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Meconium Stained Amniotic Fluid and its Relation to Maternal Risk Factors

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Abstract **Original Research Article**

Background: Meconium stained amniotic fluid has been considered a sign of fetal distress in presentations other than breech and associated with poor fetal outcome but others considered meconium passage by fetus as physiological phenomenon and produces environmental hazards to fetus before birth. Such magnitude of different opinion was the object behind taking up of this study. ***Aims and objectives*:** To study maternal risk factors responsible for meconium stained amniotic fluid and its correlation with the fetal outcome in terms of morbidity and mortality. ***Meterial and methods*:** 100 women in labour with meconium stained amniotic fluid studied considering the inclusion criteria in the Department of Obstetrics and Gynecology, Pravara Rural Hospital, Loni. Cases divided into two -'thin' and 'thick' meconium stained group. Maternal and Fetal monitoring, uterine contraction assessed and Apgar score, birth weight, resuscitation of baby noted. All babies of both group followed up to first week neonatal life. ***Results*:** In our study, among 100 cases, 45% of the cases had thin meconium and 55% had thick meconium. Increased incidence of meconium staining was seen in crossed dates. The other risk factors were hypertension, anemia, oligohydramnios, IUGR. 56% went in for cesarean section due to intrapartum fetal distress. 33% of the cases went into NICU in view of low APGAR score due to birth asphyxia and meconium aspiration syndrome. Perinatal death was seen in 4 cases, one due to birth asphyxia and the other three due to MAS. ***Conclusion*:** Based on this study we conclude that meconium stained amniotic fluid is associated with increased incidence of caesarean section, low APGAR score, meconium aspiration syndrome and increased NICU admission.

Keywords: Meconiun Stained Amniotic Fluid, Meternal Risk Factors, Mode of Onset of Labour.

INTRODUCTION

Meconium staining of AF is a commonly observed phenomenon in day-to-day practice of obstetrics and its significance as a sign of fetal distress is controversial. The passage of meconium in utero has been described by various authors by different mechanisms. Three theories have been suggested for fetal passage of meconium.

a) The pathological explanation proposes that fetuses pass meconium in response to fetal hypoxia.
b) In utero passage of meconium represents normal gastrointestinal tract maturation, which is under neural control.
c) Commonly, meconium passage occurs following relaxation of anal sphincter and increased peristalsis due to vagal stimulation.
d) By the end of the sixteenth week of gestation the gastrointestinal functions of the fetus are sufficiently developed to absorb much of water from it, propel the unabsorbed matter as far as the lower colon.

The major goal of obstetric care is to prevent maternal and fetal morbidity and mortality. The presence of MSAF is believed to be one of the oldest and surest sign of fetal distress in utero due to fetal hypoxia. At the other end of spectrum, meconium passage is a normal physiological event in a term fetus and is not a sign of fetal distress in the absence of fetal heart rate abnormalities. But it can become an environmental hazard when fetal acidemia supervenes. Whatever be the cause of meconium passage, any asphyxial event in a fetus with meconium stained fluid might result in gasping in utero, aspiration of meconium and its resultant complications.

Such increased rate of fetal morbidity and mortality indicates the potential danger of meconium staining of AF during labour.

With the decline of maternal mortality and morbidity over the past few decades, modern obstetricians are much more concerned about the welfare of the fetus during pregnancy, labour and after birth. Meconium in the AF or detection of fetal heart rate abnormality indicates fetal distress which may result in still birth or in the birth of an asphyxiated baby with the consequences of that being, neurological problem and other manifestations.

The present study "Maternal risk factors and the perinatal outcome in meconium stained amniotic fluid" will help to note the incidence of meconium staining of amniotic fluid and its correlation with the maternal risk factors. This study was an effort to ascertain whether meconium staining of AF has any correlation with high risk factors, predisposing to fetal distress in labour and to assess exactly the fetal condition and outcome in all cases of MSAF with the help of data obtained in the present series.

