ORIGINAL RESEARCH PAPER
Volume - 10 | Issue - 07 | July - 2021 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

MECONIUM STAINED LIQOUR AND ITS IMPACT ON PERINATAL OUTCOME

Obstetrics & Gynaecology

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ABSTRACT

Background- The occurrence of meconium-stained amniotic fluid (MSAF) during labor has long been considered the predictor of adverse fetal outcomes such as meconium aspiration syndrome and perinatal asphyxia, which leads to perinatal and neonatal morbidity and mortality

Methods- A Prospective observational study was carried out in Smt. Hira Kunwar Ba Mahila Hospital, Jhalawar attached to Jhalawar Medical College,over one year from January 2020 to January 2021. Total 278 cases taken at random basis having following inclusion criteria

Result- MSL is responsible for neonatal morbidity in 15.1% of cases. Rate of neonatal morbidity was higher in thick meconium group (24.9%) as compared to thin meconium group (6.2%) and this difference was statistically significant. In our study birth asphyxia (5.8%) was the most common complication followed by MAS (4%), Pneumonitis (3.6%) and Sepsis (1.8%).

Conclusion- Passage of meconium still remains as an enigma to the obstetrician and equally worries the paediatrician. As shown in the study, thick meconium is associated with increased operative intervention, low apgar score, increased rate of NICU admission and increased risk of neonatal morbidity and mortality as compared to thin meconium.

KEYWORDS

NICU, MAS, APGAR

INTRODUCTION

The occurrence of meconium-stained amniotic fluid (MSAF) during labor has long been considered the predictor of adverse fetal outcomes such as meconium aspiration syndrome and perinatal asphyxia, which leads to perinatal and neonatal morbidity and mortality[1]. Indeed although 12- 22% of labour are complicated by meconium, only a few are linked to infant mortality[2]. Meconium is a germ-free ,thick-green,odorless material which is first recognized in the fetal intestine around 12 week of gestation and stores in the fetal colon throughout gestation[3] .Meconium is thought to be passed from the fetal gestro-intestine tract as a response to hypoxia, mesentic vasoconstriction induced gut hyperperistalsis, falling umbilical venous saturation, vagal stimulation and normal physiological function of a mature fetus[4]. Meconium -stained amniotic fluid is uncommon before 37 weeks of gestation, and the occurrence of a meconium-stained amniotic fluid increases with increasing gestational age. The volume of amniotic fluid normally continues to decrease after 38 wks and may become problematic, moreover, meconium release into an already reduced amniotic fluid volume results in thick viscous meconium, it may cause meconium aspiration syndrome[2].Meconium aspiration syndrome defined as respiratory distress in an infant born through Meconium stained amniotic fluid whose symptoms cannot be otherwise explained.

MSAF is associated with both maternal and foetal risk factors. Maternal factors include hypertension, gestational diabetes mellitus, chronic respiratory or cardiovascular diseases, post dated pregnancy, pre-eclampsia and eclampsia . Foetal factors include oligohydramnios ,foetal growth restriction and poor biophysical profile. MSAF is associated with increased risk of operative interference in terms of instrumental delivery or caesarean section and increased rate of neonatal resuscitation and meconium aspiration syndrome (MAS)[5]. As per NICE guidelines published in 2014, meconium stained amniotic fluid is classified as -

1. Significant MSL is defined as dark green or black amniotic fluid that is thick or any meconium stained amniotic fluid containing lumps of meconium.
2. Non- significant MSL is defined as a thin yellow or greenish tinged fluid; containing non-particulate meconium[7].

MATERIAL AND METHODS

A Prospective observational study was carried out in Smt. Hira Kunwar Ba Mahila Hospital, Jhalawar attached to Jhalawar Medical College,over one year from January 2020 to January 2021. Total 278 cases taken at random basis having following inclusion criteria. all pregnant women with meconium stained liquor irrespective of age, parity & stage of labour, singleton pregnancy, full term pregnancy, cephalic presentation. Complete history taken ,clinical assessementdone,type of delivery was noted and analysis done by using appropriate statistical method.

INCLUSION CRITERIA

1. All pregnant women with meconium stained liquor irrespective of age, parity & stage of labour.
2. Cephalic presentation
3. Singleton pregnancy
4. Gestational age ≥ 37 weeks
5. Previous normal deliveries and previous cesarean section.
6. Patient who have signed the informed consent.

