



Research Article

Copyright © All rights are reserved by Rafia Rashid

Clinical Profile and Outcome of Meconium-Stained Babies Managed in a Tertiary Care Hospital

Rafia Rashid^{1*}, Abid Hossain Mollah², Manisha Banerjee³, Syed Shafi Ahmed⁴ and Salahuddin Mahmud⁵¹Department of Pediatric Gastroenterology, Hepatology & Nutrition, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh²Professor & Head, Department of Neonatology, BIRDEM General Hospital, Dhaka, Bangladesh³Professor & Head, Department of Neonatology, Dhaka Medical College Hospital, Dhaka, Bangladesh⁴Professor & Head, Department of Pediatric Gastroenterology, Hepatology & Nutrition, Bangladesh Institute of Child Health, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh⁵Associate Professor, Department of Pediatric Gastroenterology, Hepatology & Nutrition, Bangladesh Institute of Child Health, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh

***Corresponding author:** Rafia Rashid, Department of Pediatric Gastroenterology, Hepatology & Nutrition, Dhaka Shishu (Children) Hospital, Dhaka, Bangladesh.

Received Date: March 03, 2021**Published Date:** April 09, 2021

Abstract

Objectives: This study evaluates clinicopathological features and the outcome of meconium-stained babies managed in the special care baby unit of Dhaka Medical College Hospital (DMCH), a tertiary care hospital in Bangladesh.

Methods: This observational study was performed in DMCH from 1st March to 31st October 2011. One hundred two neonates with meconium-stained amniotic fluid (MSAF) at birth were selected purposively. Information about the duration of labour, mode of delivery, maternal illness, and maternal medication during pregnancy were recorded. Any other complications like obstructed labour, history of premature rupture of membrane (PROM), history of less fetal movement, history of birth asphyxia were taken from parents and available medical records. Babies' clinical conditions were assessed with APGAR score, birth weight, gestational age, signs of asphyxia, respiratory difficulties, convulsion, reflex activity and requirement of resuscitation, percentage of oxygen saturation, capillary blood glucose (CBG). Other related investigations were also recorded. The outcome of these babies was observed and recorded. Statistical analysis (Chi-square tests) was performed on the recorded data using SPSS (version 24) to identify the association between meconium staining and different clinical features of the newborn.

Results: Among the 102 neonates, we found 39 (38.2%) cases of only meconium staining, 56 (54.9%) cases of staining with ingestion, and 7 (6.9%) cases of staining with aspiration. Only meconium-stained cases were relatively well alert with normal vital parameters. Other cases of ingestion and aspiration developed complications, such as birth asphyxia, aspiration pneumonia, meconium aspiration syndrome and hypoxic-ischemic encephalopathy, septicemia. 7.84% of the studied 102 cases died, who were mainly from the aspiration group.

Conclusion: This study found that meconium-stained babies' prominent clinical features are breathing difficulties, hypoxic-ischemic encephalopathy, features of sepsis, features of pneumonia, and meconium gastritis. Hospitalization was needed in 97.06% of cases, and 7.8% of cases died due to associated complications.

Keywords: Meconium-stained amniotic fluid; Meconium aspiration syndrome; Perinatal morbidity; Perinatal mortality

Introduction

The presence of meconium in amniotic fluid is a potentially serious sign of fetal compromise mortality and morbidities [1,2]. It has been associated with poor perinatal outcomes, including low APGAR scores, increased rate of chorioamnionitis, increased

incidence of neonatal intensive care admission, and a high perinatal death rate [3]. 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 12% to 16% of all deliveries [6-8]. The presence of meconium below the vocal cord is known as meconium aspiration. It 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].

Meconium aspiration syndrome (MAS) occurs at higher rates in pregnancies beyond 40 weeks, with 34% of cases born after 40 weeks. In a study in 1996, among 1426 deliveries, 204 deliveries had MSAF, of which thick meconium was present in 141 [13]. From August 1999 to July 2000, in another study, the total number of live births was 3002, and the incidence of meconium-stained amniotic fluid was 8.3% (249/3002) [15]. MSAF is associated with lots of adverse outcomes of the fetus and has long been considered a bad predictor of fetal outcome. There is no significant data regarding this phenomenon available for our country. So, this cross-sectional observational study evaluates the clinical profiles and outcome of meconium-stained babies.

