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Original Research Article

## Neonatal outcome in deliveries complicated by meconium-stained amniotic fluid

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### ABSTRACT

**Background:** Meconium staining amniotic fluid is associated with lots of adverse outcome and has long been considered to be a bad predictor of fetal outcome. This prospective observational study was undertaken to find out immediate fetal outcome in meconium-stained liquor.

**Methods:** The design of the study was prospective. This study was conducted from July 2021 to December 2021. The study included women with meconium-stained amniotic fluid in labor with gestational age >37 completed weeks.

**Results:** Total 100 cases were enrolled. Majority of the patients (74%) were in the age group of 21-30 years with the mean age being 24.6±2.4 years. Fetal distress occurred in 30% of babies, more in association with thick meconium (15%). Caesarean deliveries were 70%. Apgar scores between 0-3 was seen in 17% babies and 1% at fifth minute, between 4-6 in 21% babies and between 7-10 in 62% babies at first minute of birth. Admission in neonatal ward was 32% with perinatal mortality of 6%.

**Conclusions:** Meconium-stained amniotic fluid was associated with higher rate of caesarean delivery, increased need for neonatal resuscitation, increased rate of birth asphyxia with hypoxic ischemic encephalopathy, meconium aspiration syndrome, hospital admission and mortality. It is more commonly associated with pregnancy induced hypertension (PIH), post-datism, oligohydramnios and gestational diabetes mellitus.

**Keywords:** Meconium-stained liquor, Foetal outcome

### INTRODUCTION

Presence of meconium in amniotic fluid is a potentially serious sign of fetal compromise and associated with an increased perinatal mortality and morbidities. It has been associated with poor perinatal outcome including low Apgar scores, increased rate of chorioamnionitis, increased incidence of neonatal intensive care admission and high rate of perinatal mortality. Meconium-stained amniotic fluid is considered a harbinger of fetal compromise because of its direct correlation with fetal distress and increased likelihood of aspiration of meconium with resultant deleterious effects on the neonatal lung. Meconium passage is less up-to 34 weeks of gestations with vertex presentation but after 37 weeks

its incidence increases steadily with increasing gestational age.<sup>1</sup> Passage of meconium in utero with staining of the amniotic fluid occurs in 12% to 16% of all deliveries.<sup>2</sup> Presence of meconium below the vocal cord is known as meconium aspiration and this finding occurs in 20% to 30% of all infants with meconium-stained amniotic fluid with around 12% mortality. Aspiration can occur in utero with fetal gasping or after birth with the first few breaths of life. Meconium staining amniotic fluid is associated with lots of adverse outcome of fetus and has long been considered to be a bad predictor of fetal outcome. Factors such as placental insufficiency, maternal hypertension, pre-eclampsia, oligohydroamnios or maternal drug abuse (tobacco or cocaine) result in, in utero passage of meconium.<sup>3</sup> Main aim of this study is to correlate maternal

outcome in form of mode of delivery and fetal outcome in meconium-stained liquor deliveries and study the need for immediate resuscitation to improve perinatal morbidity and mortality.

## METHODS

A prospective observational study was conducted in obstetrics and gynaecology department of our institution from July 2021 to December 2021 and study population included 100 cases of meconium-stained liquor during labor and their outcome in terms of mode of delivery and fetal outcome.

### Inclusion criteria

The inclusion criteria were: women in labor with term pregnancy (>37 weeks gestation), cephalic presentation, and live singleton normal pregnancy.

### Exclusion criteria

Exclusion criteria were: pregnant women in labour with not knowing last menstrual date, eclampsia, antepartum hemorrhage, intrauterine fetal death, congenital malformation, pre-existing maternal heart or lung disease, pregnancies with IUGR babies, and presentations other than cephalic.

Following selection of cases, detailed history was taken and general and systemic examinations were done. Detailed obstetrical examination was undertaken noting the presentation, position, height of fundus, amount of amniotic fluid, fetal heart rate, uterine contractions, and pelvic status. Use of any medications like oxytocin, sedatives, analgesics was also noted. Detailed follow up of the progress of labor was done using partogram to observe whether the progress of labor was coinciding with normal progress. Patients whose progress was smooth according to the partogram were allowed to progress for normal vaginal delivery. Whereas those patients whose progress did not coincide with the partogram were closely observed and artificial rupture of membrane was done at an earlier stage. Meconium-staining of amniotic fluid was noted during artificial or spontaneous rupture of membranes and its consistency along with fetal heart rate pattern was noted and accordingly the mode of delivery was decided. Fetal outcome was measured by Apgar scores at 1st and 5th minutes, requirement of neonatal resuscitation, admission in neonatal ward and intensive care unit.

