BANGLADESH J CHILD HEALTH 2009; VOL 33 (2): 41-45

Original Articles

Fetal Outcome in Deliveries with Meconium Stained Liquor

MST. HOSNA ARA KHATUN[1], JAHANARA ARZU[2], EMDADUL HAQUE[3], MA KAMAL[3], MOHAMMAD ABDULLAH AL MAMUN[4], MOHAMMAD FAIZUL HAQUE KHAN[4], MD. MAHBUBUL HOQUE[5]

Abstract

Introduction: Meconium staining amniotic fluid is associated with lots of adverse outcome and has long been considered to be a bad predictor of fetal outcome.

Objective: This prospective observational study was undertaken to find out immediate fetal outcome in meconium stained liquor.

Materials and Methods: This study was conducted in Obstetrics and Gynecology department of Dhaka National Medical Collage Hospital from July to December 2008. The pregnant women with yellow, brown and thinly stained amniotic fluid in labour with gestational age 37 completed weeks were enrolled in the study. Their babies were taken as case and followed upto 7 days after delivery in National Medical Collage Hospital and in Dhaka Shishu Hospital after admission when required. Babies born without meconium stained liquor were taken as a control.

Results: Total 80 cases were enrolled in the study as case and 80 cases were enrolled as control. Mean gestational age was 39.3±1.5 weeks in cases and 38.5±1.3 weeks in control. There was 13.8% pregnancy induced hypertension in case group and 3.8% in control group. Pre-eclampsia were present 10% in case group and 1.1% in control group ($p<0.05$). Caesarean deliveries were high (75%) in cases and it was much higher with thick meconium (75%) as compared to the thin meconium (25%, $p<0.001$). Apgar scores in first minute and fifth minute were also low in cases. Birth asphyxia was more in cases (20%). Meconium Aspiration syndrome (25%) and Convulsion (3.8%) were developed only in cases. Admission in neonatal ward was more (22.5%) in cases ($p<0.05$) as compared to control. Neonatal mortality was high (3.8%) in cases than control (1.3%).

Conclusion: Meconium stained amniotic fluid were associated with higher rate of caesarian delivery, increased need for neonatal resuscitation, increased rate of birth asphyxia with hypoxic ischemic encephalopathy, meconium aspiration syndrome, hospital admission and mortality.

Key words: *Meconium stained liquor, foetal outcome.*

Introduction

Presence of meconium in amniotic fluid is a potentially serious sign of fetal compromise and associated with an increased perinatal mortality and morbidities[1,2]. It has been associated with poor perinatal outcome including low Apgar scores, increased rate of chorioamnionitis, increased incidence of neonatal intensive care admission and high rate of perinatal death[3]. Meconium stained amniotic fluid is considered a harbinger of fetal compromise because of its direct correlation with fetal distress and increased likelihood of aspiration of meconium with resultant deleterious effects on the neonatal lung[4]. Meconium passage is rare before 34 weeks of gestations and after 37 weeks its incidence increases steadily with increasing gestational age[5]. Passage of meconium in utero with staining of the amniotic fluid occurs in 12% to 16% of all deliveries[6-8]. Presence of meconium

1. Assistant Professor, Department of Obstetrics and Gynaecology, Dhaka National Medical College
2. Registrar, Department of Obstetrics and Gynaecology, Dhaka National Medical College
3. Registrar, Dhaka Shishu Hospital
4. Medical Officer, Dhaka Shishu Hospital
5. Associate Professor, Department of Neonatology, BICH and Dhaka Shishu Hospital

Correspondence: Dr. Mst. Hosna Ara Khatun

below the vocal cord is known as meconium aspiration and this finding occurs in 20% to 30% of all infants with meconium stained amniotic fluid[9] with around 12% mortality[7]. Aspiration can occur in utero with fetal gasping or after birth with the first breaths of life[10]. As meconium staining amniotic fluid is associated with lots of adverse outcome of fetus and has long been considered to be a bad predictor of fetal outcome[11] and as there is no significant data in our country, so this observational study was undertaken to find out pregnancy and immediate fetal outcome in meconium stained liquor to see the babies needed for immediate resuscitation, hospitalization and mortality.

