



MECONIUM STAINED LIQUOR: SIGNIFICANCE AND PERINATAL OUTCOME.

Obstetrics & Gynaecology

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ABSTRACT

Background: The aim of this study is to know the significance of meconium stained liquor and its association with perinatal outcome.

Methods: The present study is a prospective observational study conducted from August, 2020 on 100 women with meconium stained liquor.

Results: Out of 100 patients, 29% presented with Grade-I meconium stained liquor, 43% with grade-II meconium stained liquor and 28% with grade-III meconium stained liquor. 50% of the patients with grade-III meconium stained liquor had abnormal pattern of FHR; caesarean delivery rate was 85.7% in patients with grade-III meconium stained liquor with increased rate of NICU admissions (82.14%) with one neonatal death.

Conclusions: In the present study, it was observed that grading of meconium has a bearing on mode of delivery and perinatal outcome. Thick meconium stained liquor is associated with abnormal FHR pattern, operative delivery and perinatal morbidity and mortality.

KEYWORDS

MSL- Meconium Stained Liquor, NICU (Neonatal Intensive Care Unit), MSAF (Meconium Stained Amniotic Fluid).

INTRODUCTION

Meconium is a germ-free, thick, black-green, odourless material which is first recognized in the fetal intestine (ileum) around 12 weeks of gestation and stores in the fetal colon throughout gestation¹. Meconium passage is rare before 32 weeks and its incidence increases as the gestational age increases². Meconium staining of the amniotic fluid has long been regarded as a sign of fetal distress but however its significance varies from entirely being physiological to a sign of fetal distress³. Although the exact cause is not known, meconium is thought to be passed from the fetal gastro-intestinal tract as a response to hypoxia, mesenteric vasoconstriction, induced gut hyper-peristalsis, falling umbilical venous saturation, vagal stimulation and normal physiological function of a mature fetus⁴. Meconium Stained Amniotic Fluid has a strong association with post- dated pregnancy. The risk factors for meconium stained amniotic fluid are both maternal and fetal. The maternal factors are hypertension, gestational diabetes mellitus, maternal chronic respiratory or cardiovascular diseases, post term pregnancy, pre-eclampsia, eclampsia, intrahepatic cholestasis of pregnancy, maternal anaemia and prolonged labour. The fetal factors include oligohydramnios, intrauterine growth retardation, and poor biophysical profile⁵. The incidence of Meconium Stained Liquor varies from 7-22%⁶, 5% of these develop meconium aspiration syndrome, which is associated with clinical disease ranging from mild respiratory distress to severe respiratory distress. Meconium aspiration syndrome can cause or contribute to neonatal death in upto 0.05% (i.e., 1 in 2000 of all pregnancies)⁷.

The present study was done to know about the association of risk factors with meconium stained liquor and early intervention and the likely perinatal outcome.

Meconium Stained liquor can be graded according to its visual appearance. Grade-I meconium stained Liquor is translucent, light yellow green in colour, Grade-II meconium stained liquor is opalescent with deep green and light yellow in colour and grade-III meconium stained liquor is opaque and deep green coloured in appearance.

According to RCOG guidelines, Meconium Stained Amniotic Fluid is classified as significant Meconium Stained Liquor and non-significant Meconium Stained Liquor. Non-significant Meconium Stained Liquor is defined as a thin yellow or greenish tinged fluid; containing non-particulate meconium whereas, significant Meconium Stained Liquor is explained as dark green or black amniotic fluid that is thick and tenacious and consists of lumps of meconium.

INCLUSION AND EXCLUSION CRITERIA

Inclusion Criteria:

1. Full term pregnancy.

2. Singleton pregnancy.
3. Vertex Presentation.
4. Meconium staining of amniotic fluid is detected after rupture of membranes.

Exclusion Criteria:

1. Gestational age <37 weeks.
2. Previous caesarean section.
3. Multiple pregnancy.
4. Non-cephalic presentation.

MATERIAL AND METHODS

After obtaining ethical clearance, this prospective observational study was carried out from August 2020 on 100 women with MSL in the department of Gynaecology at GMC, Kathua, Jammu and Kashmir. The women fulfilling the inclusion criteria were enrolled in the study after taking the written and informed consent. Patients' detailed history, gestational age, per abdominal examination, per speculum and per vaginal examination, etc were done. Admission tests including intrapartum CTG was recorded. Use of any medication like oxytocin, analgesics and sedatives, time of rupture of membranes, appearance of meconium were noted.

By visual examination of meconium staining, amniotic fluid was graded as Grade-I, Grade-II and Grade-III.

Relation of meconium was co-related with age, parity stage of labour. CTG was done and in women with abnormal CTG findings, non-progression of labour and showing any other obstetric indication, LSCS was performed. Perinatal outcome was measured in terms of APGAR score at five minutes, birth weight, NICU admission; the neonates who had meconium aspiration syndrome and birth asphyxia was recorded.

RESULTS AND OBSERVATIONS

Table No. 1.

