TO STUDY THE ASSOCIATION OF PERINATAL OUTCOME WITH MECONIUM STAINED LIQUOR IN TERM PREGNANCY IN A BUSY PERIPHERAL TERTIARY CARE HOSPITAL

Gynaecology

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ABSTRACT

Passage of meconium still remains an enigma to the obstetrician and equally worries the paediatrician. The presence of meconium in amniotic fluid is still believed to be a serious sign of intra-uterine fetal compromise which is associated with an increase in perinatal morbidity. Clear amniotic fluid on the other hand is regarded as a good sign of clinical reassurance to both the obstetrician as well as the pediatrician.

The exact etiology of meconium stained amniotic fluid is unclear. In our study the mean gestational age of the meconium stained liquor group was 39.6 (+ 1.4) weeks and of the clear liquor group was 38.8 (+ 1.3) weeks. In our study, 32% of the cases in the meconium stained group had gestational age between 40–42 weeks in comparison to only 13% patients in the control group.

Our study concluded that meconium stained amniotic fluid was more prevalent in primigravidas (59%). No significant co-relation was found between age and meconium stained amniotic fluid.

There is a greater incidence of meconium stained amniotic fluid in the unbooked population. As per our study, 35% of the patients in the meconium stained group were unbooked compared to 11% of the population in the control group. Overall, 77% of the population was booked and 33 % were unbooked.

In our study, 47% of the patients had thin meconium, 20 % had moderate and 33% of the patients had thick meconium.

As per present study, there was a greater incidence of fetal heart rate abnormalities in the form of abnormal CTG in meconium stained group in comparison to the clear group. In the group with meconium stained liquor, 30% of the patients had fetal heart rate abnormalities whereas only 12% of the patients in the clear liquor group had fetal heart rate abnormalities.

Meconium stained liquor is associated with increased rate of operative deliveries as per our study. In our study, we found that 46% of the patient in the MSAF group underwent caesarean section whereas in the clear liquor group, 25% of the patients underwent caesarean section. In the MSAF group 49% patients had vaginal delivery and 5% had instrumental delivery.

From the present study, we concluded that the percentage of babies with Apgar score <7 at 1 minute in the meconium stained group was more compared to the clear liquor group. In our study 27% of the babies in the MSAF group had low Apgar scores compared to only 11% of the babies in the clear liquor group. 73% of the babies in the MSAF group had Apgar score >7.

No significant co-relation was noted between Apgar score at 5 minutes and meconium staining of liquor. 9% of the babies in the meconium stained group had Apgar score <7 at 5 minutes compared to 6% of controls.

Majority (46%) of the babies had birth weight between 2.5 – 3.0 kg whereas a significant percentage of babies had birth weight below 2.5 kg (21%).

Meconium stained amniotic fluid is associated with a greater number of SNCU admissions. In our study, 20% of the babies in the meconium stained group were admitted to the nursery in comparison to only 9% nursery admissions in the clear liquor group.

In this study it was seen that meconium aspiration syndrome was prevalent in the thickly stained group than in thinly stained group. 80% of the babies having meconium aspiration were in the thick meconium group.

Early neonatal death did not seem to be significantly associated with meconium stained amniotic fluid, as per our study. 3 out of 100 babies born in the meconium stained group died whereas there was no death in the clear group.

KEYWORDS

INTRODUCTION

Meconium, the fecal material that accumulates in the fetal colon throughout gestation, is a term derived from the Greek word mekoni, meaning “poppy juice” or “opium”^[1]. The term was coined by Aristotle, who believed that the substance caused sleeping state of the fetus in the mother's womb.

Meconium is a sterile, thick, black-green, odorless material first observed in the fetal intestine during the third month of gestation. Meconium results from the accumulation of debris, including desquamated cells from the intestine and skin, gastrointestinal mucin, lanugo hair, fatty material from the vernix caseosa, amniotic fluid and intestinal secretions. Meconium is passed into the amniotic fluid by peristalsis of fetal gut accompanied by relaxation of the internal and external anal sphincters. Meconium is found in fetal gut from 10 weeks of gestation, but passage of meconium is rare before 32 weeks. Incidence of meconium passage increases steadily beyond 37 weeks of gestation and reaches approximately 15 – 20% at term^[2].