Materials and Methods

A prospective observational study was conducted in Obstetrics and Gynecology department of Dhaka National Medical College Hospital from July to December 2008 and study population was neonates who had meconium stained amniotic fluid. During this period pregnant women who fulfill the following criteria were enrolled 1) visual observation of green, yellow, brown, thinly stained amniotic fluid in labour and 2) gestational age 37 completed weeks. Pregnant women in labour with not sure of last menstrual date, eclampsia, antepartum hemorrhage, intrauterine fetal death, congenital malformation, pre existing maternal heart or lung disease, women caring with known IUGR, presentations other than cephalic were excluded. Pregnant women in labour but having clear amniotic fluid were taken as control. All babies were followed upto 7 days after delivery in National Medical Collage Hospital and hospitalized in Dhaka Shishu Hospital when required. Babies born without meconium stained liquor were taken as a control. A semi-structured questionnaire was prepared for both cases and control. The questionnaires were same for all patients. Written consent was taken from all the parents before enrollment. Consistency of meconium was divided into thick and thin. Details information of fetal outcome was recorded. Fetal outcome was measured by Apgar scores at 1st and 5th minutes, weight, requirement of neonatal resuscitation, admission in neonatal ward and or intensive care unit. Babies and mother who were discharged within 24 to 48 hours of delivery were reexamined at 7th day as they were advised to attend for follow-up. Birth asphyxia was diagnosed when baby did not take spontaneous respiration at birth and Apgar scores at five minute was less than seven. Both groups were compared with maternal factors like parity, antenatal and natal complications with fetal outcome. Relevant investigations including chest X-ray were carried out. The gestational age was determined by acertaining 1st day of last menstrual period. Data were analyzed by using SPSS version 12.

Results

During the study period 80 cases were enrolled as case and 80 cases were enrolled as control. Among the case group 52% and in control group 55% were from urban area respectively. Mean age of the mother was 24.5±4.9 years in cases and 23.6±4.2 years in controls. check up was less frequent in cases ($p<0.05$). In the cases male female ratio of babies was 2:1 and in control it was 1.8:1. Antenatal Mean gestational age was 39.3±1.5 weeks in cases and 38.5±1.3 weeks in control. Mean weight was 2.9±0.4 Kg in cases and in control 2.8±0.4 Kg ($p<0.01$). Mean fetal heart rate were 139.5±10.1 beats/min in cases and in control 135.2±6.7 beats/min ($p<0.01$). Apgar scores in first minute and fifth minutes were also low in cases (6.8±1.2 and 8.3±1.1 respectively) in comparison to control, which was also statistically significant ($p<0.01$ and <0.05 respectively) (Table-I).

Table-I

Demographic characteristics of the study population with immediate fetal outcome (n=160)

	Case (n=80)	Control (n=80)	P value
Maternal age (yr, mean ± SD)	24.5±4.9	23.6±4.2	0.21*
Antenatal check-up	68(85%)	77(96.3%)	0.01**
Gestation at delivery (wk, mean ± SD)	39.3±1.5	38.5±1.3	-
Gravida (mean ± SD)	1.8±0.9	1.7±0.9	0.39*
Birth weight (Kg, mean ±SD)	2.9± 0.4	2.8± 0.4	0.006*
Fetal heart rate (mean ±SD)	139.5±10.1	135.2±6.7	0.002*
APGAR at 1 min (mean ±SD)	6.8 ± 1.2	7.3±0.1	0.001*
APGAR at 5 min (mean ±SD)	8.3 ± 1.1	9.1±1.1	0.01*

*Student sample t-test, **Chi-Square (χ^2) Test

There were 13.8% pregnancy induced hypertension in cases and 3.8% in control (p<0.05). Pre-eclampsia were present 10% in cases and 1.1% in control (p<0.05) (Table-II).

Mode of delivery was significantly influenced by the presence of meconium. There was only 25% normal delivery in cases where as it was 51.3% in control. Caesarean deliveries was high (75%) in cases and it was much higher in thick meconium (75%) as compared to the thin meconium 25% (p <0.001) (Table-III).

Birth asphyxia were more (20%) in cases (p<0.05) than in control (6.3%). Requirement of oropharyngeal suction was also more (69.6%) in cases (p<0.001). Intubations needed only in cases (5%). Meconium aspiration syndrome and convulsion developed only in cases which were (25%) and (3.8%) respectively. Admission in neonatal ward was more (22.5%) in cases (p<0.05). Neonatal mortality was also high in cases than control but it was not statistically significant (p>0.05) and there was no still born (Table-IV).

