stained liquor present. Table 2

Table 1: Basic demographics and outcome of females (n = 175)

		Frequency	Percent
Parity of Women	1	31	17.7%
	2	54	30.9%
	3	48	27.4%
	4	42	24%
Body Mass Index	Normal	9	5.1%
	Overweight	65	37.1%
	Obese	101	57.7%

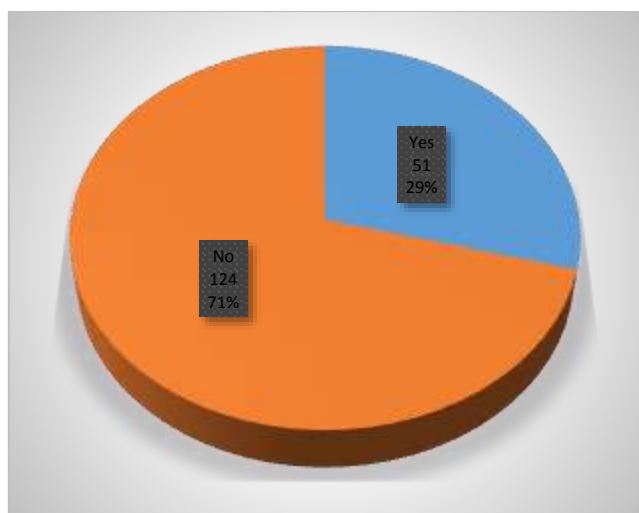


Fig 1: Distribution of meconium stained liquor

Table 2: Meconium Stained Liquor in relation to different variables.

		Meconium Stained Liquor		Total	p-value
		Present	Absent		
C-section	Yes	19 (37.3%)	23 (18.5%)	42 (24%)	0.008
	No	32 (62.7%)	101 (81.5%)	133 (76%)	
Poor Apgar score	Yes	4 (7.8%)	2 (1.6%)	6 (3.4%)	0.040
	No	47 (92.2%)	122 (98.4%)	169 (96.6%)	
NICU Admission	Yes	7 (13.7%)	4 (3.2%)	11 (6.3%)	0.009
	No	44 (86.3%)	120 (96.8%)	164 (93.7%)	
Birth Asphyxia	Yes	10 (19.6%)	5 (4%)	15 (8.6%)	0.001
	No	41 (80.4%)	119 (96%)	160 (91.4%)	
Early neonatal death	Yes	7 (13.7%)	4 (3.2%)	11 (6.3%)	0.009
	No	44 (86.3%)	120 (96.8%)	164 (93.7%)	

DISCUSSION

Meconium-stained amniotic fluid is a major reason for concern for both obstetricians and pediatricians since it raises the risk of birth hypoxia, maternal-asphyxia syndrome, and hospitalizations to the neonatal intensive care unit. In this study frequency of meconium stained liquor in females presenting in labor at term was 51(29.1%). Comparison of fetomaternal outcome in women with and without meconium stained liquor showed that C-section rate (37.3% vs. 18.5%, p-value=0.008), Poor Apgar score (7.8% vs. 1.6%, p-value=0.040), NICU admission (13.7% vs. 3.2%, p-value=0.009), Birth Asphyxia (19.6% vs. 4%, p-value=0.001) and early neonatal mortality (13.7% vs. 3.2%, p-value=0.009) was significantly higher among women with meconium stained liquor.

Dagne Addisu in his study reported the prevalence of meconium stained amniotic fluid as 17.8%.¹¹ Nadia Mohammad in her study reported the frequency of meconium stained amniotic fluid as 7.58% (76.5% thin meconium liquor & 23.5% thick meconium).¹² A study from Nigeria teaching hospital reported the frequency of meconium stained amniotic fluid as 20.4%.¹³ However, in this study frequency was higher when compared with above mentioned studies. i.e. (29.1%) This might be because to a discrepancy in sample sizes. In addition, variations in service availability and quality across research locations may account for the observed variance.