Age in years	Cases with meconium stained liquor	Percentage of cases with meconium stained liquor.
<20	9	9%
21-25	40	40%
26-29	35	35%
30-34	12	12%
>35	4	4%

P Value: 0.5

Party Wise Distribution:

Nulliparous	67	67%
Multiparous	33	33%

P Value: 0.5

Socio-economic Status:

Upper	3	3%
Middle	44	44%
Lower	53	53%
P Value: 0.5		

Residence:

Urban	32	32%
Rural	68	68%
P Value: 0.5		

In this study, out of the 100 patients with meconium stained liquor studied. 67% were nulliparous and 33% with multiparous. Most of the women were in the age group of 21-25 years (40%), 35% from the age group of 26-30 years and 12% from the age group of 31-35 years and 9% of the patients were below 20 years and 4% were above 35 years. Most of the women were from lower socio-economic status and from the rural area.

Table No. 2: Risk Factor Associated With MSL.

Maternal	%age	Fetal	%age
Post dated pregnancy	43	PROM	4
Hypertensive disorders of pregnancy (HDP)	8	IUGR	5
Rh Isoimmunisation	3	Oligohdramnios	5
Gestational diabetes mellitus	2		
IHCP	10		
Prev LSCS	7		
Anemia (Moderate/Severe)	6		
Prolonged Labour	7		
P Value: 0.5		P Value: 0.5	

In the present study, among the risk factors associated with MSL, post-dated pregnancy was the commonest risk factor associated with 43% of cases. Hypertensive disorders of pregnancy (HDP) was observed in 8%. IHCP in 10% and prolonged labour in 7% of cases. 7% of women had previous caesarean delivery. 6% women were moderate to severe anemia and 2% has a gestational diabetes mellitus. Also, Oligohydramnios was observed in 5% of cases, 5% had a IUGR fetus and PROM was observed in 4% of cases.

Table No. 3: No. Of Patients With Grading Of MSL.

Grade-I	29
Grade-II	43
Grade-III	28
P Value: 0.5	

In this study, most of the patients had Grade-II MSL (43%), Grade-I of MSL was noted as 29% of cases and grade-III of MSL was noted in 28% of cases.

Table No. 4: MSL And CTG Patterns

	Grade-I	Grade-II	Grade-III
Normal CTG pattern	16 (55.17%)	21 (48.83%)	8 (29.57%)
Suspicious CTG pattern	9 (31.03%)	9 (20.93%)	6 (21.42%)
Pathological CTG pattern	4 (13.79%)	13 (30.23%)	14 (50%)
Total	29	43	28
P Value: 0.5		P Value: 0.5	P Value: 0.5

In the present study, in patients with grade-I MSL, 55.17% had normal CTG pattern, 31.03% had suspicious CTG pattern and 13.79% had pathological CTG. Among the patients with grade-II MSL, 48.83% had normal CTG pattern, 20.93% had suspicious CTG pattern and 30.23% had abnormal or pathological CTG pattern. In women with grade-III MSL, 28.57% had normal CTG, 21.42% had suspicious CTG pattern while 50% had an abnormal CTG pattern; suggesting a higher incidence of abnormal FHR which increasing grade of MSL.

Table No. 5 Mode Of Delivery And Grading Of MSL

Mode of delivery	Grade-I	Grade-II	Grade-III
Vaginal delivery	17 (58.62%)	19 (44.18%)	3 (10.71%)
Instrumental Vaginal Delivery	2 (6.89%)	1 (2.32%)	1 (3.57%)
LSCS	10 (34.48%)	23 (53.48%)	24 (85.71%)

	29	43	28
	P Value: 0.5	P Value: 0.5	P Value: 0.5

In the present study, the rate of caesarean delivery was higher in women with grade-III MSL (85.71%) while it was 53.48% in grade-II MSL and 34.48% in women with grade-I MSL. This is due to higher incidence of abnormal CTG pattern in women with grade-III MSL, contributed by other obstetrical indications.

Table No. 6 Neonatal Outcome In MSL

	Grade-I	Grade-II	Grade-III
Asymptomatic	24 (82.75%)	32 (74.45%)	5 (17.85%)
NICU admission	5 (17.24%)	11 (25.58%)	23 (82.14%)
Birth Asphyxia	1 (3.44%)	2 (4.65%)	3 (10.71%)
Meconium aspiration syndrome	0	3 (6.99%)	5 (17.85%)
Septicemia	1 (3.44%)	2 (4.65%)	3 (10.71%)
Early Neonatal deaths	0	0	1 (3.59%)
P Value: 0.5		P Value: 0.5	P Value: 0.5

In the present study, among the women with grade-III MSL 82.14% needed NICU admissions, 10.71% exhibited birth asphyxia. In women grade-I and II MSL, NICU admissions was needed in 17.24% and 25.58% respectively and birth asphyxia was observed in 3.44% and 4.65% cases of women in Grade-I and II respectively. MAS was overall seen in 8 cases (8%) in the present study, 17.85% of women in grade-III MSL and 6.99% of women in Grade-II MSL. There was one early neonatal death in the study. 82.75% of babies with grade-I MSL were asymptomatic showing it also be a physiological event.

