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MANAGEMENT AND OUTCOME OF NEONATE BORN TO MOTHER HAVING H/O MECONIUM STAIN AMNIOTIC FLUID

Paediatrics

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ABSTRACT

Introduction: This study is done to find out the various maternal risk factors and its correlation with the fetal outcome in terms of morbidity and mortality in our Institute.

Material and methods: The study was carried out in department of pediatrics, Dhiraj Hospital S.B.K.S., a tertiary care teaching hospital from March 2016 to July 2017 as a prospective study. 165 cases who had history of meconium stained amniotic fluid were included in the study to evaluate any maternal risk factor; maternal and fetal monitoring; 1 min and 5 min APGAR score; complication and outcome of baby. Management was done under the standard NRP protocol. If any complication occurred, then standard care in NICU was given

Result: In our study out of 165 cases, 39% had thin meconium and 61% had thick meconium. Incidence of meconium passage was higher in late gestational age (>40 weeks). Maternal risk factors like hypertension(10.91), Oligohydramnios(10.30%), anemia(3.03%) and most of had no risk factor (75.76%) present. There were higher incidences of low APGAR score and requirement of resuscitation in non vigorous babies in thick MSL as compared to thin MSL. 35.76% patients developed complications; birth asphyxia in 16.36% with HIE in 8.48%, EOS in 4.24%, MAS in 4.85% with PPHN in 3.03%. 4.24% patients were expired mainly due to birth asphyxia with HIE and MAS with PPHN.

Conclusion: Chances of MSL increased with late gestation age > 40 weeks, maternal risk factor like hypertension, anemia, Oligohydramnios. Meconium stained amniotic fluid is associated with increased incidence of LSCS, low APGAR score, birth asphyxia and meconium aspiration syndrome and increased NICU admission.

KEYWORDS

Meconium stain amniotic fluid, meconium aspiration syndrome, PPHN, birth asphyxia

INTRODUCTION

During the fetal life the first intestinal secretion from fetus is meconium, which starts as early as 10th weeks of gestation age and incidence of intrauterine passage of meconium is increases with the increase in gestational age.[1] It is composed of intestinal epithelial cells, lanugo, mucus, amniotic fluid, bile and water.[2, 3] The presence of meconium stained amniotic fluid(MSAF) is a serious sign of foetal compromise, which is associated with an increase in perinatal morbidity and mortality.[4,5] Increased fetal morbidity and mortality is more associated with in thick meconium stain liquor compare to thin meconium stain liquor. This can vary from light to heavy staining.[6] It is considered "significant" if dark green or black, with a thick, tenacious appearance. Clear amniotic fluid on the other hand is considered reassuring for fetal well-being.[7] Meconium staining of amniotic fluid has been considered to be a predictor of poor fetal outcome, because any asphyxial event in a fetus with meconium stained liquor result in gasping in utero which causes aspiration of meconium and its resultant complications and its direct correlation to fetal distress and increased likelihood of inhalation of meconium with resultant deleterious effects on neonatal lungs.[8]

Increased perinatal morbidity and mortality rates have been associated with meconium stained amniotic fluid and of special concern is meconium aspiration syndrome, which is initially manifested as respiratory distress, hypoxemia and acidosis and may progress rapidly to respiratory failure.[9] It is rare before 32 weeks, increasing to more than 30% in post term pregnancy. Most of the babies are 37 weeks or older.[10]

The present study will help us to note the incidence of meconium staining of amniotic fluid and its correlation with the maternal risk factors, management during labour, and its outcome. Since all babies with meconium passage during labour don't have associated maternal risk factors and all don't have adverse outcome, it is very important to distinguish those who are likely to develop fetal distress and intervene accordingly to prevent complication like meconium aspiration syndrome and its sequel.

The incidence of meconium stained amniotic fluid varies with maternal risk factors. So this study is an effort to look for whether meconium staining of amniotic fluid has any correlation with risk factors, fetal distress in labour and to assess what the exact fetal condition and their outcome in all cases of meconium stain amniotic fluid with the help of data obtained in the present study.

MATERIAL AND METHODS

SOURCE OF DATA:

The study was done at Dhiraj hospital, Pipariya, in the department of pediatrics. The study period was from April 2016 to July 2017. This study includes, 165 cases admitted in hospital at any gestation age who exhibit meconium stained liquor after spontaneous or artificial rupture of membranes with full feeling the inclusion and exclusion criteria.

INCLUSION CRITERIA

a) Live singleton pregnancy (new born) with mother having MSAF
b) All neonates born in Dhiraj hospital with mother having MSAF

EXCLUSION CRITERIA

a) Baby with congenital malformations.
b) Intrauterine death

Purpose of study will be explained to the study subject's parents and appropriate details will be taken in a proforma along with informed consent. Mothers in labour room were studied when there was meconium found at the time of rupture of membrane or when clear AF convert into meconium stained fluid during the course of labour. A total 165 cases were studied as prospective study who had history of meconium stained liquor. Associated maternal risk factors like anemia, preeclampsia, essential hypertension, Oligohydramnios; mode of delivery like vaginal/ forceps delivery/ LSCS; type of meconium (thick and thin) taken into consideration in analyzing the perinatal outcome.