**Table 3: Comparison of meconium-stained amniotic fluid with Apgar score at 1 and 5 minute.**

Type of meconium	APGAR score (%) at 1 minute			APGAR score (%) at 5 minute		
	0-3 (severe)	4-6 (moderate)	7-10 (mild)	0-3 (severe)	4-6 (moderate)	7-10 (mild)
<b>Thin (38)</b>	2 (5.26)	6 (15.78)	30 (78.94)	-	01 (2.63)	37 (97.37)
<b>Moderate (34)</b>	7 (20.58)	9 (26.47)	18 (52.94)	00 (0)	02 (5.88)	32 (94.11)
<b>Thick (28)</b>	8 (28.57)	6 (21.42)	14 (50)	01 ((3.7)	01 (3.7)	25 (92.59)
<b>Total (100)</b>	17	21	62	01	04	94

The data was analyzed in Microsoft excel 2010 software.

## RESULTS

Total 100 patients were taken for the study and they were analysed into 3 groups according to their cervical dilation status.

In group 1, all 20 cases of meconium-stained amniotic fluid were delivered by caesarean section. In group 2, out of 65 patients, 45 patients were delivered by caesarean section and 20 patients were delivered by normal vaginal delivery. In group 3, out of 15 patients, 5 patients were delivered by caesarean section and 10 patients were delivered vaginally. This showed faster delivery by caesarean section was required for better fetal outcome (Table 1).

**Table 1: Correlation between cervical dilatation and meconium passage with mode of delivery.**

Group	Cervical dilatation (cm)	No. of cases	Mode of delivery	
			LSCS	Normal vaginal delivery
<b>1</b>	0-3	20	20	0
<b>2</b>	4-7	65	45	20
<b>3</b>	8-10	15	5	10

Out of 30 patients of fetal distress, 17% had thin meconium, 33% had moderate meconium and 50% had thick Meconium (Table 2).

**Table 2: Correlation between consistency of meconium staining and fetal distress.**

Type of meconium	No. of babies with fetal distress	% of babies with fetal distress
<b>Thin</b>	5	17
<b>Moderate</b>	10	33
<b>Thick</b>	15	50
<b>Total</b>	30	100

In present study, APGAR score was noted immediately after birth, then the newborn babies were resuscitated and at 5 minutes APGAR score was reassessed. It was observed that after resuscitation Apgar score improved in many babies. (Table 3).

NICU admission was required in 32 babies. Out of which 18 babies with thick meconium, 9 babies with moderate Meconium required admission. (Table 4). The rate of NICU admission was more in babies delivered with moderate and thick meconium.

**Table 4: Meconium-stained liquor and NICU admission.**

Type of meconium	No. of cases	NICU admission
<b>Thin</b>	38	05
<b>Moderate</b>	34	9
<b>Thick</b>	28	18
<b>Total</b>	100	32

This shows 50% cases had normal fetal heart rate at the time of detection of meconium, 22% had bradycardia and 28% had tachycardia (Table 5).

**Table 6: Meconium-stained amniotic fluid and perinatal morbidity and mortality.**

Perinatal morbidity	Thin	Moderate	Thick	Total	Perinatal mortality
<b>Birth asphyxia</b>	0	1	4	5	1
<b>Aspiration pneumonia</b>	3	1	1	5	1
<b>Respiratory distress syndrome</b>	-	2	3	5	1
<b>Febrile illness</b>	1	2	2	5	1
<b>Infection/septicaemia</b>	-	3	1	4	1
<b>Hypoxic ischemic encephalopathy</b>	0	1	2	3	1
<b>Jaundice</b>	-	1	2	3	0
<b>Convulsion</b>	-	1	1	2	0

## DISCUSSION

This study was done to find out the fetal outcome of those deliveries where liquor was meconium stained and to determine the risk of adverse fetal outcome associated with meconium-stained amniotic fluid. Majority of the patients (74%) were in the age group 21-30 years with the mean age being 24.6±2.4 years. Akhtar et al showed that the mean age of mother was 26.2±5.2 years.<sup>4</sup> Present study shows birth weight of 2.6-3 kg in majority of babies. Sedaghatian et al observed similar result in their study.<sup>5</sup> In our study patients with thin, moderate and thick meconium were studied and analyzed. In present study 60% patients had associated obstetric risk factors like PIH, post-datism, oligohydroamnios. In present study, 50% cases had normal fetal heart rate at the time of detection of meconium, 22% had bradycardia and 28% had tachycardias which were similar with the findings of Berkus et al.<sup>6</sup> In present study, Apgar score at first minute was poor in 49.99% patients with thick meconium as compared to 21.04% of patients with thin meconium at the first minute. This shows that consistency of meconium is one of major factors in deciding fetal outcome. Mode of delivery was significantly influenced by the presence of meconium-stained amniotic fluid. Caesarean deliveries were high (70%), more with thick meconium. At our tertiary care center with facilities

Birth asphyxia, aspiration pneumonia, respiratory distress syndrome, febrile illness, infection/septicemia and hypoxic ischaemic encephalopathy contribute to perinatal morbidity leading to perinatal mortality in few babies.