EXCLUSION CRITERIA

1. Gestational Age $<36^{+6}$ Weeks
2. Malpresentation
3. Multiple Pregnancies
4. Congenital anomalies in the fetus

RESULTS

Significant association was found between mode of delivery and consistency of meconium. Cases with thick meconium had higher rate of LSCS as compared to thin (77.4% v/s 59.3% ; P = 0.001).The 1 minute and 5 minute APGAR score was less in thick meconium group as compared to thin meconium and this difference was statistically significant (P =0.0001). 29.5% of neonates with MSL, were admitted in NICU. Neonates with thick MSL had higher rate of NICU admission as compared to thin MSL (43.6% v/s 16.6%) and statistically significant (P = 0.0001).In our study, neonatal morbidity found in 15.1% of cases. Rate of neonatal morbidity was higher in thick meconium group (24.9%) as compared to thin meconium group (6.2%) and statistically significant (P = < 0.0001). This association was also statistically significant in MAS (7.5% in thick and 0.7% in thin group; P = 0.004) and pneumonitis (6% in thick and 1.4% in thin group ; P = 0.038). Whereas in sepsis(3% in thick and 0.7% in thin group; P = 0.146) and birth asphyxia (8.3% in thick and 3.4% in thick group; P = 0.085), this association was statistically insignificant. Neonates with MSL had 2.5 % mortality rate. All mortality occurred in thick MSL group and none occurred in thin MSL group. This difference was statistically significant (P= 0.0001). MAS (42.8%) and sepsis (42.8%) were the commonest causes of neonatal mortality in MSL cases followed by pneumonitis (14.3%).

Table: 1 Distribution of Mode of Delivery According to Consistency of Meconium

Mode of delivery	Consistency of meconium		Total	Chi Sq	P Value
	Thick	Thin			
LSCS	103	86	189	10.480	0.01*
	(77.4%)	(59.3%)	(68.0%)		

NVD	30	59	89		
	(22.6%)	(40.7%)	(32.0%)		
Total	133	145	278		
	(100%)	(100%)	(100%)		

Thick meconium group were delivered mainly by LSCS while NVD was the main mode of delivery in thin meconium group.

Table:2. Distribution of Mean APGAR Score According to Consistency of Meconium

APGAR Score	Consistency of meconium	N	Mean	Std. Deviation	T value	P value
1 minute	Thick	133	4.9248	1.29465		
	Thin	145	5.8414	1.00468	6.624	<0.0001*
5 minute	Thick	133	6.6090	1.73133		
	Thin	145	7.8138	1.22467	6.741.	<0.0001*

The 1 minute and 5 minute APGAR score was less in thick meconium group as compared to thin meconium group and apgar score at 5 minute were seen to be improved in both thick and thin meconium group as compared to APGAR score at 1 minute.

Table:3
NICU Admission in MSL Cases

NICU Admission	Consistency of meconium		Total	Chi sq	P value
	Thick	Thin			
Yes	58	24	82		
	43.6%	16.6%	29.5%	24.421	<0.0001*
No	75	121	196		
	(56.4%)	(83.4%)	(70.5%)		
Total	133	145	278		

In present study 29.5% of neonates with MSL needed admission to NICU. Thick meconium group was associated with more rate of NICU admission (43.6%) as compared to thin group (16.6%).

Table :4 Distribution of Neonatal MorbidityAccording to consistency of MSL

Neonatal morbidity		Consistency of meconium						Chi Sq	P Value
		Thick (n =133)		Thin (n = 145)		Total (n =278)			
		N	N %	N	N %	N	N %		
MAS	Yes	10	7.5%	1	0.7%	11	4.0%	8.513	0.004*
	No	123	92.5%	144	99.3%	267	96.0%		
Sepsis	Yes	4	3.0%	1	0.7%	5	1.8%	2.110	0.146
	No	129	97.0%	144	99.3%	273	98.2%		
Pneumonitis	Yes	8	6.0%	2	1.4%	10	3.6%	4.299	0.038*
	No	125	94.0%	143	98.6%	268	96.4%		
Birth Asphyxia	Yes	11	8.3%	5	3.4%	16	5.8%	2.974	0.085
	No	122	91.7%	140	96.6%	262	94.2%		
Total	Yes	33	24.9%	9	6.2%	42	15.1%	18.72	<0.0001*
	No	100	75.1%	136	93.8%	236	84.9%		

MSL is responsible for neonatal morbidity in 15.1% of cases.Rate of neonatal morbidity was higher in thick meconium group (24.9%) as compared to thin meconium group (6.2%) and this difference was statistically significant. In our study birth asphyxia (5.8%) was the most common complication followed by MAS (4%), Pneumonitis (3.6%) and Sepsis (1.8%).

