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Research Article

Perinatal Outcome in Meconium Stained Amniotic Fluidat Dhiraj General Hospital, a Tertiary Health Care Centre in Rural Gujarat: A Prospective Study

Jitendra Shukla[1], Unnati Amin[2], Piyusha Chandrayan[1*], Saini HB[3]

[1]Associate Professor, Department of Obstetrics and Gynecology, Sumandeep Vidyapeeth University, Gujarat, India
[2]Senior Resident, Department of Obstetrics and Gynecology, Sumandeep Vidyapeeth University, Gujarat, India
[3]Professor, Department of Obstetrics and Gynecology, Sumandeep Vidyapeeth University, Gujarat, India

[*]**Corresponding Author:** Piyusha Chandrayan, Associate Professor, Department of Obstetrics and Gynaecology, Dhiraj Hospital, S.B.K.S. M.I & R.C., Sumandeep Vidyapeeth University, Pipariya, Vadodara, Gujarat, India, Tel: 8758747564

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Abstract

Introduction: Meconium in amniotic fluid is a serious sign of fetal compromise and associated with a perinatal complications and outcome, including low APGAR scores, increased incidence of chorioamnionitis, increased incidence of neonatal intensive care admission and high rate of perinatal death. It is less likely for a fetus to pass meconium before 34 weeks of gestation. After 37 weeks its incidence increases steadily with increasing gestational age. It reflects maturation of fetal myelination and parasympathetic innervations. Aspiration can occur in utero with fetal gasping or with the first breath of life after birth. However most of the infants with meconium in liquor do not have low APGAR score, acidosis or clinical illness compared to the infants born with clear amniotic fluid.

Material and method: A prospective observational study was conducted in obstetrics and gynaecology department of Dhiraj Hospital, Sumandeep Vidyapeeth from March 2019 to August 2020.

Methodology: After history and clinical examination,all patients were allowed to go in labour and were watched throughout labour.

- Patients who had meconium stained liquor on

spontaneous or artificial rupture of membrane were taken as cases.

- Other patients who did not have meconium stained liquor throughout labour were taken as controls.
- Time of meconium passage, consistency of meconium was noted in each case.
- Thin meconium and thick meconium cases were seperately identified.
- Fetal heart rate patterns were monitored throughout labour.
- Type of delivery whether spontaneous, operative vaginal or LSCS was noted in each case.
- APGAR scoring at 1 and 5 minutes, need for resuscitation, stomach wash and endotracheal intubation in baby was noted.
- Need for NICU admission for complications like respiratory distress syndrome, aspiration pneumonia, birth asphyxia, septicemia, jaundice, convulsion, hypoxic ischemic encephalopathy was noted.
- Duration of hospital stay of neonate was noted.

Statisical method: As this was a prevalence study, purposive sampling was done.All the categorial variables were analysed with the help of chi square test and fisher's exact test and all the continuous variables were analysed with independent 't test'.

Conclusion: Thus to conclude Thick MSL is associated with abnormal CTG changes, higher incidence of LSCS, low apgar score and more NICU admissions due to Meconium Aspiration Syndrome (MAS), Hypoxic ischaemic encephalopathy (HIE), and sepsis as compared to thin MSL

Keywords: Meconium Aspiration Syndrome; Fetal Heart Rate; LSCS; Oropharyngeal Suction; NICU Admission

1. Introduction

The word meconium originates from Greek word "meconium arion" which basically means like opium or poppy like substances which cause sleep like state of the fetus in mother's womb [1]. The baby in the uterus is surrounded by the amniotic fluid providing a protective and low resistance environment which acts as a cushion for the baby. It is foetal urine which is contributed by secretions from amniotic membranes and foetal skin [2]. Meconium in amniotic fluid is a serious sign of fetal compromise and associated with a perinatal complications and outcome including low APGAR scores, increased incidence of chorioamnionitis, increased incidence of neonatal intensive care admission and high rate of perinatal death. It is less likely for a fetus to pass meconium before 34 weeks of gestation. After 37 weeks its incidence increases steadily with increasing gestational age. It reflects maturation of fetal myelination and parasympathetic innervations. Aspiration can occur in utero with fetal gasping or with the first breath of life after birth. However, most of the infants with meconium in liquor do not have low APGAR score, acidosis or clinical illness compared to the infants born with clear amniotic fluid. Thus the neonatal outcome in meconium stained liquor is generally comparable to deliveries with clear amniotic fluid, when the fetal heart rate is normal. Perinatal morbidity is increased in newborn with abnormal heart rate [3]. Meconium stained amniotic fluid is associated with lots of adverse outcome of fetus and has long been considered to be a hint for poor perinatal outcome. This observational study was undertaken to find out the perinatal outcome in amniotic stained liquor compared to clear liquor.