Presence of meconium stained amniotic fluid is seen in 10-15 % of deliveries^[2]. In utero, passage of meconium may simply represent the normal gastrointestinal maturation or it may indicate an acute or chronic hypoxic event, thereby making it a warning sign of foetal compromise. The many possible pathophysiological pathways of intraamniotic meconium passage all have the same origin, which is

ante- or intrapartum asphyxia. Presence of meconium below vocal cord is known as meconium aspiration and it is seen in around 20-30 % of all infants with meconium-stained amniotic fluid. Meconium aspiration syndrome (MAS) is defined as a respiratory distress that develops shortly after birth, with radiographic evidence of aspiration pneumonia and presence of meconium stained amniotic fluid. MAS occurs in about 5% of deliveries with meconium-stained amniotic fluid and death occurs in about 12% of infants with MAS^[3]. In addition, up to one third of all cases in which aspiration occurs, develop long term respiratory compromise.

Obstetricians and midwives even in the ancient days of Hippocrates were concerned about the grave outcome of labour when liquor was stained with meconium. Contrary to the earlier belief, that passage of meconium was a sure sign of fetal death, Schwarz (1858) recognized that it was an indication of diminution of placental exchange of oxygen.

With the decline of maternal mortality and morbidity over the past few decades, modern obstetricians are much more concerned about the well-being of the fetus. Management of labour complicated by meconium stained amniotic fluid is still a widely debated subject. Meconium stained amniotic fluid is still associated with increased incidence of caesarean section, instrumental vaginal delivery and adverse perinatal outcome. In recent years, with improvement in the

antenatal and intrapartum care, there is a decline in the incidence of still births and this has resulted in a better neonatal outcome. With the availability of cardiotocogram, continuous electronic fetal heart rate monitoring is possible now and labour can be monitored more efficiently. Amnioinfusion was introduced as an important intervention to prevent meconium aspiration syndrome, but with time, opinion regarding its beneficial effect seems to be divided.

In the context of these conflicting and controversial observations regarding meconium staining of amniotic fluid in labour, the present clinical study was done to find out its significance in respect of perinatal mortality and morbidity.

AIMS AND OBJECTIVES

To study the association of perinatal outcome with meconium stained liquor in term pregnancy in a busy peripheral tertiary care hospital.

SPECIFIC OBJECTIVES

1. To detect the association of fetal heart rate abnormalities in CTG with meconium stained liquor.
2. To observe the neonatal outcome in form of mode of delivery, Apgar scores at 1 and 5 minutes in a patient in labour with meconium stained liquor.
3. To find out the admission rates of neonates in SNCU in case of patients with meconium stained liquor.
4. To compare the outcome of meconium stained amniotic fluid with clear amniotic fluid in relation to perinatal outcome in form of fetal heart rate abnormalities in CTG, mode of delivery, Apgar scores at 1 and 5 minutes and admission rates of neonates in SNCU in term pregnancy.

MATERIALS AND METHODS

The Hospital based Prospective Observational study was conducted in the Department of Obstetrics and Gynaecology, Darbhanga Medical College and Hospital, Laheriasarai, Bihar from March 2019 to February 2020.

Total 100 pregnant women of 37 – 42 weeks gestation with singleton pregnancy and vertex presentation with meconium stained amniotic fluid. Pregnant women of 37 – 42 weeks gestation with singleton pregnancy and vertex presentation with clear amniotic fluid.

GROUPS –

GROUP A - term pregnancy with meconium stained amniotic fluid

GROUP B - term pregnancy with clear amniotic fluid

Inclusion Criteria –

- Pregnancy with 37 – 42 weeks gestation
- Pregnancy with previous vaginal deliveries
- Singleton pregnancy with live fetus with vertex presentation
- Patient in active labour with rupture of membranes(spontaneous or artificial)

Exclusion Criteria –

- Pregnancy <37 weeks of gestation
- Pregnancy with severe maternal disease
- Pregnancy with previous LSCS
- Pregnancy with any fetal malformation
- Pregnancy with severe fetal distress
- Pregnancy with amnionitis , hydramnios , antepartum haemorrhage
- Pregnancy with non – vertex presentation and multiple gestation
- Pregnancy with pregnancy induced hypertension (PIH)

PARAMETERS TO BE STUDIED

1. Obstetric Parameters

- a) Term pregnancy(37-42 weeks) will be confirmed, from the 1st day of the last menstrual period and from an ultrasound scan in the 1st trimester.
- b) Blood pressure by mercury sphygmomanometer
- c) Blood for CBC, urea, creatinine
- d) Blood sugar – random and post-prandial
- e) VDRL, HBsAg, HIV 1 and 2
- f) Thyroid profile
- g) Mode of delivery

2. Fetal parameters

- a) Fetal heart rate abnormality in CTG

b) Apgar score at 1 min

c) Birth weight

d) SNCU admission

METHODOLOGY-

Following selection of the cases, a detailed history was recorded in the labour room including age, parity, previous obstetrical, medical, surgical history, history of present pregnancy for any abnormality. Mothers were examined clinically to find out the presentation, position, amount of liquor and height of fundus. Assessment of pelvis and the cervix were also done. Use of any medication like oxytocin, analgesics and sedatives were noted.