Table-II

Hypertensive disorders of pregnancy (n = 160)

Hypertensive disorders	Case (n=80) N (%)	Control (n=80) N (%)	P value*
Preeclampsia	08 (10)	01 (1.1)	0.03
Pregnancy induced hypertension	11 (13.8)	03 (3.8)	0.04

*Chi-Square (χ^2) Test

Table-III

Obstetric outcome of labours (n=160)

Mode of delivery	Case (n=80)	Control (n=80)	P value*
Vaginal delivery	20 (25)	41 (51.3)	0.001
Caesarian section	60 (75)	39 (48.7)	0.001
		Case group (n=80)	
	Thick	Thin	
Consistency of meconium	60 (75)	20 (25)	<0.001

*Chi-Square (χ^2) Test

Table-IV

Fetal mortality and morbidity (n=160)

	Case (n=80) N (%)	Control (n=80) N (%)	P value*
Birth asphyxia	16 (20)	05 (6.3)	0.01
Oropharyngeal suction required	55 (69.6)	17 (21.3)	<0.001
Intubations needed	04 (5.0)	0 (0)	-
Meconium Aspiration Syndrome	20 (25.0)	0 (0)	<0.01
Convulsion	03 (3.8)	0 (0)	0.24
Neonatal ward Admission	18 (22.5)	05 (6.3)	0.006
Mortality	03 (3.8)	01 (1.3)	0.62

*Chi-Square (χ^2) Test

Discussion

This study was done to find out the fetal outcome of those deliveries where liquor was meconium stained and to determine the risk of adverse fetal outcome associated with meconium stained amniotic fluid. The mean age of the mother and mean gestational age of the fetus were higher in cases which were found statistically significant. Sunoo et al[12] found significant increased rate of meconium in amniotic fluid at 39 weeks. In this study it was also found that rate of meconium staining in amniotic fluid increased with gestational age. This can be explained by that the hormone motilin is secreted in increasing quantities by the fetus as gestational age advances and most meconium discharges are said to occur in postdated gestations, because the motilin levels are highest then[13]. Mean weight of cases were also increased. Sedaghatian et al[14] observed similar result in their study. Mean fetal heart rate were also found significantly high in cases which were similar with the findings of Berkus et al[1] who observed significantly higher risk of an abnormal fetal heart rate and arterial P^H<7.20 (indicators of fetal compromise) in meconium stain group. In this study arterial blood gas analysis was not done as a routine investigation. Apgar scores have low predictive value of birth asphyxia and it is affected by other factors. But in places where facilities of acid base assessment of the newborn are not available, we might rely on the findings of Apgar scores and or WHO criteria for the diagnosis of birth asphyxia. In present study, Apgar scores in fifth minute were significantly lower in cases. Sedaghatian et al[14] found similar result in their study. Wiswell et al[15] found significantly lower one minute Apgar scores in meconium stained neonate but not in five minutes. Oyelse et al[16] found significantly lower five minutes Apgar scores. From this study we could not exclude some hypoxic insult increased with gestational age being responsible for the increased incidence of meconium stained amniotic fluid as we could not perform fetal blood sampling for blood gas analysis and suggesting that the condition was indicative of fetal compromise.

Hypertensive disorders of pregnancy are one of the common problems in pregnancy. In this study higher rate of pregnancy induced hypertension was found in cases with higher rate of preeclampsia. This was in accordance with a similar report from Bhide et al[17]. Antenatal check up was less frequent in cases in this study. Khatun[18] found very high association between antenatal checkup and amniotic stained liquor. Mode of delivery was significantly influenced by the presence of meconium stained amniotic fluid. Caesarean deliveries were high (75%) 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. Among the cases, rate of caesarean delivery was more in thick meconium (75%) compared to thin meconium which was highly significant. Similar observation was made by Patil et al[4]. But Rossi et al[19] did not find increased rate of operative delivery as compared to general population.

Birth asphyxia was more frequent in cases than in control. Gupta et al[11] found that birth asphyxia was significantly high in meconium stained amniotic fluid. Khatun[18] found 12.9% birth asphyxia cases in her study. Requirement of oropharyngeal suction was significantly more in cases. Intubations were needed and convulsion developed only in cases. Meconium aspiration syndrome was developed in cases. Among them it was significantly higher in thick meconium stained. Bhide et al[17] reported 22%, but Patil et al[4] had reported 12.8% meconium aspiration syndrome. It might be due to the fact that meconium aspiration syndrome was primarily associated with acute hypoxic events late in labour or often a chronic prenatal disease related to acute events that occur late in labour or after birth and also depends on increasing consistency of meconium.