2. Materials and Methods

A prospective observational study was conducted in obstetrics and gynaecology department of Dhiraj Hospital, Sumandeep Vidyapeeth from March 2019 to

August 2020. The inclusion criteria were women in labor with

1 Term pregnancy (>37 weeks gestation)
2 Cephalic presentation
3 Live singleton pregnancy Exclusion criteria were:
   - Cephalopelvic disproportion
   - Presentations other than cephalic

'Pregnant women in labour with not knowing last menstrual date' Maternal complications like Eclampsia, Antepartum hemorrhage

- Intrauterine fetal death
- Congenital malformation
- Pre-existing maternal heart or lung disease
- Pregnancies with IUGR babies

All patients fulfilling inclusion and exclusion criteria as mentioned above were taken for the study.

- After history and clinical examination,all patients were allowed to go in labour and were watched throughout labour.
- Patients who had meconium stained liquor on spontaneous or artificial rupture of membrane were taken as cases.
- Other patients who did not have meconium stained liquor throughout labour were taken as controls.
- Time of meconium passage, consistency of meconium was noted in each case.
- Thin meconium and thick meconium cases were seperately identified.
- Fetal heart rate patterns were monitored throughout labour.
- Type of delivery whether spontaneous, operative vaginal or LSCS was noted in each case.
- APGAR scoring at 1 and 5 minutes, need for resuscitation, stomach wash and endotracheal intubation in baby was noted.
- Need for NICU admission for complications like respiratory distress syndrome, aspiration pneumonia, birth asphyxia, septicemia, jaundice, convulsion, hypoxic ischemic encephalopathy was noted.
- Duration of hospital stay of neonate was noted.

2.1 Statistical methods

As this was a prevalence study, purposive sampling was done. All the categorial variables were analysed with the help of chi square test and fisher's exact test and all the continuous variables were analysed with independent 't test'.

3. Result

The data collected in this study of 500 patients is presented in the following tables. Out of 500 patients selected for the present study which had inclusion criteria, 15 % were meconium stained out of which 56 cases had thin meconium and 22 cases had thick meconium. Fetal CTG abnormalities were more common in MSAF group and were noted in 29.4% of cases which is significantly increased compared to control group with CTG abnormalities in 7.1%. The difference was significant with p value of <0.001.When the subgroups of thick and thin meconium were compared, the thick meconium group showed more frequent fetal heart rate changes. Variable deceleration was the most common CTG abnormality noted. 37 (42.3%) patients with meconium stained amniotic fluid had normal vaginal delivery, while in control group out of 422, 353 (83.6%) delivered normally. Incidence of LSCS and assisted vaginal delivery was more in meconium stained amniotic fluid. On comparing the subgroups of thick and thin meconium, it was the thick group where operative intervention was more commonly needed.

The difference between subgroups is insignificant with p value of 0.125. Relatively higher p value is due to low number of cases in thick subgroup. If meconium first appeared in the latent phase, the incidence of LSCS was more as compared to when it appeared in the second stage. The overall incidence of LSCS was higher if the mechanism was thick. Moreover the LSCS incidence was much higher if the meconium was thick irrespective of stage. Low Apgar Score at 1 and 5 minutes was more prevalent in MSAF compared to control with p value of <0.001. At 1 minute the low APGAR score was noted in 39.7% of MSAF cases. At 5 minutes, the low APGAR score cases reduced to 24.3%, but was much higher than controls with strong statistical significance.

Low Apgar score at 1 and 5 minutes is noted in MSAF and is more often noted in cases with thick meconium. Low APGAR score was noted in 54.5% and 45.4% at 1 and 5 minutes respectively in cases with thick meconium compared to cases with thin meconium with low APGAR score in 33.9% and 16% at 1 and 5 minutes respectively which is statistically significant (p value of 0.043). Oropharangeal suction was done in 47 babies (60.2%) in cases against 61 babies (14.4%) in control group with a p value <0.001. Oropharangeal suction was done in all the babies with thick meconium. Among the thin meconium cases and controls, Oropharangeal suction was done only in those babies who were relatively depressed.

NICU admission was frequent in cases and was needed in 24.5% of cases compared to 5.7% of controls. The difference is highly significant with p value of <0.001. On comparing the thin and thick subgroups, it was the thick subgroup with high incidence of NICU admission. Nearly half of the cases with thick meconium needed NICU admission and only 14.2% of cases with thin meconium needed NICU admission. Perinatal complications were seen in 13 cases out of which 3 developed MAS, 8 developed HIE, 2 babies developed sepsis.

MSAF (Cases)	**NMSAF (Controls)**	**Total**
78 (15.6%)	422 (84.4%)	500
Thin	Thick	
56 (71.7%)	22 (28.2%)	

Table 1: Incidence of MSAF.

FHR Abnormality	**Status**		**Total**	**P Value**
	Cases Controls		(n=500)	0.0001
	(n=78)	(n=422)		
Present (%)	23 (29.4%)	30 (7.1%)	53 (10.65%)	

Table 2: FHR Abnormality in Different Groups.

