Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/jptcp.v28i2.3395

PERINATAL OUTCOME OF MECONIUM STAINED AMNIOTIC FLUID

Dr Purva Mahapatra[1], Dr Subhalaxmi Dash[2*], Dr Satyajit Jena[3], Dr Sudhanshu Sekhara Nanda[4], Dr Chintamani Mahanta[5],

[1]Senior Resident, Dept of O&G, PRM Medical College, Baripada, Odisha, India (Ex PG , SCB Medical College, Cuttack, Odisha)
[2*]Asst Professor, Dept of O&G, MKCG Medical College, Berhampur, Odisha, India
[3]Asst. Prof. (Obst & Gynecology), SCB Medical College, Cuttack, Odisha, India
[4]Asst. Professor, Dept of O&G, PRM Medical College, Baripada, Odisha, India
[5]Asso. Professor, Dept of O&G, PRM Medical College, Baripada, Odisha, India

[*]**Corresponding Author:** Subhalaxmi Dash,
[*]Asst Professor, Dept of O&G, MKCG Medical College, Berhampur, Odisha, India,
Email: drsubhalaxmidash@gamil.com

Abstract:
Objective To determine the perinatal outcome of labouring mothers with meconium-stained amniotic fluid (MSAF).
Methods A prospective observational study was conducted among labouring mothers with meconiumstained amniotic fluid from December 2019 to june 2020 at SCB Medical College ,Cuttack, Odisha, India . Data was collected with pretested structured questionnaires. A Chi-square test used to check statistical associations between variables. Those variables with a p-value of less than 0.05 were selected for cross-tabulation and binary logistic regression. P-value set at 0.05, and 95% CI was used to determine the significance of the association. Relative risk was used to determine the strength and direction of the association.
Result Among 556 participants, there where 278(50%) primigravida in a stained fluid group. Labour was induced in 145 (26.07%) of the stained fluid group and has a statistically significant association with meconium staining. The stained fluid group was twice more likely to undergo operative delivery compared with a non-stained fluid group. There were more low Apgar scores at birth (36.8%), birth asphyxias (9%), neonatal sepsis (1%), neonatal death (1%), and increased admissions to neonatal intensive care unit among the meconium-stained group. Meconium aspiration syndrome was seen in 35(6.2%) of the stained fluid group.
Conclusion Meconium-stained amniotic fluid is associated with increased frequency of operative delivery, birth asphyxia, neonatal sepsis, and neonatal intensive care unit admissions compared to clear amniotic fluid.

Keywords: meconeum stained amniotic fluid

Introduction

Meconium stained amniotic fluid(MSAF) is usually seen in 12 to 16% of deliveries [1]. Meconium passage is less common before 37 weeks of gestational age and increases steadily with gestational age [2]. It may represent the normal gastrointestinal maturation, or it may indicate an acute or

chronic hypoxic event, thereby making it a potential warning sign of a fetal Compromise [3, 4]. Though its controversial to differentiate physiologic or pathologic meconium staining of amniotic fluid, there are few shreds of evidence that indicates its association with increased meconium aspiration syndrome, operative delivery, respiratory distress, neonatal sepsis, need for resuscitation, neonatal intensive care admission, and low Apgar score [5–8]. Besides, infants born through a meconium-stained amniotic fluid are more likely to develop
respiratory distress and are at increased risk of perinatal death [1, 9]. Meconium aspiration syndrome (MAS) is characterized by the presence of respiratory distress with radiographic evidence of aspiration pneumonitis in the presence of meconium-stained amniotic fluid [4, 10]. MAS occurs in about 5% of deliveries with meconium-stained amniotic fluid [11], and death occurs in about 12% of infants with MAS [12]. The evidence of poor perinatal outcome associated with meconium-stained amniotic fluid mandates a well-designed study. Still, there is no well-designed comparative study in our country in general and no study at all in our hospital on the subject matter. The present study was, therefore, aimed at determining perinatal outcomes among laboring mothers with MSAF .