Admission in neonatal ward was more in cases and neonatal mortality was also high in cases than control. In present study mortality rate was 3.75% in cases with thick meconium compared to 1.25% mortality in control. One baby of control group died of septicemia at 5 days of age. Khatun[18] found 2.9% mortality in meconium stained amniotic fluid with thick meconium and 1.4% mortality in control. Gupta et al[11] found 4.9% mortality in meconium stained amniotic fluid group compared to 2.8% in control.

Conclusion

Meconium stained amniotic fluid is associated with increased need for neonatal resuscitation, increased risk of birth asphyxia, meconium aspiration syndrome, hospital admission and mortality. So identification of pregnant woman at risk of passage of meconium

during labour would allow intensive fetal surveillance and early intervention which might lead to reduction in neonatal adverse outcome.

References

1. Berkus MD, Langer O, Samuelloff A, Zenakis EM, Field NT, Ridgeway LE. Meconium stained amniotic fluid: Increased risk for adverse neonatal outcome. Obstet Gynecol 1994; 84: 115-20.
2. Nathan L, Lenevo KJ, Camody TJ III, Kelly MA, Sherman ML. Meconium: a 1990s perspective on an obstretic hazard. Obstet Gynecol 1994; 83: 329-32.
3. Ahanya SN, Lakshmanan J, Morgan BL, Ross MG. Meconium passage in utero: mechanisms, consequences, and management. Obstet Gynecol Surv 2005; 60: 45-56.
4. Patil KP, Swamy MK, Samatha K. A one year cross sectional study of management practices of meconium stained amniotic fluid and perinatal outcome. Obstet Gynecol India 2006; 56: 128-30.
5. Steer PJ, Eigbe F, Lissauer TJ, Beard RW. Interrelationships among abnormal cardiotocograms in labor, meconium staining of the amniotic fluid, arterial cord blood pH and Apgar scores. Obstet Gynecol 1989; 74: 715-21.
6. Wiswell TE, Henley MA. Intratracheal suctioning, systemic infection and the meconium aspiration syndrome. Pediatrics 1992; 89: 203-06.
7. Cleary GM, Wiswell TE. Meconium-stained amniotic fluid and the meconium aspiration syndrome - An update. Pediatr Clin North Am 1998; 45: 511-29.
8. Maymon E, Chaim W, Furman B, Ghezzi F, ShohamVardi I, Mazor M. Meconium stained amniotic fluid in very low risk pregnancies at term gestation. Eur J Obstet Gynecol Reprod Biol 1998; 80: 169-73.
9. Wiswell TE, Bent RC. Meconium staining and the meconium aspiration syndrome. Unresolved issues. Pediatr Clin North Am 1993; 40: 955-81.
10. Kligner MC, Kruse J. Meconium aspiration syndrome: Pathophysiology and prevention. J Am Board Fam Pract 1999; 12: 450-66.
11. Gupta V, Bhatia BD, Mishra OP. Meconium stained amniotic fluid: Antenatal intrapartum and neonatal attributes. Indian Pediatr 1996; 33: 293-97.
12. Sunoo CS, Kosasa TB, Nakayama RT, Hale RW. The incidence of meconium aspiration in Hawaii. Hawaii Med J 1993; 52: 290-93.
13. Benirschke K, Kaufmann P. Pathology of the human placenta. New York: Springer-Verlag; 2000.
14. Sedaghatian MR, Otheman L, Rashid N, Ramachandran P, Bener BA. An 8 year study of meconium stained amniotic fluid in different ethnic groups. Kuwait Medical Journal 2004; 36: 266-69.
15. Wiswell TE, Gannon CM, Jacab J. Delivery room management of the apparently vigorous meconium stained neonate-results of the multicenter international collaborative trial. Pediatrics 2000; 106: 1-7.
16. Oyelese Y, Culin A, Ananth CV, Kaminsky LM, Vintzileos AM, Smulian JC. Meconium-stained amniotic fluid across gestation and neonatal acid-base status. Am J Obstet Gynecol 2006; 108: 345-49.
17. Bhide SS, Shendurnikar N, Aiyer S, Baxi SR. Neonatal outcome after meconium stained amniotic fluid. J Obstet Gynecol India 1994; 48: 933-35.
18. Khatun M. Meconium Staining liquor and its correlative with fetal outcome within seven days of birth in Dhaka Medical College. Dissertation. Bangladesh College of Physicians and Surgeons. 2005; 39-43.
19. Rossi EM, Philipson EH, Williams TG, Kalhan SC. Meconium aspiration syndrome: intrapartum and neonatal attributes. Am J Obstet Gynecol 1998; 10: 107-10.