

■ *Original Articles*

Maternal and fetal outcome in term labour with meconium stained amniotic fluid

S Kumari¹, SN Gupta², I P Mahato¹, R Giri¹, A Yadav¹, A Thakur², K Thapa³

¹Department of General Practices and Emergency Medicine, BPKIHS, Dharan

²Department of Obstetrics and Gynaecology, BPKIHS, Dharan

³Department of Obstetrics and Gynaecology, Koshi Zonal Hospital, Biratnagar

Abstract

Introduction: Passage of meconium in utero is a dangerous sign for fetal outcome which influence the decision to deliver as well as the mode of delivery. **Methods:** This descriptive case control study was carried out in the department of Obstetrics and Gynaecology, Koshi Zonal Hospital from March 2006 to July 2006. A total of 50 women with meconium stained amniotic fluid (MSAF) were studied to identify maternal and fetal outcome and was compared with women with clear amniotic fluid. **Results:** Normal delivery was significantly higher (58%) in clear liquor group as compared to MSAF group (22%). Cesarean section was more common in MSAF group (66%) where as it was (38%) in the clear liquor group ($p=0.005$). Low Apgar scores of < 5 at one minute was seen in 48% of MSAF and 6% of clear liquor born babies ($p<0.2$). But at 5 minutes low Apgar score persisted in same 48% of MSAF babies whereas it was seen in 12% of clear liquor group ($p<0.000$). Among the babies born with MSAF 34% were referred to higher center compared to 6% in clear liquor babies ($p=0.000$). Four babies with thick MSAF and one baby with clear liquor had neonatal death ($p=0.005$). **Conclusion:** Mode of delivery and fetal outcome were adversely affected by the presence of thick meconium stained liquor as compared to clear liquor. Additional monitoring facilities e.g. cardiotocography (CTG) if available would reduce fetal distress and allow timely intervention in such cases.

Keywords: meconium stained amniotic fluid, perinatal outcome

Introduction

In the practice of Obstetrics, the aim is to have safe delivery and have healthy mother and baby. Meconium is a green, viscous liquid that first appears in fetal ileum from 10 wks gestation.¹ Meconium stained amniotic fluid rarely occurs before 34 weeks gestation.² After 34 weeks incidence of meconium passage increases with gestational age and reaches approximately 30% at 40 weeks and 50% at 42 weeks.^{3,4} The increased incidence of meconium

stained amniotic fluid with advanced gestational age probably reflects the maturation of peristalsis in the fetal intestine, intestinal parasympathetic innervations and myelination.⁵ When the fetus suffers from hypoxia or asphyxia, increased parasympathetic stimulation by vagus leads to passage of meconium. Intrauterine asphyxia also produces a gasping response by which meconium enters the trachea and once it has been aspirated into lungs it causes mechanical obstruction to airways, chemical pneumonitis and atelectasis.⁶

Approximately 10-20% of live births demonstrate meconium in the amniotic fluid, yet few infants are adversely affected. Therefore the current risks associated with meconium remains uncertain and

Address for correspondence
Dr Shakuntala Kumari Gupta
Assistant Professor
Department of GP&EM, BPKIHS
Email: drshakuntala2003@yahoo.com

controversial. There are different opinions about the mode of delivery. Some experts explain that even if meconium is present in amniotic fluid, clinician may allow patients to labour in the presence of reassuring fetal heart rate and some prefer for immediate operative delivery. Fenton and Steer suggested that passage of meconium was not significant if the fetal heart rate was greater than 110 beats per minute.⁷ So, when facilities like cardiotocography (CTG), fetal blood sampling is not available, it is difficult to decide whether vaginal delivery or cesarean section should be done. Even when cesarean section is done, meconium aspiration syndrome can still occur and considerable morbidity may result both to newborn and mother.

In most of the hospitals in Nepal, facilities like CTG and fetal blood sampling are not available. It is for this reason this study was undertaken to compare the outcomes in two groups.