Method

This cross-sectional observational study was performed in the Department of Neonatology, Dhaka Medical College Hospital from 1st March 2011 to 31st October 2011. One hundred two neonates with meconium-stained at birth were selected for the study, excluding sick neonates with birth injuries, congenital anomalies, and multiple gestations. Babies' clinical conditions were assessed with APGAR scores at the first and 5th minute, birth weight, gestational age (at birth), signs of perinatal asphyxia, respiratory difficulties, reflex activity, percentage of oxygen saturation, capillary blood glucose (CBG), and requirement of resuscitation after birth. Information about the other related investigations were also recorded. X-ray of the chest was done in suspected cases of meconium aspiration. The outcome of these babies about uneventful recovery, ingestion, cases of aspiration, death cases, and any other complications was recorded. Parents and guardians of the enrolled babies were

informed about the study, and written consent was obtained. The Ethical Review Committee of Dhaka Medical College Hospital approved this study. A predefined questionnaire was used to collect data that was then processed and analyzed using the statistical software SPSS (version 24.0). In addition to descriptive statistics, Chi-square and Fisher's Exact tests were performed to find the association between meconium staining and the clinical outcome.

Result

A total of 102 samples were enrolled for the study. Among them, 99 were admitted to special care baby unit (SCABU) for observation as well as treatment (whenever needed) From the selected sample, 39 (38.2%) babies had only staining (on the skin, umbilicus, nail), 56 (55%) babies had staining with ingestion, and 7 (6.8%) babies had features of aspiration along with staining (Figure 1). Gestational age of majority of the studied patients were between 37 to 42 weeks. The average birth weight was 2.614 (\pm 0.355) kg. About 56.9% of cases were male and the rest were female Table 1. Breathing difficulties were present in 24 (61.5%) cases among 39 cases of only staining, 49 (87.5%) cases among 56 cases of ingestion, and 100% cases of aspiration. This association between meconium condition and breathing difficulties was statistically significant as the p-value is less than 0.05. Birth asphyxia of babies was not statistically significant. CRT higher than 3 seconds was found in all cases of aspiration. Hypoxic-ischemic encephalopathy were observed significantly for cases of ingestion, while all the cases of aspiration showed poor reflexes. Oxygen saturation was low in all the cases of meconium aspiration. For other cases of staining, poor oxygen saturation was not typical. CBG of babies was not significantly affected by meconium staining. Features of pneumonia was observed in most cases (57.1%) with ingestion and all the cases of aspiration. This study revealed a significant association between the presence of meconium gastritis and meconium conditions Table 2.

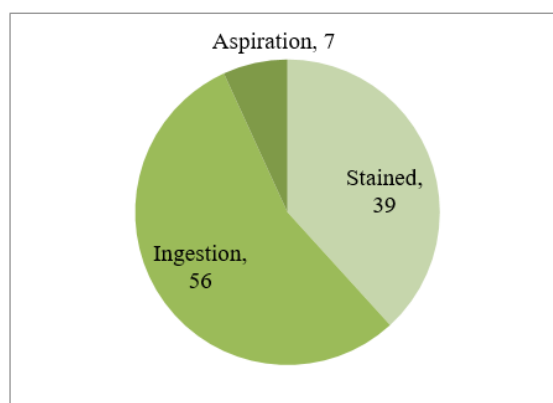


Figure 1: Meconium condition of the studied patients (n = 102).

Table 1: Demographic characteristics of the studied patients (n = 102).

Demographic Characteristics		Number (%)
Gestational age	< 37 weeks	17 (16.7%)
	37-42 weeks	70 (68.6%)
	> 42 weeks	15 (14.7%)
Birth weight (kg)		2.614 (\pm 0.355)
		(Mean \pm SD)
Gender	Male	58 (56.9%)
	Female	44 (43.1%)

Table 2: Clinical profile of the studied patients (n = 102).

