

An Impact of Meconium Stained Liquor on Perinatal Outcome.Shailashree¹, Smita Krishnarao Bhat²¹Junior Resident, Department of Obstetrics and Gynaecology, Bharati Vidyapeeth (Deemed to be University) Medical College and Hospital, Sangli, India²Professor, Department of Obstetrics and Gynaecology, Bharati Vidyapeeth(Deemed to be University) Medical College and Hospital, Sangli, India.

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Conflict of interest: Nil

Abstract:

Background: Meconium stained amniotic fluid is associated with increased frequency of operative delivery, birth asphyxia, neonatal sepsis, NICU admissions. Thus, early detection and timely interventions are necessary to reduce the complications. The presence of abnormal fetal heart rate detected in the non-stress test along with the meconium stained amniotic fluid is a definite indication of fetal compromise. The Apgar scores calculated at 1 min and 5 min give us an idea of the impact caused by the meconium staining on the neonate.

Materials and Methods: This study is carried out in the department of obstetrics in a tertiary care centre. This is a prospective observational study involving all the patients who deliver with meconium stained liquor for 6 months of duration. The meconium stained liquor is classified into 3 grades and fetal heart rate abnormalities recorded using non-stress test are noted. The Apgar score of the neonates is noted at 1 minute and 5 minutes of birth. The evidence of cord around neck, IUGR, postmaturity, congenital anomalies are looked for and the reasons for NICU admission are listed.

Results: The meconium staining is associated with increased rate of caesarean section (59.7%), increased NICU admissions (61.4%) and more common in primigravida patients (56.1%). An equal association of the grade 2 and 3 meconium is seen with non-reactive non-stress test (both 66.66%). 78.9% of the neonates have low Apgar score at 1 min whereas only 52.6% of the neonates at 5 min. The main cause of the meconium staining is found to be placental insufficiency (26.3%) followed by oligohydramnios (24.5%). The most common reasons for NICU admissions are respiratory distress (45.7%) followed by Meconium aspiration syndrome (22.8%) and neonatal sepsis (17.1%). The neonatal morbidity rate is found to be 61.4% whereas the neonatal mortality rate is 17.5% which is significant.

Conclusion: The presence of meconium stained liquor is a serious sign of intrauterine fetal compromise, associated with raise in neonatal morbidity. Thick meconium stained liquor along with Non-reactive NST is significantly associated with higher caesarean section rate, low Apgar score, NICU admissions, neonatal morbidity. It is associated with increased risk of adverse neonatal outcomes such as MAS, perinatal asphyxia which leads to perinatal and neonatal morbidity and mortality. The clinical significance is that meconium staining alerts the obstetrician to do the early intervention and also to look for other signs of fetal compromise.

Keywords: Meconium Stained Liquor, NICU, Non-Stress Test, Apgar Score.

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Introduction

Meconium is derived from the Greek word "mekonion" which means "like opium". It is believed that this substance causes sleeping state of foetus in the mother's womb. It is the viscous green liquid with gastrointestinal secretions, bile, mucus, pancreatic juice, cellular debris, amniotic fluid, swallowed vernix caseosa. The two principal reasons for the passage of meconium are fetal maturity (mainly CNS and GI system) and fetal compromise. Meconium stained amniotic fluid is associated with increased frequency of operative delivery, birth asphyxia, neonatal sepsis, NICU admissions. [1] The factors associated with an increased risk for meconium stained amniotic fluid

are maternal age, placental insufficiency, prolonged labor, induced labor, postdatism, Diabetes mellitus, pre-eclampsia, maternal drug abuse etc. Thus, early detection and timely interventions are necessary to reduce the complications. [2,3,4] A closer monitoring of fetal well being is prudent in these cases. The suspicious and pathologic tracings in cardiotocography are seen commonly in these cases. [8,9] The presence of abnormal fetal heart rate along with the meconium stained amniotic fluid is a definite indication of fetal compromise. [5,6] Thick meconium stained amniotic fluid is associated with increased peripartum infection rates. [7] The pregnancies complicated with

meconium stained liquor are regarded as at risk of fetal distress. Hence, the obstetricians need to get alerted to look for further signs of fetal compromise.[10] It is definitely associated with the adverse neonatal outcomes. The Apgar scores calculated at 1 min and 5 min give us an idea of the impact caused by the meconium staining on the neonate. The meconium staining is associated with increase in neonatal morbidity rate and neonatal mortality rate. Supportive therapy like oxygen supplementation, mechanical ventilation, IV fluids are the cornerstone in the management. Availability of surfactant, inhaled nitric oxide ventilators, ECMO has made it possible to salvage more infants with meconium aspiration syndrome.[5,11,12]

Aims and Objectives

Aim: To determine an impact of meconium stained liquor on the perinatal outcome.