Methods

This descriptive case control study was conducted at Koshi Zonal hospital from March 2006 to July 2006. This study comprised of 50 women admitted in labour and having meconium stained fluid and comparative group comprised of 50 women in labour with clear amniotic fluid. Consistency of meconium was divided into thick and thin. Thick meconium group was characterized by thick greenish meconium with particulate matter in amniotic fluid and thin group was characterized by light greenish staining of amniotic fluid.

Detailed history of all patients was taken using a structured questionnaire and detailed examination was done for all. Information on the mode of delivery and fetal outcome was recorded in a proforma. Fetal outcome was measured by fetal heart sound, Apgar score at 1 and 5 minutes, perinatal complications, babies referred to special care baby unit (SCBU) for ongoing care and neonatal death. All babies were followed up for a period of 7 days following delivery. Comparisons were made between meconium stained group and clear amniotic fluid group to find out if any difference existed between the two groups in relation to mode of delivery and fetal outcomes. Data analysis was done by using computer software SPSS 11. Chi-square test was done to find out any significant statistical relation between the variables.

Results

During the study period of 5 months, there were a total of 1800 deliveries in Koshi Zonal Hospital. Of these, 485 had meconium stained amniotic fluid an incidence of 27%.

Fetal heart rate abnormality: Only 3(6%) of clear amniotic fluid had FHR abnormality. Among MSAF, 17(34%) had FHR abnormality. This was seen in 2 out of 22 in thin MSAF group whereas 15 out of 28 of thick MSAF group had FHS abnormality ($p=0.000$) as shown in Table 1.

Table 1: FHS abnormality and MSAF

FHS abnormality	Thin MSAF	Thick MSAF	Clear AF
Noted	2	15	3
Not noted	20	13	47

Mode of delivery: MSAF were more likely to have instrumental and operative delivery (78%) than controls (42%). Cesarean section was seen more in MSAF group ($p=0.005$).

APGAR score: As shown in Table 2, 24(48%) of MSAF and 3(6%) of clear liquor born babies had low Apgar score of < 5 at one minute. At 5 minute, the same 24(48%) of MSAF born babies had low Apgar score and it was 6(12%) in clear liquor group. The difference was found significant both at 1 minute ($p<0.2$) and at 5 minutes ($p<0.000$).

Table 2: Apgar score between MSAF and clear liquor group

Apgar score (1 minute)	MSAF		Clear liquor	
	No.	%	No.	%
≤ 5	24	48	3	6
> 5	26	52	47	94
Total	50	100	50	100
Apgar score (5minute)	MSAF		Clear liquor	
	No.	%	No.	%
≤ 7	24	48	6	12
> 7	26	52	44	88
Total	50	100	50	100

Referral to higher center: Among the babies born with MSAF 17/50(34%) were referred to higher

center for SCBU admission compared to only 3/50(6%) in clear liquor born babies(P=0.000) as described in Table 3.

Table 3: Referred to higher center for SCBU

Refer to higher center	Thin MSAF	Thick MSAF	Clear AF
Yes	0	17	3
No	22	11	47

Perinatal complications: As shown in Table 4, Respiratory Distress Syndrome ,Meconium Aspiration Syndrome(MAS),Hypoxic Ischemic Encephalopathy (HIE) and sepsis were seen in 25 cases of MSAF, but only 5 in the control group.

Table 4: Perinatal complication in cases of MSAF and controls

Perinatal complication	Controls, Clear AF	Cases, MSAF	p-value	Thin	Thick
No problem	45(90%)	25(50%)		14(64%)	11(39%)
Meconium aspiration Syndrome	0	2(4%)	0.15	0	2(7.2%)
Respiratory Distress Syndrome	1(2%)	9(18%)	0.007	3(13.5%)	6(21.4%)
Hypoxic Ischemic Encephalopathy	3(6%)	10(20%)	0.064	4(18%)	6(21.4%)
Sepsis	1(2%)	4(8%)	0.168	1(4.5%)	3(10.8%)
Total	50(100%)	50(100%)		28(100%)	22(100%)

Infant mortality: The known deaths among the MSAF was 4, a mortality rate of 8%. 5 babies in moribund condition were discharged after discussion with family members. If assumed these babies died, then mortality in MSAF reached 9. One baby died in the control group (2%). The incidence of death (know and assumed) seen in the MSAF group babies was statistically significant (p=0.005).