Clinical Features		Only stained (n = 39)	Stained with ingestion (n = 56)	Stained with aspiration (n = 7)	P-value
n (%)		n (%)	n (%)		
Breathing Difficulties	Absent	15 (38.5%)	7 (12.5%)	0 (0%)	0.004*
	Present	24 (61.5%)	49 (87.5%)	7 (100%)	
Birth Asphyxia	Absent	12 (30.8%)	19 (33.9%)	1 (14.3%)	0.57
	Present	27 (69.2%)	37 (66.1%)	6 (85.7%)	
CRT (Capillary Refill Time)	< 3 sec	36 (92.3%)	51 (91.1%)	0 (0%)	<0.001*
	\geq 3 Sec	3 (7.7%)	5 (8.9%)	7 (100%)	
Reflex Activities	Weak	3 (7.7%)	22 (39.3%)	7 (100%)	<0.001*
	Moderate	15 (38.5%)	28 (50%)	0 (0%)	
	Good	21 (53.8%)	6 (10.7%)	0 (0%)	
PaO ₂	< 60%	3 (7.7%)	5 (8.9%)	7 (100%)	<0.001*
	60%-80%	0 (0%)	30 (53.6%)	0 (0%)	
	80%-95%	36 (92.3%)	21 (37.5%)	0 (0%)	
CBG	< 2.6 mmol/L	3 (7.7%)	4 (7.1%)	2 (28.6%)	0.161
	2.6-7.8 mmol/L	36 (92.3%)	52 (92.9%)	5 (71.4%)	
Features of Pneumonia	Present	3 (7.7%)	32 (57.1%)	7 (100%)	<0.001*
	Absent	36 (92.3%)	24 (42.9%)	0 (0%)	
Meconium Gastritis	Present	0 (0%)	18 (32.1%)	3 (42.9%)	<0.001*
	Absent	39 (100%)	38 (67.9%)	4 (57.1%)	

*Statistically significant

Table 3: Outcome of the studied patients (n = 102).

Meconium Condition	Survived	Died	P-value
Stained (n = 39)	39 (100%)	0 (0%)	<0.001*
Ingestion (n = 56)	51 (91.1%)	5 (8.9%)	
Aspiration (n = 7)	4 (57.2%)	3 (42.8%)	

*Statistically significant

Among the 102 study cases, 8 (7.84%) cases died, and 94 (92.16%) cases survived. 42.8% cases of aspiration and 8.9% cases of ingestion died. Hospitalization was required for most of the cases of meconium staining. Among the 102 study samples, 97.06% of cases were hospitalized. All the cases of ingestion and aspiration were hospitalized for a period of 72 – 96 hours on an average.

Discussion

The present study findings were discussed and compared with previously published relevant studies regarding the presence

of meconium, clinical profiles, and outcome of stained babies. In this current study, it was observed that other demographic characteristics like gender and birth weight of the babies did not significantly affect meconium staining.

In a recent study, Shukla and Swapna found 58.2% of cases developed respiratory distress [11]. However, another study by Divia showed that respiratory distress was present in about 8.4% of cases [12]. The current study also finds that a very high percentage (78.4%) of cases developed respiratory distress. MAS is a well-

known complication of MSAF with incidence varies from 1-6.8% in babies born with MSAF [4]; in our study, it was found in 6.9% of total cases.

Birth asphyxia was frequently observed in meconium-stained babies. In this study, 68.2% of cases had birth asphyxia, though this association between birth asphyxia and meconium condition was not statistically significant. Gupta et al. [13] found that birth asphyxia was significantly high in meconium-stained amniotic fluid, whereas Khatun et al. [16] found only 12.9% cases in their study. Stained with ingestion and aspiration cases also showed very poor neurological reflexes (hypoxic-ischemic encephalopathy). This study finds 31.4% of cases of hypoxic-ischemic encephalopathy, but Shukla and Swapna [11] only found 2.8% of such cases. A study with a larger study size from multiple centers might explain this anomaly. Features of shock (CRT > 3 seconds) was observed in all aspirations cases. Oxygen saturation was low ($\text{PaO}_2 < 60\%$) in all 7 cases of aspiration. For other cases of only staining, poor oxygen saturation was not typical. Features of pneumonia was present in 57.1% of cases of ingestion and among all the cases of aspiration.

According to Bhatia et al. [15], mortality ranges from 6% to 40% for meconium-stained babies. Gupta et al. [13] found 4.9% mortality in the meconium-stained amniotic fluid group compared to 2.8% mortality in control. The current study result was also consistent with the abovementioned studies having a mortality rate of 7.84%. Cases that died were mainly from ingestion and aspiration groups.