OBJECTIVES

1) To study the various maternal risk factors responsible for meconium stained amniotic fluid
2) To study the mode of onset of labour with meconium stained amniotic fluid
3) To study the sequel of events on neonates in meconium stained amniotic fluid

METHODOLOGY

SOURCE and COLLECTION OF DATA

The study was undertaken at Rural Medical College, Loni, Maharastra, in the department of Obstetrics and Gynecology. The study period was from November 2020 to November 2021. The study included, 100 cases admitted in hospital after 37 weeks of pregnancy in labor who exhibited meconium stained liquor after spontaneous or artificial rupture of membranes. The study was conducted on pregnant women admitted to hospital after 37 weeks of gestational age in labor with their consent. Data was collected from antenatal history and clinical examination.

INCLUSION CRITERIA

a) Term labour (>37 completed weeks)
b) Cephalic presentation.

EXCLUSION CRITERIA

a) Antepartum hemorrhage
b) Malpresentations
c) Pregnancy with congenital malformations.
d) Intrauterine death

RESULTS

Incidence of meconium stained amniotic fluid in different age groups. Large number of cases belongs to 21-25 age groups accounting to 45% of total. Only 5% of difference was seen between the age group of 26 – 30yrs compared to 21 – 25yrs.

Table-1: Correlation of gestational age

Gestational age group in weeks	No. of cases	Percentage	Mean gestational age in Weeks
< 37	04	04	35.5
37-39	44	44	38.5
40-42	52	52	41

Increased incidence of MSAF is noted in gestation > 40 weeks. Large group of cases belong to gestational age 40-42weeks with a mean gestational age of 41 weeks.

Table-2: Incidence of Gravidity in 100 cases of meconium stained deliveries

	Thin Meconium		Thick Meconium			Total
Gravidity	No. of cases	%	No. of cases	%	No. of Cases	%
Primigravida	23	23	38	38	61	61
Multigravida	22	22	17	17	39	39
Total	45	45	55	55	100	100

Chi square test – 3.36, P value > 0.05

Incidence of meconium stained liquor was more common in Primigravida compared to Multigravida. There was no significant association with gravidity and the consistency of meconium.

Table-3: Antenatal and intrapartum risk factors associated with meconium staining

Risk Factors	No. of Cases	Percentage
Hypertension	6	6
Anaemia	4	4
IUGR	1	1
Oligohydramnios	8	8
Prolonged labour	10	10
More than one risk factor	10	10
No risk factors	61	61

Chi square test – 14.18, P value < 0.05

Maternal Antepartum and intrapartum risk factors in cases of meconium stained amniotic fluid included Oligohydramnios, Hypertension, Anaemia, IUGR, Prolonged labour. More than one risk factor was seen in 10 cases. Cases with crossed dates had increased incidence of meconium stained amniotic fluid.

Table-4: Correlation of mode of onset of labour with meconium staining

Mode of	Thin Meconium		Thick Meconium			Total
onset of Labour	No. of cases	%	No. of cases	%	No. of Cases	%
Spontaneous	40	40	38	38	78	78
Induced	5	5	17	17	22	22
Total	45	45	55	55	100	100

Chi square test – 5.82, P value < 0.05

Our study showed 40% cases had spontaneous labour in thin meconium group, where as in thick meconium group it was 38%. Among the induced cases, 22 cases had meconium stained liquor. Increased association of meconium staining was seen in mothers with spontaneous onset of labour probably because of other associated risk factors.

Table-5: Cause and incidence of neonatal morbidity and mortality

Causes	No. of cases	No. of deaths	%
Asphyxia	21	1	1
MAS	12	3	3
Pneumonia	0	0	0
Septicemia	0	0	0
HIE	0	0	0

Among the 12 cases of MAS, 1 baby had still birth and 3 died in the first week neonatal period.

