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Comparative analysis of fetal outcome in case of meconium stained amniotic liquor and clear liquor

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Abstract
The aim of this study is to know the association between the meconium stained amniotic fluid and fetal outcome.
Objective: To evaluate the fetal outcome in case of meconium stained amniotic fluid.
Material and methods: This is a prospective observational study which is conducted at Jawahar medical foundations ACPM medical College, obstetric and gynaecology department from February 2020 to July 2020.Total 501 cases selected singleton pregnancy with cephalic presentation above 37 weeks of gestation are included in this study after taking detailed history and doing complete examination. Out of these patients 151 were having meconium stained amniotic liquor rest of them were having clear liquor.
Around 39% cases out of 151 patient were registered at ACPM medical college or somewhere Rest of 61% of patient were unregistered.
Result: Out of 151 patients, primigravida patients comprises of 55%. Patients with advanced gestational age more than 40 weeks in 55% of patient. Hypertension having more chances of meconium stained liquor than the control cases. Neonatal outcome was poor in terms of low Apgar score at birth, birth asphyxia, Meconium Aspiration Syndrome (MAS) and increased neonatal admission among cases.
Conclusions: Both obstetrician and pediatrician is facing problems because of meconium stained liquor which causes increase rate of cesarean section, birth asphyxia, meconium aspiration syndrome and NICU admission.

Keywords: Meconium stained amniotic fluid, meconium aspiration syndrome, birth asphyxia, fetal outcome

Introduction
Meconium is an odorless black-green color material found in the fetal intestine. It is first demonstrable in the fetal intestine at third month of gestation [1]. Meconium is formed by the accumulation of water, intestinal epithelial cells, lanugo, mucous, bile etc [2].
30% of deliveries were seen with presence of meconium stained amniotic fluid [3].
'Meconium' is derived from the Greek word "meconium" meaning poppy juice or opium which was thought to cause increased sleepiness of the fetus in mother's womb [4]. Meconium stained liquor is basically warning sign it may be present in normal gastrointestinal mensuration or it may indicate and event that may be an acute or chronic hypoxia of fetus.
Before 34 weeks of gestation meconium passage is rare but after 37 weeks of gestation incidence of meconium passage steadily increases. Other factors which result in meconium passage are maternal hypertension, preeclampsia, oligohydramnios, drug addiction in mother [5].
As gestational age of fetus approaches towards the full term, the gastrointestinal tract matures and vagal stimulation or spinal cord compression may cause peristalsis and relaxation of the rectal sphincter leading to meconium passage into amniotic fluid. Meconium alters the chemical characteristics of amniotic fluid which reduces antibacterial activity and increasing the risk of perinatal bacterial infection.
Intrauterine exposure of fetal respiratory tract to meconium is associated with inflammation of lung tissues [6]. Meconium deactivates the surfactants and also inhibits the synthesis of surfactants [7, 8]. Free fatty acids present in the meconium strip the surfactants from the alveolar surface causing diffuse atelectasis [9].
Respiratory distress is very common in infants born with meconium stained amniotic fluid than those having clear fluid [10]. The definition of meconium aspiration is presence of meconium below vocal cord and it is seen in around 20-30% of infants those who are born with meconium stained liquor [11].

Meconium aspiration can occur after birth at the time of babies first cast for in utero with fetal respiratory movements. Radiographic evidence of aspiration pneumonitis with meconium stained amniotic liquor define meconium aspiration syndrome [12].
Meconium aspiration syndrome occurs in 9 -20% of deliveries which meconium stained liquor and fetal death occurs in about 2-4% of infants having meconium aspiration syndrome [3].
We are taking utmost care to increase maternal and child care institutes are doing many changes in antenatal and intrapartum care. All of these efforts resulted in better in neonatal outcome. Considering all these factors studies conducted where fetal outcome in meconium stained liquor and clear liquor were compared.

Material and methods

Indoor department of obstetric and gynaecology JMF ACPM medical College prospective observational study was carried out from period of February 2020 to July 2020.

Inclusion criteria

- All pregnant women have completed more than 37 weeks of gestation which singleton intrauterine gestation which cephalic presentation with no fetal congenital malformation where included

Exclusion criteria

- Preterm deliveries who had completed less than 37 weeks of gestation and other presentation than cephalic presentation who is known congenital malformation of fetus.

Patient having amniotic fluid with meconium staining taken as a cases and those patients having clear liquor taken as a control group.
151 cases with meconium stained amniotic fluid were selected and comparison done with randomly selected controls.
Data entry forms filled up in a systematic way.
Partograph entries were also considered.
Electronic fetal monitoring chart observed.
Fetal APGAR score noted at 1 minute and 5 minute.
Birth weight of the baby, NICU admission, birth asphyxia, meconium aspiration syndrome, early neonatal death observed.
Test used for analysis is Chi square Test.