Table 5: Infant mortality and MSAF

Mortality	Controls, clear AF	Cases, MSAF	Thin	Thick
Death	1	4	0	4
Discharged (assumed death)	0	5	0	5
Total deaths	1	9	0	9

Discussion

The frequency of the occurrence of meconium staining of amniotic fluid in different studies have shown a range of 10-22%.^{8,9} In the studies done in India, the range of incidence varied from 7.4% to 14.3%.¹⁰⁻¹² In the present study, the incidence was 27% which is higher than reported in most of the literature.

In this study fetal heart rate abnormality was seen in 34% in MSAF group whereas 6% in clear AF group. David et al found that fetal heart rate abnormality and low apgar was seen in MSAF group.¹²

In spite of debate, there are still a number of unresolved controversies concerning management of the labour with meconium stained amniotic fluid. Nevertheless most obstetricians feel unsafe about the state of the fetus if meconium stained liquor is seen. This influences the mode of delivery. In setting where other facilities of intrapartum monitoring like cord blood sampling, CTG and non stress test are not available, instrumental as well as cesarean delivery are found to be increased when meconium is present.

In the present study 22% of MSAF group had normal vaginal delivery as compared to 58% in clear liquor group. Similarly, cesarean delivery was 66% among MSAF group compared to 38% in clear liquor group. Instrumental delivery was greatly increased by the presence of thick meconium but cesarean delivery was slightly higher 16/22 (72%) in thin meconium as compared to thick meconium 6/28(21%). This is because thick meconium tends to occur later in second stage, perhaps during the instrumental delivery. Finding of this study is comparable to the

studies done by Sashikala et al who found 38.7% of MSAF group had normal delivery whereas 40.7% of MSAF group had cesarean delivery and 20.7% had instrumental delivery.⁶ Clifford et al found cesarean section rate of 38% in MSAF group as compared to 26% in clear liquor group.¹³

In the present study the association of MSAF with low Apgar was strong, 22.8% of thick MSAF babies had low Apgar score (<5) at one minute as compared with thin MSAF born babies. At 5 minute only 9% of thin meconium and 78.6% of thick meconium babies had low Apgar score (<7). One of the reasons for persistently low Apgar scores could be the very limited resuscitation facilities available. These findings are comparable with the study of Clifford JB et al 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.¹³ But this dropped to 1.6% in both MSAF and clear liquor babies at five minutes. In the study by Sashikala 61% of MSAF babies had asphyxia as graded by Apgar score at one minute.⁹ Ziadeh found 30% of thick meconium babies had low Apgar score of less than 7 at one minute.¹¹

Among the babies born with MSAF 17/50(34%) were referred to higher center for SCBU admission compared to only 3/50(6%) in clear liquor born babies. Among referred newborn 15/28(54%) were with thick meconium. Ziadeh and Scott both reported increased admission of babies with MSAF to special care unit.^{11,14}

Among the referred babies 18% were diagnosed as having transient tachypnoeic attack and 20% had hypoxic ischemic encephalopathy as compared to 2% and 6% in respectively in clear liquor. Similarly 4% of the babies developed MAS and 8% had septicemia in MSAF in compared to none and 2% respectively in the clear liquor group. In the study of Sasikala, 39.7% developed transient tachypnoea, 6.1% MAS and 3.8% septicemia.

In this study no baby in either group were still born but 4(8%) babies with thick meconium and 1(2%) baby in clear group died in the hospital. Five babies from the thick meconium group had an unknown outcome. Similarly Gupta et al found that 4.9% of MSAF babies had neonatal death as compared to 2.8% in clear liquor babies.¹⁵

Conclusion

Both mode of delivery and fetal outcome were affected by the presence of thick meconium stained liquor as compared to clear. So presence of thick meconium should be monitored closely and additional monitoring facilities such as CTG if available could guide obstetrician to decide the mode of delivery and any other necessary intervention on time. Thick MSAF in presence of low Apgar score is directly responsible for high neonatal morbidity and mortality.

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