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Original Research Article

Influence of meconium stained liqour on fetomaternal outcome

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ABSTRACT

Background: Amnion, the membrane covering the fetus is filled with amniotic fluid which is nature's mechanism to protect the fetus against several intrauterine hazards. The amount of amniotic fluid varies and keeps on increasing till near term and then declines. Meconium-stained liquor is a dire emergency and all labour protocols change rapidly as it is an indicator of asphyxia and distress.
Methods: This study was done in the Obstetrics and Gynaecology Department of Dhiraj Hospital. Study duration was 1.5 years. A total of 160 patients were included in the study. Various maternal and neonatal parameters were assessed to identify the outcome of clear liquor group and meconium-stained group. Further subdivision of meconium staining into thin and thick meconium was also done.
Results: A sharp increase in the incidence of caesarean section and instrumental delivery was noted in the meconium-stained liquor group. The APGAR scores at 1 minute and 5 minutes showed greater risk to the neonate in thick meconium staining. Incidence of birth asphyxia and Meconium Aspiration Syndrome were found more in the meconium-stained group.
Conclusions: Early detection of high-risk pregnancies in the antenatal period and timely intervention can prevent a lot of cases of meconium staining. Initial management of fetal hypoxia helps in improving fetal status dramatically.

Keywords: Amniotic fluid, Birth asphyxia, Meconium-stained liquor

INTRODUCTION

Amniotic fluid serves several roles in pregnancy. It helps in musculoskeletal development of the fetus, allows fetal swallowing and breathing. It serves as a cushion for the fetus to protect it from external pressure changes and trauma. It has bacteriostatic properties.[1] Meconium is composed of intestinal epithelial cells, lanugo, mucus, amniotic fluid, water and bile. It is usually passed as a response to vagal stimulation, hypoxia, falling venous umbilical saturation or normal physiologic function of a mature fetus. Out of all pregnancies, 10% have a risk of meconium passage and out of those 5% suffer from meconium aspiration. This can result in grave neonatal morbidity and mortality.[2] Clinical interpretation of fetal wellbeing is a crucial part of modern-day obstetrics. Fetal distress may be acute, chronic or acute on chronic. When a fetus passes meconium, there is a risk of aspiration which can lead to obstruction of the airway, decreased alveolar gas exchange and chemical pneumonitis. Passage of thick particulate meconium blocks the terminal airways leading to mismatch in ventilation-perfusion and atelectasis. Aspiration of meconium leads to hypoxemia, acidosis and hypercapnia, similar to Mendelson's syndrome.

Long standing effect of meconium aspiration is pulmonary hypertension in the neonate. Inspite of numerous advances, neonates are still affected by meconium aspiration in modern obstetrics. There is still a search of the ideal protocol to deal with meconium-stained liquor to balance optimum fetal outcome and avoid unnecessary operative deliveries. This study was aimed at identifying

the perinatal outcome in meconium-stained compared to clear liquor. To assess the feto-maternal outcome in patients with meconium-stained liquor during labour as compared to patients with clear liquor.

Objectives

To study the effect of meconium-stained liquor on outcome of labour. To study the effect of meconium on fetal and neonatal outcome (such as fetal distress, birth asphyxia, meconium aspiration syndrome, NICU stay). To calculate the APGAR scores of newborns at 1 minute and 5 minutes in all patients and compare with clear liquor group.

METHODS

Study design

A prospective observational study was conducted in Dhiraj Hospital after obtaining permission from the Institutional Ethics Committee.

Study population

All women in labour attending the labour room or the outpatient department of Dhiraj Hospital.

Study period

The study duration January 2020 to May 2021

Sample size

The size of the sample was 160.

Patients who fulfilled the inclusion criteria were included in the study after taking consent.

Inclusion criteria

All pregnant women in labor with gestational age between 37-42 weeks. Singleton pregnancy with vertex presentation. Liquor- thin or thick meconium stained were included in Cases.

Exclusion criteria

All women below 37 weeks and above 42 weeks of gestation. Presentations other than cephalic. Intra uterine fetal demise, Rh incompatibility, multiple pregnancy. Associated medical disorders like hypertension, diabetes. Maternal complications such as Antepartum haemorrhage, Eclampsia. Any patient not giving consent for participation in the study.

For controls all the patients immediately following case that satisfy the above inclusion and exclusion criteria but have clear liquor serve as controls.