Results

501 patient were taken in account who were 37 weeks of gestation with singleton pregnancy with cephalic presentation.
Patients were divided into two groups one with meconium stained amniotic fluid serving as a cases which are 151 and rest were with clear liquor who were as a control group.
Out of 151 cases 61% were unregistered unbooked only 39% were booked.
At least three visits with first visit in first trimester 10% women were of < 20 years, 67% were of 20 to 30 age group, 23% were >30 years 45% cases had gestational age between 37- 40 weeks as compared to 78% of controls, 47% cases were between 40-42 weeks as compared to 18% of controls, 8% cases had gestational age more 42 weeks as compare to 4% of control of same gestational age.

Table 1: Prevalance of booked cases in MSL

Parameter	Cases (%)	Control (%)
Registered	59(39%)	157(45%)
Unregistered	92(61%)	193(55%)

Table 2: Prevalance MSL in relation with Maternal Age

Maternal Age	Cases (%)	Control (%)
<20yrs	15(10%)	24(7%)
20-30yrs	101(67%)	231(66%)
>30yrs	35(23%)	95(27%)

Table 3: Prevalance MSL in relation with Parity Status

Parity	Cases (%)	Control (%)
Primi	83(55%)	150(43%)
Multi	68(45%)	200(57%)

Table 4: Prevalance MSL in relation with Gestational Age

Gestational Age	Cases (%)	Control (%)
37-40 Weeks	68(45%)	273(78%)
40-42 Weeks	71(47%)	63(18%)
>42 Weeks	12(8%)	14(4%)

Severe anemia found in 18% of cases
Preeclampsia cases were seen in 37% of cases
Premature rupture of membranes was seen in 22% of cases
Preeclampsia was associated with significantly higher rate of meconium staining in cases as compared to control groups.

Table 5: Relation of Antepartum factor with MSL

Parameter	Cases (%)	Control (%)	P value
Anemia	27(18%)	18(5%)	0.26
Pre-Eclampsia	56(37%)	28(8%)	0.018
PROM	33(22%)	63(18%)	0.23

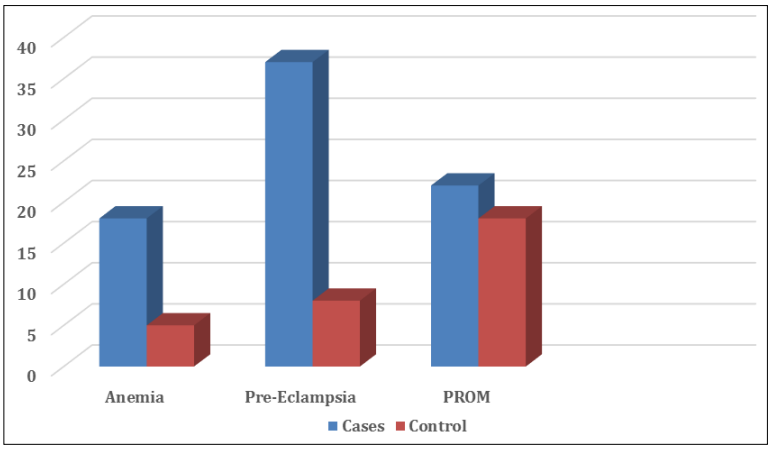

Fig 1: Relation of Antepartum factor with MSL

Cesarean section rate was significantly higher in meconium stained amniotic fluid cases which is about 48% cases as compared to 23% in control groups which is very significant. Approximately 8% had instrumental deliveries as compared to 5% cases among controls.

Table 6: Mode of Delivery in MSL

Mode of Delivery	Cases (%)	Control (%)	P value
Spontaneous Vaginal Delivery	67(44%)	252(72%)	<0.0001
Instrumental Delivery	12(8%)	17(5%)	0.032
Cesarean Section	72(48%)	81(23%)	<0.0001

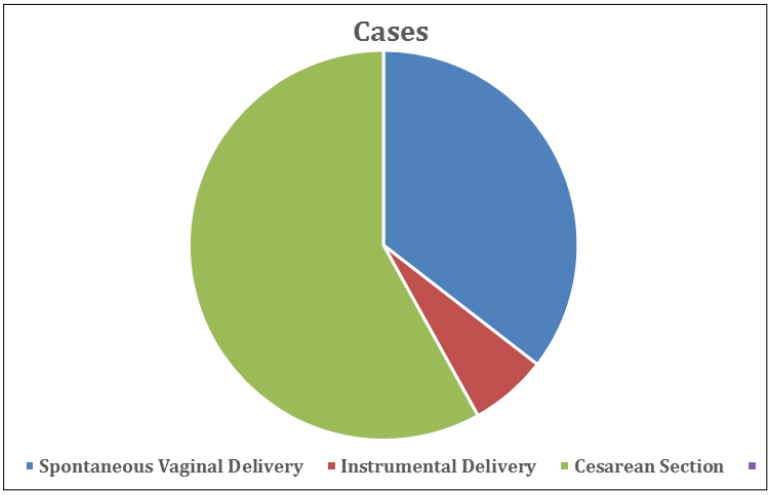

Fig 2: Mode of Delivery in MSL

Meconium stained amniotic fluid neonates had low APGAR SCORE 25% cases needed intensive care admission.