Time of rupture of membranes and appearance of meconium were noted. When meconium appeared either at the time of rupture of the membranes or after sometime during the course of labour, a speculum examination was done after taking proper aseptic precautions to collect the meconium stained liquor over the speculum to a test tube for clinical quantitative gradation depending on the consistency and colour.

When liquor was light green in colour it was considered as thin staining, yellow as moderately thick and deep green as thickly stained. At the time of detection of meconium stained liquor, position and station of the head, effacement and dilatation of the cervix was noted. Continuous CTG was done to note any fetal heart rate abnormalities. Partograph was maintained to assess the progress of labour.

During delivery any abnormality of cord and placenta were noted.

Pediatrician was present during delivery of cases with meconium stained liquor. Oropharyngeal and/or nasopharyngeal suction, laryngoscopy and suction, endotracheal intubation was done according to the condition of the newborn. Condition of the newborn was assessed by Apgar score at 1 min and 5 mins after birth.

APGAR SCORE

SIGN	0	1	2
Respiratory effort	Absent	Slow, irregular	Good, crying
Heart rate	Absent	Slow (<100)	>100
Muscle tone	Flaccid	Flexion of extremities	Active body movements
Reflex irritability	No response	Grimace	Cry
Colour	Blue, pale	Body pink, extremities blue	Complete pink

Total score = 10, No depression = 7-10, Mild depression = 4-6, Severe depression = 0-3.

All the babies of the study group were followed up for 4 to 7 days for perinatal morbidity and mortality. Incidence of SNCU admission in the study group and the incidence of meconium aspiration & meconium aspiration syndrome were noted in babies born with meconium stained liquor.

RESULTS AND ANALYSIS

In this study, 200 pregnant women were taken into consideration. 100 women were from the group with meconium stained liquor (Group A) and 100 were from the group with clear liquor (Group B), both groups being at term gestation.

Collected data was entered into MS Excel Spread Sheet and data was analysed using MS Office Excel 2010. Chi-square was done for statistical analysis of the data. Mean and standard deviation was calculated using standard methodologies. The independent t-test was used to compare the mean of continuous variables between two unrelated groups, p-value <0.05 was considered statistically significant.

Table 1 : Comparison Of Baseline Characteristics

Characteristics	Group A (Mean±SD)	Group B (Mean±SD)
Age (yrs.)	21.4±4.0	21.9±3.2
Height (cms)	157.7±4.5	154.2±3.9
Weight (kg)	56.7±3.9	55.6±4.3

BMI (kg/m ²)	23.7±1.2	23.3±1.1
Gestational Age	39.6±1.4	38.8±1.3
Systolic Blood Pressure (mmHg)	115.5±7.0	109.2±8.3
Diastolic Blood Pressure (mmHg)	74.9±5.0	72.4±5.8

Table 2: Comparison Of Age Distribution Between Group A And Group B

Age Distribution	Group A (n=100)	Group B (n=100)
<20	27	30
20-24	56	49
25-29	13	17
30-34	2	4
35-40	2	0
Total	100	100
Mean Age	24.4±4.0	21.9±3.2

Table 3: Comparison Of Parity Between Group A And Group B

Parity	Group A (n=100)	Group B (n=100)
0	65	59
1	28	30
>1	7	11

Table 4: Comparison Of Booking Status Between Group A And Group B

	Group A (n=100)	Group B (n=100)	Total
Booked	65	89	154
Unbooked	35	11	46
Total	100	100	200

Table 5: Comparison Of Gestational Age Between Group A And Group B

	Group A (n=100)			Group B (n=100)		
	No. of cases	%	Mean GA (wks)	No. of cases	%	Mean GA (wks)
37-40	68	68	39.69	87	87	38.88
>40-42	32	32		13	13	

Table 6: Clinical Gradation Of Meconium (n = 100)

Gradation of Meconium	Number	Percentage
Thinly stained liquor	47	47%
Moderately stained liquor	20	20%
Thickly stained liquor	33	33%

Table 7: Comparison Of Mode Of Delivery Between Group A And Group B

Mode of Delivery	Meconium Stained Group (N=100)		Clear Group (n=100)	
	Number	%	Number	%
Vaginal delivery	49	49	73	73
Instrumental Delivery	5	5	2	2
Caesarean Section	46	46	25	25