Perinatal mortality was 6% in present study (Table 6).

**Table 5: Correlation between fetal heart rate and degree of meconium-stained liquor.**

FHR/ min	No. of cases	Degree of meconium		
		Thin	Moderate	Thick
<b>&lt;90</b>	5	0	0	3
<b>90-120</b>	17	4	7	6
<b>120-160</b>	50	21	16	13
<b>&gt;160</b>	28	13	9	6
<b>Total</b>	100	38	34	28

of intrapartum monitoring like nonstress test and cardiotocography, the rate of caesarean delivery was increased because of early detection of irregular fetal heart rate patterns. Present study showed 19.23% developed birth asphyxia. This was comparable to the study conducted by Usha et al.<sup>7</sup> Higher chances of IUGR and intrapartum asphyxia (Apgar score <7) were noted in babies born to mother having snoring and sleep disordered breathing. In present study mortality rate was 4% in cases with thick meconium and 2% in cases of moderate meconium. Khatun et al found 2.9% mortality in meconium-stained amniotic fluid with thick meconium.<sup>8</sup> Gupta et al found 4.9% mortality in meconium-stained amniotic fluid.<sup>9</sup>

The limitations of the study were mainly because of the institute being a tertiary care center, the patients referred here from primary and secondary care centers at full term didn't have all the required documents which may affect the fetal outcome and further management of patient.

## CONCLUSION

Meconium-stained amniotic fluid is associated with increased need for neonatal resuscitation, increased risk of birth asphyxia, meconium aspiration syndrome, hospital

admission and mortality. So, identification of pregnant women at risk of passage of meconium during labour would allow intensive fetal surveillance and early intervention which might lead to reduction in neonatal adverse outcomes. Neonatal expertise at the time of delivery with equipments like oxygen mask, laryngoscope, suction catheter, endotracheal tube and AMBU bag should be present and advanced neonatal resuscitation unit is required to decrease fetal morbidity and mortality in patients with meconium-stained amniotic fluid.

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## REFERENCES

1. Steer PJ, Eigbe F, Lissauer TJ, Beard RW. Interrelationships among abnormal cardiotocograms in labor, meconium staining of the amniotic fluid, arterial cord blood pH, and Apgar scores. *Obstet Gynecol.* 1989;74:715-21.
2. Maymon E, Chaim W, Furman B, Ghezzi F, Shoham Vardi I, Mazor M. Meconium stained amniotic fluid in very low risk pregnancies at term gestation. *Eur J Obstet Gynecol Reprod Biol.* 1998;80:169-73.
3. Shaikh EM, Mehmood S, Shaikh MJ. Neonatal outcome in meconium stained amniotic fluid- One year experience. *J Pak Med Assoc.* 2010;60(9):711-4.
4. Akhtar N, Fazilatunnesa, Yasmean S. Mode of delivery and fetal outcome in meconium stained amniotic fluid in DMCH. 2006.
5. Sedaghatian MR, Otheman L, Rashid N, Ramachandran P, Bener BA. An 8 year study of meconium stained amniotic fluid in different ethnic groups. *Kuwait Med J.* 2004;36:266-9.
6. Berkus MD, Langer O, Samuelloff A, Zenakis EM, Field NT, Ridgeway LE. Meconium stained amniotic fluid: Increased risk for adverse neonatal outcome. *Obstet Gynaecol.* 1994;84:115-20.
7. Khatun M. Meconium Staining liquor and its correlative with fetal outcome within seven days of birth in Dhaka medical college. Dissertation. *Bangladesh Coll PhysiciansSurgeons.* 2005;2:3943.
8. Sharma U, Gokhroo K, Sharma M. Perinatal outcome in meconium stained amniotic fluid. *As J Obstet Gynaecol Practice.* 2004;8(4):37-40.
9. Gupta V, Bhatia BD, Mishra OP. Meconium stained amniotic fluid: Antenatal intrapartum and neonatal attributes. *Indian Paediatr.* 1996;33:293-7.

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