Careful antepartum and intrapartum monitoring of the fetal and maternal wellbeing was done by using the partogram and electronic fetal monitoring system. Immediate intervention was done as and when required either by instrumental delivery or by operative method to safeguard the maternal and fetal wellbeing.

Statistical analysis

Data was collected and analzyed by SPSS version 17.

RESULTS

In the 21-25 age slot, there were 33 cases in the MSL group (41.25%) and 39 cases in the clear liquor group (48.75%). The above table shows the sex distribution of the babies born. In the MSL group, 35 babies born were female (43.75%) whereas 45 babies born were male (56.25%). In the clear liquor group, 50% were male babies and the other 50% were females. The importance of sex distribution is that the female new-borns thrive with lesser postnatal management and better outcome, thus stressing a statement of stronger longevity of the female sex.

The above table shows the socioeconomic status of patients involved in the study. In the MSL group, 81.25% of patients were from the lower socioeconomic class and 18.75% of patients were from the middle class. In the clear liquor group, 71.25% of patients were from the lower socioeconomic class and 28.75% of patients from the middle class. Both groups are comparable and significant. 56 patients presented with thin meconium staining whereas 24 patients presented with thick meconium staining.

There were only 47.5% vaginal deliveries in the MSL group as compared to 71.5% in the clear liquor group. The percentages of caesarean section, vacuum and outlet forceps in the MSL group are 27.5%, 12.5% and 12.5% respectively as compared to the clear liquor group where they are 13.75%, 6.25% and 8.75%. The number of operative deliveries (caesarean sections) and instrumental deliveries increased in the MSL group to hasten the process of delivery and improve the neonatal outcome. APGAR score at 1 minute was between 4-6 in 13 cases of thick MSL and 35 cases of thin MSL.

All cases of clear liquor group had APGAR score between 7 and 10 at 1 minute. APGAR score at 5 minutes was between 4-6 in 9 cases of thick MSL and 24 cases of thin MSL. All cases of clear liquor group had APGAR Score between 7 and 10 at 5 minutes.

15 cases of thin MSL and 4 cases of thick MSL showed birth asphyxia. No cases in the clear liquor group showed birth asphyxia. Out of 80 cases of MSL, 8 cases developed MAS and further complications. 41.25% of the cases in the MSL group required NICU admission indicating grave prognosis for the newborn.

Table 1: Age distribution.

Age (in years)	MSL group	%	Clear liquor group	%
<20	12	15.00	12	15.00
21-25	33	41.25	39	48.75
26-30	29	36.25	24	30.00
31-35	4	5.00	5	6.25
>35	2	2.50	0	0.00
Total	80	100.00	80	100.00

Table 2: Sex distribution of the babies born.

Gender	MSL	%	Clear	%
Male	45	56.25	40	50.00
Female	35	43.75	40	50.00
Total	80	100.00	80	100.00

Table 3: Socioeconomic status of patients.

Socioeconomic status	MSL	%	Clear	%	Chi square value (All patients)	P value (all patients)
Lower	65	81.25	57	71.25		
Middle	15	18.75	23	28.75	2.208	0.137
Total	80	100.00	80	100.00		

Table 4: Frequency and type of meconium consistency in total deliveries.

Meconium consistency	N	%
Thin	56	70.00
Thick	24	30.00
Total	80	100.00

Table 5: Mode of delivery in case of MSL group and clear liquor group.

Mode of delivery	MSL	%	Clear	%	Chi square test	P value
Normal delivery	38	47.50	57	71.25		
LSCS	22	27.50	11	13.75		
Vacuum	10	12.50	5	6.25	9.662	0.021
Outlet forceps	10	12.50	7	8.75		
Total	80	100.00	80	100.00		

Table 6: Incidence of APGAR score in 1 minute in both groups.

Meconium consistency				Clear liquor group	
		N	**%**	**N**	**%**
Thick	1-3	0	0.00	0	0.00
	4-6	13	54.17	0	0.00
	7-10	11	45.83	80	100.00
	Total	24	100.00	80	100.00
Thin	1-3	0	0.00		
	4-6	35	62.50		
	7-10	21	37.50		
	Total	56	100.00		

Table 7: Incidence of APGAR Score in 5 minutes in both groups.

Meconium consistency				Clear liquor group	
		N	**%**	**N**	**%**
Thick	1-3	0	0.00	0	0.00

Continued.

Meconium consistency				Clear liquor group	
	4-6	9	37.50	0	0.00
	7-10	15	62.50	80	100.00
	Total	24	100.00	80	100.00
Thin	1-3	0	0.00		
	4-6	24	42.86		
	7-10	32	57.14		
	Total	56	100.00		

Table 8: Incidence of birth asphyxia.

