



Study on Effect of Nature of Meconium Stained Amniotic Fluid on Perinatal Outcome

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Abstract

Objective: Recognition of nature of meconium stained amniotic fluid and its effect on perinatal outcome.

Methods: The exploratory study was designed at J.S.S Medical college and Hospital, Mysore, from December 2010 to July 2012.

Results: During the study 2764 patients admitted for delivery of which 236(8.72%) cases of meconium stained amniotic fluid were randomly studied.

- Thin meconium staining present in 81 cases and thick in 155 cases . Fetal heart variability was significantly high in thick meconium staining 59.35% and thin 30.86%
- Of the 236 meconium stained amniotic fluid ,157 delivered by caesarean section 66 vaginally out of which 13 by forceps.
- Perinatal morbidity due to MAS was 9.61% and mortality 2.9%.

Conclusion: From this study, it is evident that meconium staining of liquor is a commonly observed phenomenon. Presence of thick meconium in amniotic fluid has increased incidence of perinatal morbidity and mortality, so it should be managed wisely by timely intervention, mode of delivery and neonatal resuscitation. This helps to reduce Meconium aspiration syndrome as a significant cause of perinatal mortality and morbidity.

Keywords: MSAF-Meconium stained amniotic fluid, MAS-Meconium aspiration syndrome.

Introduction

Meconium is found in fetal gut from 10 wks of gestation but passage of meconium in amniotic fluid is rare before 34 weeks. Incidence of meconium passage increases with gestational age and reaches approximately 30% at 40 weeks and 50% at 42 weeks^{1,2}. Passage of meconium into amniotic fluid might be a physiologic phenomenon of GIT maturation, or as a sign of acute or chronic hypoxic event, thus making it a indicator of fetal distress⁵. Many maternal factors

contribute to passage of meconium before birth which include prolonged gestation, type of labour, anemia, hypertension disorders of pregnancy^{3,4}. Presence of meconium in amniotic fluid is seen 12-16 % of deliveries⁶.

The primary concern regarding meconium stained amniotic fluid has been subjected to extensive studies and are directed at 2 major issues:

1. Significance of meconium as a sign of fetal distress or hypoxia.
2. Prevention of short and long term sequel

such as meconium aspiration syndrome and meconium pneumonitis.

Meconium aspiration syndrome (MAS) is defined as neonatal respiratory distress that develops shortly after birth in presence of meconium stained amniotic fluid with radiographic evidence of meconium pneumonitis⁷. Meconium aspiration can occur before or during labour or after delivery with first few breaths. MAS can contribute to neonatal deaths in up to 0.05%. The case fatality rate in meconium aspiration syndrome is reported to range from 20 to 40%⁸.

Recent studies indicate that meconium is not an independent marker for fetal distress^{10,11}. Perinatal outcome is significantly related to nature of meconium in early labour⁴. Thick meconium stained amniotic fluid with cephalic presentation with low fetal scalp blood PH, low levels of Po₂ and abnormal fetal heart rate patterns (late decelerations, severe variable decelerations and decreased variability) are associated with increased perinatal morbidity and mortality⁵. MSAF is associated with increased operative interferences during labour like forceps and caesarean delivery as well as NICU admission⁴.

Management of meconium stained amniotic fluid is a combined effort of obstetrician and neonatologist⁹. Early recognition of meconium staining of liquor during delivery interventions like forceps or caesarean section, oral and nasopharyngeal suctioning immediately after the delivery of head has shown improved perinatal outcome^{3,12,13,15}. Suction of the pharynx as soon as possible after delivery of the head is acceptable as long as care is taken not to traumatize the pharynx or larynx, because this may precipitate meconium aspiration¹⁴.

Hence considering the risks of MSAF, this study is done at a medical college, where facilities for electronic fetal monitoring, emergency caesarean and NICU are available to know the perinatal outcome in deliveries complicated with MSAF in relation to nature of MSAF.

Materials and Methods

The exploratory study was designed at J.S.S Medical college and Hospital, Mysore, from December 2010 to July 2012. 236 cases of meconium stained amniotic fluid diagnosed by spontaneous or artificial or on intraoperative rupture of membranes by simple random sampling were included as participants.

Inclusion criteria -

Cases of meconium stained amniotic fluid diagnosed by artificial/spontaneous/intraoperative rupture of membranes with a singleton pregnancy in cephalic presentation with a written informed consent were included for the proposed study.