Objectives:

1. To grade the meconium stained liquor and determine its perinatal outcome
2. To correlate the fetal heart rate abnormalities and perinatal outcome in meconium stained liquor.

Materials and Methods

This study is carried out in the department of obstetrics in a tertiary care centre. This is a

prospective observational study involving 57 patients who delivered with meconium stained liquor. This study is carried out for 6 months of duration after approval from the ethics committee.

Inclusion criteria: Pregnant women aged 19 years and above, primiparous or multiparous, singleton pregnancy, cephalic presentation, in labour and who are willing to participate are selected for this study.

Exclusion criteria: Patients with multiple gestations, malpresentations, congenital anomalies of the fetus, antepartum hemorrhage with clear liquor and who are not willing to participate are excluded from this study.

An informed written consent and a detailed history is taken and the meconium stained liquor is classified into 3 grades. FHR abnormalities recorded using cardiotocograph are noted. The Apgar score of the neonates is noted at 1 minute and 5 minutes. The evidence of cord around neck, IUGR, postmaturity, congenital anomalies are looked for and the reasons for NICU admission are listed. The total sample size collected in the study period is 57.

Results

Table 1: Distribution of cases according to maternal age and parity-

Maternal age	Primiparous	Multiparous	Total	Percentage
19-24 years	19	7	26	45.6%
25-30 years	11	12	23	40.3%
>30 years	2	6	8	14.1%
Total	32	25	57	
Percentage	56.1%	43.8%		

This table shows the age-wise distribution of the subjects along with their parity. Majority of the cases are seen in the age group of 19-24 years (45.6%). Also 40.3% of them are in the age group of 25-30 years and 14.1% in the group of >30 years. 56.1% of them are primiparous whereas 43.8% of them are multiparous.

Table 2: Distribution according to gestational age and mode of delivery

Gestational age (in weeks)	Vaginal delivery	LSCS	Total	Percentage
<37 weeks	6	3	9	15.7%
37-39 weeks 6 days	12	16	28	49.1%
40-42 weeks	4	11	15	26.3%
>42 weeks	1	4	5	8.9%
Total	23	34		
Percentage	40.3%	59.7%		

This table shows that majority of the patients have a gestational age of 37-39 weeks 6 days (49.1%). Meanwhile, 26.3% are in the range of 40-42 weeks gestation, 15.7% are <37 weeks gestation and only 8.9% are >42 weeks gestation. Also majority of the patients (59.7%) underwent LSCS whereas 40.3% of the patients underwent vaginal delivery.

Table 3: Distribution according to the cause and the grade of meconium stained liquor-

Cause of meconium-stained liquor	Grade 1 meconium (translucent, light green)	Grade 2 meconium (opalescent, deep green and light yellow)	Grade 3 meconium (opaque and deep green)	Total	Percentage
Placental insufficiency	3	9	3	15	26.3%
Infections	4	3	1	8	14%
Maternal hypertension	2	6	4	12	21.2%
Oligohydramnios	5	4	5	14	24.5%
Others	1	2	5	8	14%
Total	15	24	18		
Percentage	26.3%	42.1%	31.6%		

This table shows that majority of the patients are classified under grade 2 meconium (42.1%). Also 31.6% have grade 3 meconium and only 26.3% have grade 1 meconium stained liquor. The main cause is found to be placental insufficiency (26.3%) followed by oligohydramnios(24.5%).Maternal hypertension is found in 21.2% patients and infections are seen in 14%.

Table 4: Correlation of non-stress test with grade of meconium –

Grade of meconium	Number of patients with reactive NST	Number of patients with non-reactive NST	Total	Percentage of non-reactive NST among the respective grades.
Grade 1	11	4	15	26.66%
Grade 2	8	16	24	66.66%
Grade 3	6	12	18	66.66%
Total	25	32	57	
Percentage	43.85%	56.15%		

This table shows that majority of patients have non-reactive NST (56.15%) . Among them grade 2 and grade 3 meconium stained liquor have equal association with non-reactive NST (66.66%), whereas grade 1 meconium is associated with 26.66% of non-reactive NST.

Table 5: Correlation of Apgar score with the grade of meconium-

Grade of meconium	Number of patients with low Apgar score at 1 minute (<7)	Number of patients with low Apgar score at 5 minutes (<7)	Total
Grade 1	11	6	15
Grade 2	18	12	24
Grade 3	16	12	18
Total	45	30	57
Percentage	78.9%	52.6%	

This table indicates that 78.9% of the neonates have low Apgar score at 1 min whereas only 52.6% of the neonates at 5 min. There is a good amount of improvement in Apgar score after calculation at 1min and 5 min respectively, in case of grade 1 followed by grade 2 followed by grade 3 meconium.