Group	Present	%	Absent	%	Chi square value	P value
MSL						
Thin	15	32.60	41	67.40	0.949	0.329
Thick	4	16.67	20	83.33		
total	19	23.75	61	76.25		

Table 9: Incidence of meconium aspiration syndrome (MAS).

Group	present	%	absent	%	Chi square value	P value
MSL	8	10.00	72	90.00	7.907	0.004
clear	0	0.00	80	100.00		

Table 10: Incidence of NICU admission in both groups.

Group	NICU admissions	%
MSL	33	41.25
Clear	0	0.00
Total	33	41.25

DISCUSSION

In this study, the main intention was to identify the effect of meconium staining in liquor during labour and ultimately its effect on neonatal outcome. In the MSL group, out of the 80 cases, 47.5 % (38) of cases had a vaginal delivery, 27.5 % (22) underwent a caesarean section and 25 % (20) cases required instrumentation. The rate of instrumentation and operative delivery interference is consistent with another study by Mohammad N. et al, where among 149 women with MSAF, 99 (66.4%) women had caesarean section while 50 (33.6%) delivered through spontaneous vaginal delivery.[2]

Naveen S et al, also reported a caesarean section rate of 49.1% in MSAF.[3] In the current study, the APGAR Score at 1 minute was between 4-7 in 54% of patients with thick MSL and 62.5% with thin MSL. This was comparable to another study by Tolu LB et al, where 36.8% of the stained fluid group had APGAR Score less than seven and stained fluid was 2.1 times more likely to have low 5th minute APGAR Score compared to the non-stained fluid group.[4] This is much lower than the study conducted by Sori DA et al, at JUSH, which shows an APGAR score of less than seven in 88% of the exposed group.[5] Poor APGAR Scores at 1 minute and 5 minutes indicates poor neonatal outcome. The percentage of cases showing meconium aspiration syndrome (MAS) in our study is 10%. The results are comparable to another study done by Patil et al, where 12% of the babies born with meconium stained liquor developed MAS.[6] Another study by Sori DA et al, showed meconium aspiration syndrome was diagnosed in 18.5% of the neonates born through MSAF, which is very high and they explained as the possibility of overdiagnosis since the diagnosis of MAS in their study was made only with clinical judgment without Chest X-ray.[5] In our study, the incidence of birth asphyxia in thin MSL group was 32.6% and the same in thick MSL group was 16.67% which is similar to another study done by Rokade J et al.[7] This study shows that 41.25% of the babies of MSL group required NICU Admission. In another study by Debdas et al, it was observed that out of 340 cases in all, 76 babies of MSL group required NICU Admission.[8] From the study and the data mentioned above, it can be easily summarized that the fetus should not suffer hypoxia, due to any reason, at any stage of labour or during pregnancy, as this causes chronic hypoxia which has a very guarded prognosis.

CONCLUSION

In the field of Obstetrics and Gynecology, a seemingly minor looking event can lead to a major catastrophe with morbid results is best explained by a case of meconium-stained liquor. An increased rate of caesarean sections and

instrumentation has been seen in cases of meconium staining and fetal distress to prevent perinatal morbidity and mortality. Babies with thick meconium staining have a greater risk of hypoxia, meconium aspiration syndrome, low APGAR Score at 1 minute and at 5 minutes as compared to thin meconium-stained liquor babies. The need of NICU admission is also more in the thick MSL group. All foetus with meconium passage in labour do not have associated maternal morbidities or risk factors. So, it is important to identify the cases where the possibility of fetal distress is more and intervene timely to avoid complications. At the end of the study, one conclusion that can be easily drawn is that- this can be prevented. All factors increasing neonatal and maternal morbidity and mortality should be identified in the antenatal period by regular check-ups and proper surveillance. Do not allow any complication to continue to the point where it compromises the mother or the baby's survival.

Chronic intrauterine hypoxic state should never prevail. Strict intranatal vigilance is essential to avoid situations causing acute hypoxia and if it arises, corrective measures should be done immediately. Chronic hypoxic state causes profound neurological damage which at times is irreversible. With changing trends and availability of a skilled obstetrician, neonatal resuscitation unit, anesthesia team and continuous fetal monitoring, the fetal mortality associated with meconium-stained liquor has decreased significantly. A healthy mother and a healthy baby should always be the priority of any obstetrician while dealing with a case of meconium-stained liquor.

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