5 babies having meconium aspiration syndrome and 4 babies were having neonatal deaths.

There is significant difference between birth weight between cases and controls.

Table 7: Apgar score

Parameter	Cases (%)	Control (%)	P value
Apgar score at 1 minute (<7)	35(23%)	25(7%)	<0.0001
Apgar score at 5 minute (<7)	15(10%)	21(6%)	0.24

Table 8: Perinatal Outcome

Parameter	Cases (%)	Control (%)	P value
Meconium Aspiration Syndrome	5(3%)	3(1%)	0.276
Birth Asphyxia	32(21%)	21(6%)	0.002
Neonatal Sepsis	6(4%)	14(4%)	1
NICU Admission	37(25%)	28(8%)	0.0001
Early Neonatal Death	4(3%)	7(2%)	1

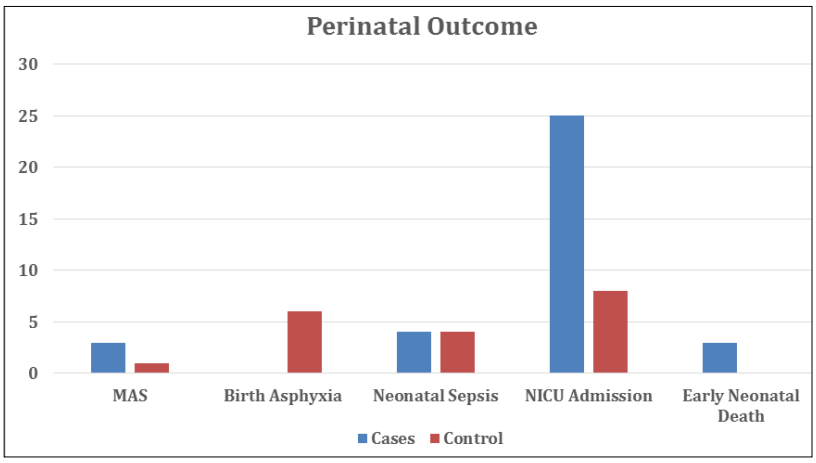

Fig 3: Perinatal Outcome in MSL

Table 9: Birth weight

Birth Weight	Cases (%)	Control (%)
<2.5kg	18(12%)	45(13%)
2.5-3kg	75(50%)	165(47%)
>3 kg	58(38%)	140(40%)

Discussion

Meconium stained liquor increases the complications like fetal outcome and increase NICU admission hence meconium passage causes concerns to obstetrician and neonatologist. The study done by bid it are showed that majority of cases which

meconium stained fluid were unbooked [13].

Meconium stained fluid increases with gestational age and this was very clear in this study 55% cases where having gestational age more than 40 weeks

Same observation found in study conducted by Naveen *et al.* [14].

Pregnancy induced hypertension preeclampsia is associated with 37% of cases

Severe uteroplacental insufficiency causes meconium passage and fetal asphyxia, hypoxia in preeclampsia [15].

Cesarean section percentage were 48% which is higher than the control group mainly because of lack of continuous electronic fetal monitoring facilities and lack of NICU facilities.

The consistency of meconium has a direct correlation with fetal outcome. The risk of perinatal death is increased five to seven times when a thick meconium is present at the onset of labor [16].

In this study most of infants were asymptomatic at birth, The perinatal outcome was poor with MSAF, as noted in this study, with NICU admissions of 25%. Meconium aspiration was the cause of death in around 4 cases.

Many babies required NICU admission for observation of respiratory distress and were observed for 24 hours and discharged from the NICU. Conditions like birth asphyxia was common complication followed by MAS, pneumonitis, septicemia required NICU stay for longer duration. Many workers noted that all cases of meconium aspiration syndrome were seen only in thick meconium group. Similarly, in present study, all cases of MAS were seen in thick meconium group. Gupta *et al*. found that birth Asphyxia was significantly high in meconium stained amniotic fluid [9]. Khatun found 12.9 % birth asphyxia cases in her study with significant increase in requirement of oropharyngeal suctioning [17]

Sasikala *et al*. reported that MSAF alone is not an indication of caesarean section, however patients with MSAF need strict supervision during labor for better perinatal outcome [18].

Literature suggests that meconium itself has potentially detrimental effects on fetal tissues and organs. It stimulates umbilical vessel constriction and causes vessel necrosis and may produce thrombi leading to tissue ischemia. Meconium though is sterile but reduces the antibacterial property of amniotic fluid by altering levels of zinc and thus facilitates intra-amniotic infections. In presence of fetal stress such as hypoxia the gasping actions of the fetus may lead to aspiration of meconium into the lungs promoting lung tissue inflammation and respiratory distress [19].

Conclusion

Meconium stained amniotic fluid increases cesarean section, causes other comorbidities of neonate like birth asphyxia, meconium aspiration syndrome. All comorbidities of neonate clearly increases as shown in this study. Attentive approach required in cases of meconium stained fluid so as to reduce complication to neonate and reduced mortality in neonate.

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