DISCUSSION

The presence of meconium may be a normal physiological event reflecting fetal maturity. On the other hand, it may reflect fetal hypoxia or increased vagal activity from cord compression⁸. Meconium stained amniotic fluid in breech presentation is of no significance as it is due to mechanical compression on the fetal abdomen but the meconium stained amniotic fluid in cephalic presentation is of great concern. It causes apprehension and anxiety for the patient as well as the health provider as it is often considered as an indication of fetal distress⁹. Meconium staining of amniotic fluid calls for a close vigilance and proper monitoring of labour. Also the incidence of meconium passage during labour increases with gestational age, 30% at 40 weeks, 50% at 42 weeks¹⁰. In the present study, out of the 100 MSL deliveries, the potential antepartum and intra-partum risk factors studies were post-dated pregnancy (43), PIH (8), Rh Isoimmunisation (3), GDM (2), IHCP (10), LSCS (7), moderate to severe anaemia (6), prolonged labour (7), PROM (4), IUGR (5) and Oligohydramnios (5).

Shelly K et al in a similar study, has shown the incidence of post-dated patients as 29.2%¹¹. Mundhara et al has shown the incidence as 50%¹² and Chakroborty et al as 34.1%¹³.

In our study, 8%, pregnancy with MSL was associated with PIH. Study done by Bhide et al showed 13% association¹⁴ whereas, Meena P et al has shown 12 in 250 (4.8%) association.

In another study conducted by Desai et al, they have shown the incidence as 20%. PROM had an association in 4% of cases which is near to that observed by Rao et al¹⁵. In their study where 5% of patients were associated with PROM. Association of IUGR and Oligohydromnios was observed to be 5% and 5% respiratory in our study. Desai et al has observed the association of Oligohydromnios in 6% and IUGR in 4.66% of cases of MSL. In the present study, Grade-I MSL was observed in 29%, Grade II MSL in 43% and Grade-III MSL in 28% of pregnancies. Nirmala et al in their study have shown the incidence as 39%, 43% and 18% respectively¹⁶. Surekha et al in their study observed the grade of MSL as 34.16%, 29.16% and 36.66%¹⁷. MeenaPriyadarshini et al have shown the presence of Grade-I MSL in 34.5%, Grade-II MSL in 40.8% and Grade III MSL in 24.8% of cases. Our study showed consistency with the study of Priyadarshini et al.

In the present study, abnormal CTG was seen in 13.79% in Grade-I, 30.23% in Grade-II and 50% in Grade-III MSL with overall incidence as 31%. In another study conducted by Biradar et al, abnormal FHR pattern on CTG were 17% in thin MSL and 34.3% in thick MSL¹⁸.

Similar study conducted by Desai et al and Priyadarshini et al showed abnormal FHR pattern as 34.66% and 49.4% respectively and

indicating that abnormal FHR pattern is seen more with MSAF.

The cases with thick grade III MSL showed a greater need of operative interference in the present study. 85.71% patients with grade III MSL had caesarean delivery, 1 (3.54%) had vaginal delivery whereas, caesarean rate was 53.48% and 34.48% in Grade II and Grade-I MSL. Overall in all grades of MSL, Caesarean rate was 57%. Instrumental delivery was 4% and spontaneous vaginal delivery rate was 39%. Similar study was done by Qadir S et al and PriyadharshiniMV et al showed comparison with present study showing higher incidence of caesarean with thick MSAF whereas, study done by Desai D et al had higher incidence of Caesarean (86%)¹⁹. Patil et al in their study showed caesarean section rate of 42 %, Espinheira MC et al in their study shown caesarean rate of 62.5%.

In the present study, 82.75% of babies were asymptomatic in grade I MSL, 74.45% were asymptomatic in Grade-II MSL and only 17.85% were asymptomatic in Grade-III MSL. 82.14% of babies in grade III MSL needed NICU admission while 25.58% in grade II and 17.24% in Grade I MSL. So, total, 61% babies were asymptomatic and 39% needed NICU admission.

There was one neonatal death in NICU. In a study conducted by Pronoy N, 56.2% infants were asymptomatic at birth, 42.9% had NICU admission and 0.8% had death while Shelly K et al have observed 22.7% NICU admission and 77.3% babies as asymptomatic. MAS was seen in 5 (17.85%) of babies in grade III MSL and 6.91% of babies in grade II MSL while birth asphyxia was observed in 10.71% of infants born with grade III MSL, 4.65% of infants born with grade II MSL and 3.44% in Grade I MSL. This shows that there was increased tendency of meconium aspiration in grade III. Studies conducted by Biradar A et al, Desai D et al and Priyadharshini MV et al have shown 5.1%, 6% and 5% rates of meconium aspiration while a low incidence of 2.1% was shown by Akhila S et al.

CONCLUSION:

The presence of meconium amniotic fluid is worrisome for both obstetricians' and pediatricians' point of view as it is associated with increased operative interference, NICU admission, birth asphyxia and meconium aspiration. As the presence of thick meconium is associated with increased perinatal morbidity and mortality, its presence should not be overlooked. The presence of meconium becomes more significant when it is associated with fetal heart rate abnormalities.

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