Study cases were grouped into 2 categories as noted below according to clinical gradation of meconium. Group I who had thin meconium and Group II who had Thick meconium during course of labour. After delivery, neonates who had heart rate >100, good muscle tone and strong respiratory efforts considered as a vigorous and the infants who had heart rate <100, poor muscle tone and weak respiratory effort were considered as a non vigorous. These all babies were managed in labour room according to standard neonatal resuscitation protocol. 1 min and 5 min APGAR score were noted. They were classified into 3 category on basis of APGAR score according to NNF guide line into no birth asphyxia, moderate birth asphyxia and severe birth asphyxia.

- Neonates who had 1 min APGAR score 3 or less at a time of birth considered as a severely asphyxiated
- Neonate who had 1 min APGAR score between 3 to 7 considered as a moderately asphyxiated.
- Neonate who had 1 min APGAR score 7 or more considered as a non asphyxiated and good outcome.
- The neonates who were vigorous, they were kept with their mother in postnatal ward. Every day regular check up of these neonates was done till they are admitted in hospital.

- The neonates who were non vigorous, they were admitted in NICU and proper management was done under the guidance of neonatologist as per standard NICU protocol. Duration of hospital stay, Out come of babies those admitted in NICU i.e. Death, Discharge, DAMA was noted.

STATISTICALANALYSIS

It was carried out by calculating the mean, standard deviation (SD) and P value.

RESULT

Total number of delivery from April 2016 to July 2017 were 2579, out of those 165 cases had meconium stained liquor. From that 39% (65 cases) had thin meconium and 61% (100 cases) had thick meconium. **Debdas et al**[11] found that 78.75% had thin MSL and 21.25% had thick MSL.

Out of all MSAF cases, 6.06% of cases belongs to gestational age < 37 weeks, 42.42% of cases belongs to gestational age between 37 to 39 weeks while 51.52% cases of cases belongs to gestational age between 40 to 42 weeks. Incidence of MSAF is increasing with gestational age after 40 weeks. Study done by **James et al**[12] found that incidence of MSAF increases with gestational age and it reaches 30% at 40 weeks and 50% at 42 weeks of gestation. **Hiremath P B et al**[13] did a similar study in which 36% of cases had gestational age from 40 – 42 weeks and large number of cases (40%) had gestation age > 42 weeks.

Table 1: Antenatal maternal risk factors associated with meconium stain liquor

Risk Factor	N	Percent
Hypertension	18	10.91%
Oligohydramnios	17	10.30%
Anemia	5	3.03%
No risk factor	125	75.76%
Total	**165**	**100.00%**

In present study most of the cases (75.76%) have no risk factor. Out of total 165 cases 51.52% babies born after 40 weeks. Other antenatal maternal risk factors associated with meconium stain liquor were hypertension (10.91%), Oligohydramnios(10.30%), anemia in mother (3.03%) respectively. Study done by **Hiremath P B**[13] shows 33% cases had anemia, 42% cases had hypertension and 25% had not any maternal risk factor. **Kamala et al**[14] found 8.66% had essential hypertension, 6% had anemia and 85.34% had not any maternal risk factor. **Vinaya Pendse et al**[15] found 26.5% had hypertension, 1% had Anemia and 72.5% had not any other maternal risk factor. **Bhide SS et al**[16] found that 13.85% had hypertension, 6% had anemia and 80.15% had not any other maternal risk factor.

Table 2: Mode of Delivery in meconium stained liquor babies

Mode of delivery	Thin	Thick
Normal	63.08%	60%
LSCS	36.92%	40%

Table shows mode of delivery in thick and thin meconium stained liquor babies. 63.08% of thin and 60% of thick meconium had normal vaginal delivery, while rest of them i.e. 36.92% of thin and 40% of thick MSL had LSCS. So,mean incidence of LSCS in MSL is 38.78%(64 cases), compare to incidence of LSCS in c/o clear liquor i.e. 26.75%(645 cases). This difference is statistically significance as P value is 0.023 (<0.005).

Table:3 Condition of newborn at a time of birth

MSL	OUT COME				Total	p value
	Non Vigorous	%	Vigorous	%		
Thin	8	12.31%	57	87.69%	65	0.034
Thick	27	27.00%	73	73.00%	100	
Total	**35**	**21.21%**	**130**	**78.79%**	**165**	

Table 3 shows that Out of 100 cases of thick meconium, 27% cases were non vigorous and 73% cases were vigorous; while from 65 cases of thin meconium 12.31% were non vigorous and 87.69% cases were vigorous. Non vigorous babies of thick MSL were required resuscitation to all, from those 59% cases developed severe birth asphyxia and 41% cases developed moderate birth asphyxia. Non vigorous babies of thin MSL were required resuscitation to all, from those 62.5% cases had severe birth asphyxia and 37.5% cases had moderate birth asphyxia. The difference of birth of non vigorous baby and requirement of resuscitation in case of thick and thin MSL is statistically significant (p value 0.035). **Miller et al**[7] in his study found that 14.10% of patient had severe birth asphyxia and 11.30% of cases had moderate birth asphyxia.