Meconium-stained amniotic fluid is a complication of pregnancy that was investigated in a local Pakistani research, which identified maternal variables and newborn prognosis. The research found that a thick Meconium stained amniotic fluid was related to a lower APGAR score (25.7%, p-value<0.01), a higher incidence of emergency cesarean surgery (71.4%, p-value=0.003), and a higher likelihood of hospital admission (28.5%, p-value=0.001). Pregnancy-related anemia, PIH, and GDM were all significant risk factors for MAS.¹² In our research, there was a statistically significant difference between the number of women who had a cesarean section because of a thick meconium and the number of women who had a cesarean section because of a thin meconium. Consistent with these results, Nadia Mohammad et al. found that the rate of cesarean birth was greater in cases of thin meconium than in cases of thick meconium.¹² The development of thick meconium later in the second stage might be to blame. The correlation between meconium-stained wine and an increased risk of a C-section has been seen in other research as well.¹⁴

Since MAS increases the odds of a child requiring treatment at a newborn intensive care unit and causes long-term morbidity and death, prevention efforts should be feasible, secure, effective, and based on risk assessment. Similar results were shown in this investigation, where newborns with MAS had a much higher NICU admission rate and death compared to neonates without MSA. More infants with positive meconium were admitted to the NICU, as documented by Saudi Arabian researcher Amjaad Althaqaf (21.87%, OR0.086, p-value=0.001).¹⁵ A similar pattern of elevated admission rates among infants with positive meconium stained beverages was also documented in a research conducted in India. However, the research did not find any statistically significant correlation between a positive meconium and a decrease in

morality in newborns.¹⁶ Consistent with these findings, another research found that the risk of delivery asphyxia was considerably greater among newborns with a positive meconium stain liquor (15.15% vs. 5.26%, $p=0.002$). Meconium in the amniotic fluid has been recognized as a major risk factor for birth hypoxia, according to a recent research from Pakistan. Thus, meconium staining was seen in 80.3% of newborns with birth asphyxia.¹⁷

MSAF is more prevalent in babies born late in the pregnancy. Its occurrence is age-dependent. Preterm infants (5.1%), full-term infants (16.5%), and postterm infants (27.1%) were found to have MSAF in a single research. Only 2- 10% of infants born with meconium-stained amniotic fluid (MASF) really go on to develop MAS. Increased post-term birth rates are associated with lower rates of access to care, which in turn increases the prevalence of MAS. Despite other difficulties, it was also lower in regions with a high prevalence of early cesarean procedures. According to one research, the prevalence of MSAF is greater in Black patients.¹⁸⁻²⁰

Cardiotocography was found to be reassuring in 71.2% of MSAF patients and non-reassuring in 28.8%; the latter was most strongly associated with thick meconium (p -value <0.001), whereas Desai et al. found no such association. The higher rate of cesarean section for women with thick meconium (60% vs 71%, p -value 0.003) suggests that obstetricians are more forceful when managing labor in women with MSAF. Consistent with these results, Kumar S et al. found that thin meconium was associated with a greater rate of cesarean birth (72%) compared to thick meconium (21%). The development of thick meconium later in the second stage might be to blame.²¹

Desai's research also found that compared to the control group, infants with thick meconium were more likely to be admitted to a nursery. There was no statistically significant difference between the groups since most infants in both groups were born healthy and asymptomatic. When the meconium was very thick, endo-tracheal suction was required ($p = 0.04$). Thick meconium was associated with a higher prevalence of MAS than thin meconium was ($p=0.02$), and MAS was discovered in 0.94 percent of all births and 12 percent of MSAF cases. The frequency of MAS in babies born with MSAF varies between 1.6% and 6.8%. Prevention actions should be practical, secure, effective, and based on risk assessment since MAS increases the likelihood of a child needing treatment at a neonatal critical care unit and causes long-term morbidity and mortality.²²

Babies delivered to moms who did not have prenatal appointments were more likely to have MAS (p -value <0.001). None of the moms in the current research experienced pre-eclampsia, although anemia in pregnancy, gestational diabetes, pregnancy-induced hypertension, and early rupture of membranes were all significant risk factors for MAS. Pregnancy-related anemia and pregnancy-induced hypertension were both linked to an increased risk of MAS (p -value <0.03 and <0.001 , respectively). Maternal anemia and pregnancy-induced hypertension were both identified by Ashtekar in India as prenatal risk factors for MAS.^{21, 23}

In light of what has been discussed, it is safe to say that obstetricians and pediatricians should be quite concerned when they see meconium in the amniotic fluid. Therefore, in order to reduce meconium-related problems and enhance fetal success, the presence of thick meconium calls for vigilant monitoring, early and prompt obstetrical intervention, and proper post-natal care.

CONCLUSION

Keeping in mind the results of this study it can be concluded that positive meconium stained liquor had a significantly impact on maternal as well as neonatal outcome. It not only increases the cesarean section rate as well as it had significant morbidity towards neonatal outcome.

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