Table 6: Distribution according to reasons for NICU admissions and maturity of neonates-

Reasons for NICU admissions	<34 weeks	>34 to 40 weeks	40-42 weeks	Total	Percentage
Respiratory distress	5	8	3	16	45.7%
MAS (meconium aspiration syndrome)	2	4	2	8	22.8%
Neonatal sepsis	3	3	0	6	17.1%
HIE (Hypoxic ischemic encephalopathy)	1	1	0	2	5.8%
Others	0	2	1	3	8.6%
Total	11	18	6	35	
Percentage	31.4%	51.4%	17.2%		

The total number of NICU admissions are 35 (61.4%), out of which respiratory distress is a major cause (45.7%) followed by meconium aspiration syndrome (22.8%) and neonatal sepsis(17.1%).The rarer causes like

Hypoxic ischemic encephalopathy contributes to 5.8% and other causes 8.6%. Majority of the neonates have a maturity of >34 to 40 weeks (51.4%) followed by <34 weeks (31.4%) and 40-42 weeks(17.2%).

Table 7: Distribution according to the neonatal morbidity and mortality

	Number of cases	Total live births considered	Rate
Neonatal morbidity	35	57	61.4%
Neonatal mortality	1	57	17.5%

This table shows the impact of the meconium stained liquor on the neonates. The neonatal morbidity rate is found to be 61.4% whereas the neonatal mortality rate is 17.5% which is significant.

Discussion

Whitridge Williams stated- “Characteristic sign of impending asphyxia is the escape of meconium”.

This study focusses on the perinatal outcome due to meconium stained liquor and the correlation of the fetal heart rate abnormalities with the grade of meconium. This study is a prospective observational study of 6 months in a tertiary care centre in which a total of 57 subjects are chosen as per the inclusion and exclusion criteria and the informed written consent is taken. Majority of the cases i.e 45.6% are in the age group of 19-24 years, 40.3% in the age group of 25-30 years and 14.1% in the group of 31-36 years. 56.1% of them are primiparous whereas 43.8% of them are multiparous. This study findings such as – the meconium staining being associated with increased rate of caesarean section(59.7%), increased NICU admissions (61.4%) and more common in primigravida patients(56.1%), are supported by similar studies. [1,2,6,8,11] Compared to one of the studies⁴that showed 35% NICU admissions and 63% of grade 2 meconium patients, our study showed relative increase in the neonatal admissions(61.4%) and more of grade 2 meconium patients (42.1%). In this study, most of the cases (49.1%) are in the gestational age range of 37-39 weeks 6 days. Compared to few studies [9,12]where grade 3 meconium is associated more with non-reactive NST, this study shows an equal association of the grade 2 and 3 meconium with non-reactive non-stress test (both 66.66%).78.9% of the neonates have low Apgar score at 1 min whereas only 52.6% of the neonates at 5 min. There is a good amount of improvement in Apgar score after calculation at 1min and 5 min respectively, in case of grade 1 followed by grade 2 followed by grade 3 meconium. This study shows a good correlation between low Apgar score at 5 min and grade 3 meconium, while in one of the studies ,it is reported that no much difference was seen in the Apgar score due to the meconium staining. Similar findings are seen in few studies [9,12] with respect to the NST changes. Variable deceleration is the most common finding among

the various NST reports. The most common reasons for NICU admissions are respiratory distress(45.7%) followed by Meconium aspiration syndrome (22.8%) and neonatal sepsis(17.1%). Compared to a study[2], in which the incidence of MAS was 5%, our study shows relative rise in the incidence of MAS(22.8%). Also the rarer causes are Hypoxic Ischemic Encephalopathy(5.8%) and others (8.6%). The main cause of the meconium staining is found to be placental insufficiency (26.3%) followed by oligohydramnios(24.5%). Maternal hypertension is found in 21.2% patients and infections are seen in 14%. Majority of the neonates have a maturity of >34 to 40 weeks (51.4%) followed by <34 weeks (31.4%) and 40-42 weeks(17.2%). The neonatal morbidity rate is found to be 61.4% whereas the neonatal mortality rate is 17.5% which is significant.

Conclusion

The presence of meconium stained liquor is a serious sign of intrauterine fetal compromise, associated with raise in neonatal morbidity. Thick meconium stained liquor along with Non-reactive NST is significantly associated with higher caesarean section rate, low Apgar score, NICU admissions, neonatal morbidity. It is associated with increased risk of adverse neonatal outcomes such as MAS, perinatal asphyxia which leads to perinatal and neonatal morbidity and mortality. The clinical significance is that meconium staining alerts the obstetrician to do the early intervention and also to look for other signs of fetal compromise.

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