Exclusion criteria-

Cases with multifetal gestation, malpresentations, congenital anomalies and women who did not give a written informed consent for the proposed study were excluded from the study.

On admission, after a detailed history, including complication during the present pregnancy, general physical examination and obstetrical examination was performed. Gestational age by virtue of history and examination were recorded. Routine hematological and urine examination were done and recorded.

In addition to the following management practices like mode of delivery, time duration between detection of MSAF and delivery of the fetus and mechanical suction (oronasopharyngeal suction) were observed and recorded. Neonatal details considered were mode of delivery, presence or absence of meconium aspiration, APGAR score at 1 and 5 minutes. MAS was confirmed by the presence of meconium below the vocal cords on laryngoscopic examination and endotracheal suction. Neonatal respiratory distress, radiological evidence of patchy densities were noted. In addition, mothers and the neonates were followed up during their stay in the postnatal and post caesarean ward.

Data Analysis: Done using Chi square test.

Definition:

Thin Meconium Very light green staining of amniotic fluid.

Thick Meconium Thick greenish meconium with particulate matter in amniotic fluid.

Procedure

All cases of meconium stained amniotic fluid, diagnosed by Artificial rupture of membranes-ARM/ Spontaneous rupture of membranes -SRM/ Intraoperative rupture of membranes were included as suitable candidates for this study.

Further cervical dilatation, character of the meconium stained amniotic fluid and fetal heart variability were noted. Partogram was maintained.

Maternal outcome was recorded in terms of mode of delivery – LSCS, vaginal delivery, instrumental delivery in association with meconium stained liquor.

Perinatal outcome was recorded in terms of meconium aspiration syndrome, Hypoxic ischaemic encephalopathy and perinatal death associated with meconium aspiration.

Results

In present study, 2764 deliveries were conducted in our hospital and out of them 236 cases had meconium stained liquor. So the incidence of meconium stained liquor was 8.53%.

In the study group, the age of the patients ranged from 19-40 years, 108(45.79%) were primigravida and 128(54.43%) were multigravida.

Table no.1: Incidence of meconium stained amniotic fluid

Total no. of deliveries	2764
Total no. of live birth	2704
Total no. of MSAF	236(8.53%)

Table no.2: Correlation of gestational age with incidence of meconium

Gestational Age	Incidence of meconium	%	X ²	P
34 weeks	2	0.85	104.605	0.000 (HS)
35-37	19	8.05		
38-40	87	36.86		
40 and more	128	54.24		
Total	236	100.00		

The association of meconium stained liquor with gestational age was found to be more with increasing gestational age (> 40wks).

Table no. 3: Incidence of MSAF in relation to maternal risk factors.

Maternal risk factors	Incidence of MSAF	%	χ^2	P
Anaemia	32	36.78	25.165	0.001 (HS)
Pre-eclampsia	9	10.34		
Eclampsia	3	3.45		
Gestational HTN	5	5.75		
Gestational diabetes	7	8.05		
Rh-negative pregnancy	14	16.09		
Cardiac disease	2	2.30		
Elderly Primigravida	5	5.75		
Other medical disorders	10	11.49		
Total	87	100.00		

In our study, most important maternal risk factors associated with passage of meconium in amniotic fluid were anaemia 36.78% cases and hypertensive disorders of pregnancy 19.54%.

Table no.4 Nature of meconium stained liquor

	Frequency	%	χ^2	P
Thick	155	65.68	11.894	0.001 (HS)
Thin	81	34.32		
Total	236	100.00		

Out of 236 cases, 155 (65.68%) cases had thick meconium stained liquor and 81(34.32%) cases had thin meconium stained liquor.

Table no 5 .Fetal heart rate variability in relation to nature of meconium

FHR Variability	Nature of meconium		Total	X^2	P	
	Thick	Thin				
Present	F	92	25	117	17.274	0.000
	%	59.35	30.86	49.58		
Absent	F	63	56	119		
	%	40.65	69.14	50.42		
Total	F	155	81	236		
	%	100.00	100.00	100.00		

(HS)

FHR variability was significantly high in thick meconium stained liquor group 59.35 % of cases as compared to thin meconium liquor group 30.86% of cases which was statistically significant.