Table 8: Comparison Of APGAR Score At 1 Min Between Group A And Group B

Apgar Score at 1 min.	Group A		Group B	
	Number of cases	%	Number of cases	%
<7	27	27	11	11
>7	73	73	89	89

Table 9: Comparison Of APGAR Score At 5 Minutes Between Group A And Group B

Apgar Score at 5 min.	Group A		Group B	
	Number of cases	%	Number of cases	%
<7	9	9	6	6
>7	91	91	94	94

Table 10: Incidence Of Meconium Aspiration Syndrome In Relation To The Type Of Meconium

Type of Meconium	Incidence (n=5)	Percentage
Thin	1	20%
Moderate	0	0%
Thick	4	80%

Table 11: Comparison Of Baby Outcome Between Group A And Group B

Outcome	Group A	Group B
Intrapartum Still Birth	1	0
Early Neonatal Death	2	0
Discharge	97	100

DISCUSSION

In the present study, the mean age of the population under study was 21.7(± 3.6) years. In a study by Neke Akhtar et al, mean age of patients was 26.2 (± 5.2) years. In other study by Sankhyan Naveen et al, mean age of the patients was 24.9 ± 3.8 years. The mean age of the cases in the meconium stained group was 21.4(± 4.05) years and the mean age of the patients in the clear liquor group was 21.97(± 3.2) years. Our study was consistent with the study of Sadiq Unnisa et al who found that the incidence of MSAF was higher in the age group of 21-30 years, similar to the study of Sandhu et al.

In our study, majority of the cases (59%) were primigravida. Similarly, in the study conducted by Mahapatro et al. 85% of the cases were primigravida and in the study conducted by Mundhra et al. 80% of the cases were primigravida. Contrary to these, Lubna et al. found MSAF to be more common in multigravidas.

35% of the cases were unbooked compared to 11% of controls in our study and 77% of the overall population was booked while 33% was unbooked. Contrary to this, in the study by Mundhra et al. 72.12 % cases were unbooked and only 27.88 % were booked. Their study was similar to Bhide et al. where majority of the cases were unbooked. Similarly, in the study by Unnisa S et al. 70% were unbooked and only 30% patients were booked.

The mean gestational age of patients in our study was 39.2 (± 1.4) weeks. Similar to our study, the mean gestational age of patients in a study by Sankhyan et al. was 39.06 (± 1.23) weeks. Similar to the study of Mst Hosna Ara Khatun et al. in which mean gestational age of the cases and controls were 39.3(± 1.5) weeks and 38.5 (± 1.3) weeks respectively, in our study the mean gestational age of the meconium stained liquor group was 39.6 (± 1.4) weeks and of the clear liquor group was 38.8 (± 1.3) weeks.

Barham (1969) classified meconium stained liquor into three groups according to different colours – light (50.82%), yellow (19.3%) and dark green (29.85%). In our study, 47% of the patients had thin meconium, 20 % had moderate and 33% of the patients had thick meconium. In a study by Naveen et al. majority of observed MSAF was of thick type (56.8%), possibly because thin MSAF being more subjective is more prone for variations in incidence. In a study by Vaghela et al. 38% patients had thin meconium, 34% had moderate, 28% had thick meconium. Erum Majid Sheikh et al. observed similar results. Similarly, Unnisa S et al reported that among MSAF 55.4% were thin stained and 44.5% were thickly stained. They classified meconium into two types, thin and thick.

Our study concluded that the incidence of fetal heart rate abnormalities are more in thick meconium stained liquor in comparison to moderate and thin liquor. 69.6% of the cases of thick meconium had abnormal fetal heart rate patterns while the occurrence of abnormal fetal heart rate patterns in moderate and thin meconium were 25% and 4.2% respectively. Our study was supported by a study conducted by Vijayasree et al. in which 9% of the thin meconium and 53.5% of the thick meconium group had abnormal fetal heart rate patterns. These findings were similar with the findings of Berkus et al who observed significantly higher risk of an abnormal fetal heart rate in meconium stained group.