Hospitalization was required for most of the cases of meconium-stained babies. Among the 102 study samples, 97.06% of cases were hospitalized for observation and necessary resuscitation, and 2.04% did not require any resuscitation. Cases that did not require hospitalization were from the category of only staining with meconium. In our study, most of the hospitalized babies were discharged within 72 to 96 hours of life without developing any complications. Shukla and Swapna also observed similarly for their hospitalized cases [11].

Conclusion

This study found that meconium-stained babies' prominent clinical features are breathing difficulties, hypoxic-ischemic encephalopathy, features of sepsis, features of pneumonia, and meconium gastritis. MAS was found in 6.9% of the cases. Hospitalization was needed in 97.06% of cases, and 7.8% of cases died due to associated complications.

Acknowledgement

We want to thank all the faculties, fellowship students, residents, and staff of the Department of Neonatology, Dhaka Medical College

Hospital and the Department of Pediatric Gastroenterology, Hepatology & Nutrition, Dhaka Shishu (Children) Hospital, for their technical and administrative assistance. We also want to thank all the parents of our patients who were very cooperative throughout the study period.

Conflict of Interest

We, the authors declare that we have no conflicting interests.

References

- Berkus MD, Langer O, Samuelloff A, Zenakis EM, Field NT, et al. (1994) Meconium stained amniotic fluid: Increased risk for adverse neonatal outcome. *Obstet Gynecol* 84: 115-120.
- Nathan L, Lenevo KJ, Camody TJ, Kelly MA, Sherman ML (1994) Meconium: a 1990s perspective on an obstetric hazard. *Obstet Gynecol* 83: 329-332.
- Ahanya SN, Lakshmanan J, Morgan BL, Ross MG (2005) Meconium passage in utero: mechanisms, consequences, and management. *Obstet Gynecol Surv* 60: 45-56.
- Wiswell TE (2001) Handling the meconium stained infant. *Semin Neonatol* 6(3): 225-231.
- Wiswell TE, Henley MA (1992) Intratracheal suctioning, systemic infection and the meconium aspiration syndrome. *Pediatrics* 89: 203-206.
- Cleary GM, Wiswell TE (1998) Meconium-stained amniotic fluid and the meconium aspiration syndrome - An update. *Pediatr Clin North Am* 45: 511-529.
- Maymon E, Chaim W, Furman B, Ghezzi F, ShohamVardi I, et al. (1998) Meconium stained amniotic fluid in very low risk pregnancies at term gestation. *Eur J Obstet Gynecol Reprod Biol* 80: 169-173.
- Wiswell TE, Bent RC (1993) Meconium staining and the meconium aspiration syndrome. Unresolved issues. *Pediatr Clin North Am* 40: 955-981.
- Kligner MC, Kruse J (1999) Meconium aspiration syndrome: Pathophysiology and prevention. *J Am Board Fam Pract* 12: 450-466.
- Romero R, Hanaoka S, Mazor M, Athanassiadis AP, Callahan R, et al. (1991) Meconium-stained amniotic fluid: a risk factor for microbial invasion of the amniotic cavity. *Am J of Obstet Gynecol* 164(3): 859-862.
- Shukla OS, Swapna ST (2019) Study of risk factors, clinical profile, and outcome in meconium-stained deliveries. *Indian J Child Health* 6(5): 213-216.
- Divia A (2018) Study on Risk Factors and Perinatal Outcome in Meconium Stained Liquor, Dissertation pp. 64-70.
- Gupta V, Bhatia BD, Mishra OP (1996) Meconium stained amniotic fluid: antenatal, intrapartum and neonatal attributes. *Indian Pediatrics* 33(4): 293-297
- Patil KP, Swamy MK, Samatha K (2006) A one year cross sectional study of management practices of meconium stained amniotic fluid and perinatal outcome. *Obstet Gynecol India* 56: 128-130.
- Bhatia BD, Gupta V, Dey PK (1996) Meconium aspiration syndrome: current concepts. *Indian J Matern Child Health* 7(1): 1-7.
- Khatun M (2005) 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 pp. 39-43.