Table :5 Distribution of Neonatal Mortality According to consistency of MSL

Condition of baby at discharge	Consistency of meconium		Total	Chi sq	P value
	Thick	Thin			
Expired	7	0	7	24.710	<0.0001*
	(5.3%)	(0.0%)	(2.5%)		
Healthy	126	145	271		
	94.7%	100.0%	97.5%		
Total	133	145	278		

In present study, neonates with MSL had 2.5% mortality rate. On comparision of neonatal mortality with consistency of MSL, all mortality occurred in thick MSL group (2.5%) and none was occurred in thin MSL group and this difference was statistically significant (P value = 0.0001).

DISCUSSION

The passage of meconium may be a normal physiological maturation event on one hand and on other hand it reflects fetal hypoxia or increased vagal activity from cord compression. A significant association has been reported between the consistency of meconium (thick versus thin) and increased rate of cesarean section, low Apgar scores and increased rate of neonatal morbidity and mortality.

In present study, 68% of MSL cases had delivery by LSCS 32% of cases delivered vaginally. Further on comparing the subgroups of thick and thin meconium, 77.4% of cases with thick meconium had LSCS, whereas only 59.3% of thin meconium had LSCS and the difference was statistically significant (P value =0.001). These results were comparable to the studies by Qadir et al (56.2% v/s 34.2%)[1]and Soni et al (94.30 % v/s 39.18%)[6].

In our study the mean APGAR score at 1 minute and 5 minute in thick meconium group was 4.92 and 6.60 respectively and in thin meconium group mean APGAR score at 1 minute and 5 minute was 5.84 and 7.81 respectively. These results were statistically significant (P value =<0.0001). Miller et al, found that mean APGAR score in thick meconium cases was 6.4 and 8.1 at 1 minute and 5 minute respectively and in thin meconium cases, it was 7.2 and 8.3 at 1 minute and 5 minute respectively[7]. In a study by Biradar A et al, mean APGAR score at 1 minute and 5 minute in thick meconium group was 6.4 and 8.3 respectively and in thin meconium group, it was 6.8 and 8.8 at 1 minute and 5 minute respectively[5]. Results of these studies were comparable to our study.

In present study 29.5% of neonates with MSL needed admission to NICU. This result of present study was comparable to the study by Priyadharshini et al (28%)[4]. However, only 13% of neonates with MSL required NICU admission in a study by Gavhane B et al[8]. 43.6% of neonates with thick meconium required NICU admission whereas 16.6% of neonates with thin MSL required NICU admission and this difference was statistically significant (P value= 0.0001). These result were comparable to the studies by Priyadharshini M et al (33.8% v/s 8.1%) and Gavhane B et al (20.56% v/s 4.34%).

As we know MSL is associated with various neonatal complications, which leads to neonatal morbidity and mortality. In this study, MSL is responsible for neonatal morbidity in 15.1% of cases. Rate of neonatal morbidity was higher in thick meconium group (24.9%) as compared to thin meconium group (6.2%) and this difference was statistically significant. In our study birth asphyxia (5.8%) was the most common complication followed by MAS (4%), Pneumonitis (3.6%) and Sepsis (1.8%). In our study, patients with thick MSL had higher rate of birth asphyxia as compared to patients with thin MSL (8.3% v/s 3.4%). These results were comparable to the study byPriyadharshini et al (8.5% v/s 2.85%) &Gavhane B et al (7.47% v/s 3.22%)[4,8]. In our study,7.5% neonates of thick MSL group had MAS, whereas only 0.7% neonates with thin MSL group had MAS and this difference was statistically significant (P value =0.004). These results were comparable to the study by Chavan R et al (14.4% v/s 4.8%)[9]and by Biradar A et al (5.1% v/s 0%)[5]. Similarly incidence of sepsis and pneumonitis was higher in thick meconium group compare to thin meconium group.

In present study, neonates with MSL had 2.5% mortality rate. This result was comparable to the study by Unnisa S et al, where it was of 2%[10]. Neonatal mortality rate was 0.5% in a study by Jain P et al[11]. On comparision of neonatal mortality with consistency of MSL, all mortality occurred in thick MSL group (2.5%) and none was occurred in thin MSL group and this difference was statistically significant (P value = 0.0001). These results were similar to the study Khillan S et al,in which neonatal mortality rate was 5.96% in thick meconium groupand 0.48% in thin meconium group[12] and Goud P et al,in which neonatal mortality rate was 15.6% in thick meconium and 2.7% in thin meconium group[13].

CONCLUSION

Passage of meconium still remains as an enigma to the obstetrician and equally worries the paediatrician. As shown in the study, thick meconium is associated with increased operative intervention, low apgar score, increased rate of NICU admission and increased risk of neonatal morbidity and mortality as compared to thin meconium.

Thus presence of MSAF needs close monitoring of fetus, mindful

interventions and presence of skilled paediatrician at the time of birth of baby.

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