Mode of delivery was significantly influenced by the presence of meconium stained amniotic fluid. Caesarean deliveries were high (46%) in cases. In spite of debate, most obstetricians feel unsafe about the state of fetus, if the amniotic fluid is meconium stained during labour. This has influenced the mode of delivery a lot. Even in places where other facilities of intrapartum monitoring like fetal blood sampling and cardiotocography are available, the rate of caesarian delivery are found to be increased. In accordance with the study of Saunders et al. in our study caesarean section was about twice more in meconium stained group than clear liquor group. 46% patients in meconium stained group had caesarean section while only 25% of patients in clear liquor group had delivery by caesarean section. In our

study 49% of the patients in the meconium stained group had vaginal delivery whereas, only 5% had instrumental delivery. The difference was statistically significant. In the study by Becker et al, 17.4% of patients in meconium group had caesarean section compared to 9.6% in control group (p-value <0.01). Similarly, in study by Wong SF 13.2% of MSAF vs 8.8% of clear amniotic fluid had caesarean section. This lower rate of C-section in meconium group may be due to scalp pH sampling which is not incorporated in our study. In the study by Patil et al 42% of the patients with MSAF had caesarean section. While In study by Naveen S 49.1% of MSAF cases had caesarean section while 10.4% of clear amniotic fluid cases had caesarean section. These results are comparable to us as scalp pH sampling was not incorporated in their study. In a study by Rokade et al. 56% of meconium stained group underwent caesarean section, 24% underwent instrumental delivery and 20% underwent vaginal delivery. In contrast to these studies, Rossi et al. did not find increased rates of operative deliveries in meconium stained liquor.

In the present study the association of MSAF with low Apgar score was strong. In our study, 27% of babies belonging to the meconium stained group had Apgar score <7 at 1 min and 73% had Apgar score >7 at 1 min whereas only 11% of the babies belonging to the clear liquor group had Apgar score <7. This result was statistically significant. In study by Patil et al, 19% of babies with MSAF had unsatisfactory Apgar scores. In a study by Wong SF et al, 29% of MSAF vs 19.4% of clear amniotic fluid had low 1 min Apgar scores. Both of these studies indicate high rate of unsatisfactory Apgar score as in our study. Clifford JB et al did a study in which 40.3% of babies among MSAF group were having low Apgar score at one minute as compared to 3.9% in clear liquor babies. In the study by Sashikala et al, 61% of MSAF babies had asphyxia as graded by Apgar score at one minute. Similarly, in a study by Mundhra et al. 20% of the cases had Apgar score <7 at 1 minute in comparison to 6.8% of controls. Similarly in a study by Rokade et al, Apgar score < 7 was found in 29% of the babies born of meconium stained liquor. In study by Becker et al no statistically relevant difference was noted in Apgar values of defined subgroups. Only 14 babies out of 2246 studied had unsatisfactory Apgar scores. 10 (0.9%) of them were in MSAF group and 4 (0.4%) in control group.

In our study, 9% of the babies of meconium stained group had Apgar score <7 at 5 minutes compared to 6% of the babies of the clear liquor group. This finding was not statistically significant. Similar to our study, Wiswell et al found significantly lower 1 minute Apgar score in MSAF neonate but not at 5 minutes. Kumari et al. found similar results in her study. In contrast, a study by Mohapatro et al. found 16.42% babies in meconium stained group to have Apgar score <7 in comparison to 4.28% of the control group. Their findings were statistically significant. Supriya et al. in their study found similar results.

In our study 3% neonatal deaths were reported in the MSAF group out of which there was one stillbirth and two early neonatal deaths whereas there was no death in the control group. However, this was not statistically significant. All deaths were associated with thick meconium. Gupta et al found that 4.9% of MSAF babies had neonatal death as compared to 2.8% in clear liquor babies. Khatun et al. found 2.9% mortality in meconium stained amniotic fluid with thick meconium and 1.4% mortality in control. In a study by Unnisa et al. 2% of neonatal deaths were reported in the MSAF group. Similar to our study, In the study by Supriya et al. among the babies with MAS, there were 20 neonatal deaths, 19 in thick meconium group and 1 in thin meconium group.

Based on our study we can conclude that meconium stained amniotic fluid is associated with increased incidence of caesarean section, lower APGAR score, more neonatal nursery admissions and meconium aspiration syndrome (MAS).

CONCLUSION

The following conclusions can be drawn from our study:

- Meconium stained liquor was subdivided into three types - thin, moderate and thick stained depending upon the colour and consistency of liquor.
- No significant correlation was seen between meconium stained liquor and maternal age, but the incidence of staining of liquor was found to be higher with increase of gestational age that is 42% in 40–42 weeks.
- Incidence of operative deliveries (instrumental vaginal delivery

and caesarean section) is significantly increased when liquor is meconium stained during labour.

- Perinatal morbidity is increased in cases with meconium stained liquor as evidenced by low Apgar score at 1 minute.
- Incidence of meconium aspiration syndrome was seen in 5 out of 100 cases, out of which 4 were seen in cases with thickly stained liquor.

Thus to conclude, our study further establishes that meconium stained amniotic fluid is associated with poor perinatal outcome.

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