Table no.6: Mode of delivery in relation to nature of meconium

Mode of Delivery		Nature of meconium		Total	2 X
		Thick	Thin		
Vaginal	F	26	40	66	49.308
	%	16.88	48.80	27.97	
Instrumental	F	2	11	13	
	%	1.30	13.40	5.51	
LSCS	F	126	31	157	
	%	81.82	37.80	66.53	
Total	F	154	82	236	
	%	100.00	100.00	100.00	

LSCS was done in 81.8% cases with thick meconium stained liquor as compared to 37.78% cases with thin meconium stained liquor. 48.8% of cases of thin meconium stained

liquor delivered vaginally compared to 16.88% cases of thick meconium stained liquor. Statistical analysis of this data yielded a P-value of <0.000, which is significant.

Table no 7. Nature of meconium and meconium aspiration syndrome

			Nature of meconium		Total
			Thick	Thin	
MAS	ABSENT	Count	126	78	204
		%	81.3%	96.3%	86.4%
	PR SENT	Count	29	3	32
		%	18.7%	3.7%	13.6%
Total		Count	155	81	236
		%	100.0%	100.0%	100.0%

$$X^2 - 11.89; P .001 (HS)$$

18.7% of infants born to women with thick meconium stained liquor, developed MAS as compared to 3.7% of infants born to women

with thin meconium stained liquor group which was statistically significant (P-value-0.001).

Table no.8 Perinatal and morbidity and mortality due to MAS

Morbidity	10(9.61%)
Mortality	8(2.9%)

Perinatal morbidity due to meconium aspiration was seen in 26(9.61%) cases out of which 16(61.53%) cases developed respiratory distress, 7 (26.94%) cases developed seizures and 3 (11.53%) cases develop sepsis.

There were 8(2.9%) neonatal deaths, out of which 6(75%) cases died due to hypoxic ischemic encephalopathy, 2(25%) cases died due to meconium pneumonitis with pulmonary hypertension.

Case fatality due to meconium aspiration syndrome was found to be 25%.

Discussion

Meconium passage prior to birth occurs in upto 20% of term deliveries but in this study incidence of MSAF was 8.53% similar to Kamala G et al³ 9.37% and Goud, Krishna study²³ 9.8%. Presence of thick stained amniotic fluid is worrisome to the obstetrician as it is associated with poor perinatal outcome. In the present study incidence of thick meconium stained amniotic fluid was 65.68% and thin meconium stained amniotic fluid was 34.32% in comparison to Debas et.al²² study incidence of thick MSAF was 51.15% and thin MSAF was 48.85%. In relation of MSAF with parity multigravida were found to be more associated with MSAF than primigravida in the present study similar to Kamala G et.al³ study as multigravida associated with MSAF waited little longer than primigravida as they had previous normal deliveries. In the present study maternal risk factors such as, anemia 36.78% and hypertensive disorders of pregnancy 19.54% were more associated with MSAF similar to Bhide et al.,¹⁹ study and khautan M et al.,¹⁷ study were hypertensive disorders of pregnancy 13%. In the present study incidence of MSAF increased with gestational age, 50% of cases had gestational age more than 40 weeks similar to Rajlaxmi mundra et al.,²⁵ study. Incidence of non reactive NST in the present study was 59.3% in the thick MSAF fluid cases and 30.8% in the thin MSAF cases, comparable to Rossario et al.,²⁴ study with incidence of non reactive NST in thick meconium stained MSAF cases 54%. Mode of delivery in association with MSAF, in the present study caesarean section was performed twice commonly in MSAF cases comparable to Saunders et al.,²⁰ Narang et al.,²¹ and Naveen et

al.,¹⁶ studies. Such higher caesarean section rates were noted due to lack of facilities for fetal scalp ph monitoring in MSAF cases with abnormal NST. In the present study perinatal morbidity was 6 times higher in thick MSAF compared to thin MSAF groups similar to Roosi et al.,¹⁸ but still thin MSAF babies needed NICU admission for observation of signs of respiratory distress. Perinatal morbidity in the present study was 2.9% similar to Debas et al.,²² where perinatal morbidity was 3%. 8 neonatal deaths occurred during the study, in which 6 were due to severe birth asphyxia with hypoxic ischaemic encephalopathy and 2 were due to meconium aspiration pneumonitis.

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