FHS Abnormality	Cases (MSAF)		Total	P Value
	Thin	Thick	(n= 78)	
Present(%)	10	13	23	0.532
	(17.8%)	(59%)	(29.4%)	
Absent(%)	46	9	55	0.0001
	(82.1%)	(40.9%)	(70.5%)	

Table 3: FHS Abnormality in Cases.

Mode of Delivery	Status		Total	P Value
	Cases Controls		(n=500)	
	(n=78)	(n= 422)		
Normal Vaginal	37	353	390	0.0001
	(47.4%)	(83.6%)	(78%)	
Assisted Vaginal	11	22	33	0.056
	(14.1%)	(5.2%)	(6.6%)	
LSCS	30	47	77	0.053
	(38.4%)	(11.1%)	(15.4%)	

Table 4: Mode of Delivery.

Mode of Delivery	Cases	(N=78)	Total	P Value
	Thin (n= 56)	Thick (n= 22)	(n= 78)	
Normal Vaginal	33	4	37	0.0001
	(58.9%)	(18.1%)	(47.4%)	
Assisted Vaginal	5	6	11	0.763
	(8.9%)	(27.2%)	(14.1%)	
LSCS	18	12	30	0.273
	(32.1%)	(54.5%)	(38.4%)	

Table 5: Mode of Delivery in Msaf Cases.

Labour Stage At					
Meconium Detection	Type of Meconium	No. of Cases	Mode of Delivery		
			Vaginal LSCS Delivery	Asst. Vaginal	
Latent Phase	Thin	22	13	1	8
	Thick	10	1	2	7
Active Phase	Thin	21	11	2	8

	Thick	8	2	2	4
Second Stage	Thin	13	9	2	2
	Thick	4	1	2	1

Table 6: Meconium First Observed and Mode of Delivery.

Apgar Score At 1 Minute	**Status**		**Total**	**P Value**
	Case Controls		(n= 500)	0.0001
	(n= 78)	(n= 422)		
<5	31(39.7%)	36(8.5%)	67(13.4%)	
>5	47 (60.2%)	386 (91.4%)	433(86.6%)	
Apgar Score At 5 Minute	**Status**		**Total**	**P Value**
	Cases Controls		(n=500)	0.0001
	(n= 78)	(n= 422)		
<7	19 (24.3%)	18(4.2%)	37(7.4%)	
>7	59(75.6%)	404(95.7%)	463(92.6%)	

Table 7: Apgar Score at 1 and 5 Minutes.

Apgar Score At 1 Minute	**Cases**		**Total**	**P Value**
	Thin (n=56)	Thick (n= 22)	(n=78)	
<5	19 (33.9%)	12(54.5%)	31(39.7%)	0.124
>5	37(66%)	10(45.4%)	47(60.2%)	
Apgar Score At 5 Minute	**Cases**		**Total**	**P Value**
	Thin (n= 56)	Thick (n= 22)	(n=78)	
<7	9 (16%)	10(45.4%)	19(24.3%)	0.0166
>7	47(83.9%)	12(54.5%)	59(75.6%)	

Table 8: Apgar Score at 1 and 5 Minutes in Msaf.

Oropharyngeal Suction	**Status**		**Total**	**P Value**
	Cases Controls		(n=500)	
	(n= 78)	(n= 422)		
Reqired	47 (60.2)	61(14.4%)	108(21.6%)	0.0001
Not Required	31(39.7%)	361(85.5%)	392(78.4%)	

Table 9: Requirement of Oropharyngeal Suction.

Nicu Admission	Status		Total	P Value
	Cases Controls		(n= 500)	
	(n= 78)	(n= 422)		
Needed	18	20	38	0.746
	(23%)	(4.7%)	(7.6%)	
Not Needed	60	402	462	0.0001
	(76.9%)	(95.2%)	(92.4%)	

Table 10: Incidence of Nicu Admission.

Nicu Admission	Type of Meconium		Total	P Value
	Thin (n=56)	Thick (n= 22)	(n= 78)	
Needed	8	10	18	
	(14.2%)	(45.4%)	(23%)	
Not Needed	48	12	60	
	(85.7%)	(54.4%)	(76.9%)	

Table 11: Nicu Admission in Cases.

4. Conclusion

Thus to conclude Thick MSL is associated with abnormal CTG changes, higher incidence of LSCS, low apgar score and more NICU admissions due to Meconium Aspiration Syndrome (MAS), Hypoxic ischaemic encephalopathy (HIE), and sepsis as compared to thin MSL.

Acknowledgement

The study is conducted after taking informed and written consent from the patients.

The study is self funded. No extra expense was required for the study.

The study was conducted after taking ethical approval from the Institutional Ethical Committee.

Conflict of Interest

There is no conflict of interest for this study.

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