DISCUSSION

Meconium stained amniotic fluid (MSAF), is a commonly observed phenomenon. MSAF has been implicated as a factor influencing fetal well-being during the intrapartum and postpartum periods. Presence of meconium in AF in cephalic presentation was of great concern even to the midwives and obstetricians of old age (Mittler and Mittler 1947). Passage of meconium, once thought to be a sure sign of fetal death in utero (Schultz 1925) but later it was realized to be a sign of fetal hypoxia, not actually fetal death (James Walker, 1954). Even the modern obstetricians are fully aware of this fact and they cannot be indifferent at the light of meconium in AF during labour which calls for close vigilance of the fetal well-being. The present study was undertaken to evaluate the significance of MSAF, its fetal outcome and the maternal risk factors associated with it in cases admitted to PIMS, LONI. During this period 100 cases of meconium stained amniotic fluid cases were included in the study which fulfilled the inclusion criteria.45 of the 100 cases had thin meconium and 55 cases had thick meconium stained amniotic fluid noted at the time of spontaneous / artificial rupture of membranes.

Sandu *et al*. [17] noted 80% of cases with MSAF belonged to the age group of 21-30 years. In our study 85% of cases with MSAF belong to the same age group.

Table-6: Comparison of incidence of MSAF with parity of mothers

Parity	Kamala *et al.* [15]	Present study
Primigravida	54	61
Multigravida	46	39

Higher incidence of MSAF was seen in Primigravida that is 61%. This study was correlating with the study done by Kamala Ghokroo *et al*.

Table-7: Comparison of Gestational Age

Gestational age	James [13]	Hiremath P B [65]	Present study
37 –39weeks	30	23	44
40 – 42 weeks	50	36	52

James [13] mentions incidence of MSAF increases with gestational age and reaches approximately 30% at 40 weeks and 50% at 42 weeks. Hiremath P B [65] and others did a similar study in which the gestational age from 40 – 42 weeks was upto 36% and they had large number of cases (40%) > 42 weeks. In present study large group of cases belong to gestational age 40 - 42 weeks.

In the present study patients with thin meconium stained amniotic fluid were 45% and patients with thick MSAF were 55%. This was in comparison with the study done by Arun and others [16].

James [12] mentions incidence of MSAF increases with gestational age and reaches approximately 30% at 40 weeks and 50% at 42 weeks.

Table-19: Comparison of Antepartum and Intrapartum Risk Factors

Risk Factors	Kamala *et al.* [64]	Vinaya Pendse *et al.* [66]	Bhide SS *et al.* [67]	Present study
Hypertension	8.66%	26.5%	13.85%	6%
Anemia	6%	1%	6%	4%
IUGR	-	-	-	1%
Oligohydramnios	-	-	-	8%
Prolonged labour	22%	-	-	10%

In present study following were the associated ante partum and intrapartum risk factors - prolonged labour, hypertensive disorder, Oligohydramnios, IUGR, Anaemia. Cases with

Crossed dates had increased incidence of MSAF. More than one risk factor was seen in 10 cases. In the study conducted by Hiremath P B [65], 33% of MSAF cases had anemia and 42% of MSAF cases had hypertension.

In present study following were the associated ante partum and intrapartum risk factors - prolonged labour, hypertensive disorder, Oligohydramnios, IUGR, Anaemia. Cases with crossed dates had increased incidence of MSAF. More than one risk factor was seen in 10 cases.

CONCLUSION

The incidence of meconium stained amniotic fluid greatly varies with maternal antenatal and intrapartum risk factors. Increased incidence was seen in cases with crossed dates. Prolonged labour, oligohydramnios and hypertension prevailed more compared to other factors and had a significant association with meconium stained liquor, P <0.05.

- Meconium stained amniotic fluid is significantly associated with abnormal foetal heart rate (P < 0.05), should be taken as a potential danger sign for the baby and the need for early intervention is required.
- Infants with severe meconium aspiration syndrome and birth asphyxia are to be managed in NICU where they can be closely monitored and vigorously treated**.**
- Prompt and efficient labour monitoring and delivery can minimize the sequel of meconium aspiration syndrome
- If neonatal complications are to be avoided, full cooperation and coordination of the Obstetrician and Pediatrician is required.
- Since all foetuses with meconium passage in labour do not have associated maternal risk factor and do not have adverse outcome, it is important to distinguish those who are destined to develop foetal distress promptly and intervene accordingly to prevent meconium aspiration syndrome and sequel.

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