Out of 165 patients 16.36% (27 cases) developed birth asphyxia, from those 8.48% (14 cases) developed hypoxic ischemic encephalopathy; 4.24% (7 cases) had early onset sepsis; 4.85% (8 cases) had meconium aspiration syndrome, from those 3.03% (5 cases) developed persistent pulmonary hypertension. Study done by **priti singh at al**[17] shows that 10.42% cases had birth asphyxia, 0.88% cases had sepsis, 5.26% cases had meconium aspiration syndrome. Miller et al found that 14.1% of patients had severe birth asphyxia.

Total 25.45% (42 cases) required oxygen, from those 27.69% (18 cases) were thin meconium and 24% (24 cases) were thick meconium group. 20.61% (34) were required antibiotic treatment either because of early onset sepsis or meconium aspiration syndrome or severe birth asphyxia who required mechanical ventilation. 15.15% (25) required mechanical ventilation due to severe birth asphyxia or meconium aspiration syndrome with persistent pulmonary hypertension. Study done by **C.Fischer et al**[18] in which out of 241 cases, 152 (63.1%) cases were required only oxygen for treatment, 3 cases (1.2%) were required nasal CPAP without mechanical ventilation, 69 (28.6%) cases were required conventional ventilation without high frequency oscillation (HFO), 89 cases(88.9%) required antibiotics for treatment.

Total 7 death (4.24%) were occurred from 165 patients; From those 1 case (14.29%) had meconium aspiration syndrome with PPHN and rest 85.71%(6 cases) had severe birth asphyxia with HIE. **Hellman et al**[19] shows total mortality rate of 7 %, out of which 70% were due to birth asphyxia, 20% were due to meconium aspiration syndrome and 10% were due to sepsis. **Debdas et al**[11] found that total mortality rate was 3 % out of which 62.40% were due to birth asphyxia, 37.60% were due to meconium aspiration syndrome. Total neonatal mortality during study period was 5.2% of live birth (136 cases), From that 0.15% death was due to MSL.

Table 4: correlation between duration of NICU stay and meconium stained liquor

NICU stay in days	n=65 THIN GROUP		n=100 THICK GROUP		n=165 TOTAL	
	NO OF CASES	PERCENTAGE	NO OF CASES	PERCENTAGE	NO OF CASES	PERCENTAGE
< 1 day	2	3.08%	15	15.00%	17	10.30%
1-3 days	6	9.23%	11	11.00%	17	10.30%
4-7 days	4	6.15%	9	9.00%	13	7.88%
>7 days	9	13.85%	13	13.00%	22	13.33%
TOTAL	21	32.31%	48	48.00%	69	41.82%

Table shows 32.31% of total thin MSL cases and 48% of total thick MSL cases were required NICU admission. 28.4% of total NICU bed occupancy is because of MSL.58.18% babies of MSL didn't required NICU admission, they just required observation. Study done by **Pravin goud et al**[20] in which 10.8% had thin MSL and 54.9% had thick MSL who required NICU admission.

Out of total 165 patients 95.76% were discharged and had good outcome and 4.24% were expired. **Hellman et al**[19] found in his study that 7% mortality occurred due to MSAF. **Debdas et al**[11] found that 3% mortality occurred due to MSAF. **Goud and Krishna et al**[20] found that 7.7% mortality occurred due to MSAF.

CONCLUSION

Increasing gestation age is considered as most common risk factor for MSAF as compared to other maternal risk factor. Incidence of meconium passage is high with gestation age >40 weeks. Other then this, hypertension, preeclampsia, anemia, Oligohydramnios was also imp. Maternal risk factor for MSL. There are high incidences of birth of non vigorous babies and resuscitation requirement in thick meconium stained group as compaired to thin meconium stained group. Neonate with history of meconium stained amniotic fluid can have morbidity and related complication like birth asphyxia, hypoxic ischemic encephalopathy, meconium aspiration syndrome, persistent pulmonary hypertension, transient tachypnea of newborn. These neonate required NICU admission for observational care, oxygen support, ventilator support. Some of them developed shock so they required ionotropic support. Duration of NICU stay is more with thick

meconium stained liquor as compare to thin stained liquor. Most of cases of MSL can be managed with only observation. Most of NICU admission cases required only short duration NICU stay i.e. <7 days. Chances of survival rates are high with proper NICU care, only few of them (4.29%) were expired. Birth asphyxia is most common cause of death followed by meconium aspiration syndrome and PPHN. More than one quarter of bed occupancy is because of MSL, so it is considerable cause of neonatal morbidity and NICU bed occupancy.

Incidence of LSCS is high in MSL compare to clear amniotic liquor(p value 0.04), so complication related with LSCS increase in c/o MSL babies. Because of lack of advance support like nitric oxide therapy and HFO in our NICU leads to difficulty in managing severe PPHN babies in c/o MSL which is limitation of our study.

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