Materials and methods

This was a hospital-based prospective observational study. The study was conducted at SCB Medical College , Cuttack a teaching referral hospital providing maternity service from December 2019 to june 2020 The current prospective study was conducted to determine the perinatal outcome of meconium-stained amniotic fluid (MSAF) .All consented pregnant women in labour who had completed more than 37 weeks of gestation, with viable singleton pregnancies with cephalic presentations and with no known fetal congenital anomalies were included. Twin pregnancy was excluded because of difficulty to determine chorionicity in labour and finding chorionicity and gestational age-matched twins. Gestational age was calculated from reliable last normal menstrual period or early ultrasound done before 24 weeks and those with an unknown date or without early ultrasound were excluded. Those with MSAF were exposed group referred to as "Stained fluid group".

Meconium stained amniotic fluid is the exposure variable of interest and classified into three grades

1. **Grade one meconium-stained liquor:** small amount of meconium diluted in a plentiful amount of amniotic fluid. The fluid has only a slightly greenish or yellowish discoloration.
2. **Grade two meconium-stained liquor:** moderate meconium staining, when there is a fair amount of amniotic fluid, but it is stained with meconium. In this case, it will be ’khaki green’ or brownish.
3. **Grade three meconium-stained liquor:** heavy staining, when there is reduced amniotic fluid and a large amount of meconium, making the staining quite thick, with ’pea soup’ consistency.

Outcome variables were: 1st and 5th minute Apgar score, MAS, Birth asphyxia, NICU admission, early-onset neonatal sepsis (EONS), early neonatal death (END), and Operative delivery (CS or instrumental delivery). Covariates were parity, mode of delivery, duration of labour, duration of rupture of membrane, obstetric or medical complications like antepartum hemorrhage, pregnancy -induced hypertension, growth restriction, oligohydramnios, intraamniotic infection (chorioamnionitis) and diabetes. According to the statistics office of the hospital, nearly 10,000 attended antenatal care, and around 4000 deliveries were attended in 2019-20, 35% of births were by cesarean section.

OBSERVATION

A total of 556 pregnant women were included in this study, with a response rate of 99.3%. Three of post-partum women couldn’t be traced on the seventh postpartum day for a phone interview and were lost to follow up. The meconium was described as grade I in 194 (34.58%) patients, grade-II in 200 (35.97%) patients, and grade-III 162 (29.13%) patients . Among 556 of the stained fluid group, 494 (88.84%) women were of 20-35-year age-group All participants had antenatal care (ANC) follow up except one patient in the non-stained fluid group. Fetal heart rate (FHR) monitoring was done with continuous cardiotocography (CTG) in 544(97.8%) of the stained fluid group. There

where 278(50%) primigravida in a stained fluid group.. Pregnancy-induced hypertension (PIH) was seen 105(18.88%) of the stained fluid group . Labour started spontaneously in 411 (73.92%) of the stained fluid group.Labour induced in 145(26.08%) of the stained fluid group . Induced labour is seven times more likely to have meconium-stained fluid compared to spontaneous onset of labour . Prolonged rupture of membrane above 12 hours was seen in 111(19.9%) of the stained fluid group. Duration of labour above 24 hours was seen in 63(11.33%) of the stained fluid group.Cesarean section was the mode of delivery in 244(43.8%) stained fluid group. Fiftyfive (10%) of the stained fluid group had instrumental deliveries. Merging cesarean and instrumental delivery as operative delivery; 299(53.7%) stained fluid group undergoes operative delivery. All thin (grade one) stained fluid gave birth vaginally, while 86% of thick (grade two and three) group underwent operative delivery. All cesarean section are emergency operations for the indication of thick meconium, fetal distress and poor progress of labour . The stained fluid group was twice more likely to undergo operative delivery compared with the non-stained fluid group .Infants with MSAF had low 5th minute Apgar scores and 111(19.9%) stained fluid group needed intensive care unit admissions. Meconium aspiration syndrome was seen in 35(6.2%), stained fluid group. Neonates born to stained fluid were 2.5 times at risk of death in the first seven post-natal life.Incidence of birth asphyxia, neonatal sepsis, and NICU admissions was statistically higher among babies born to the stained fluid. Meconium stained amniotic fluid has a positive clinically significant association with a primigravida, induction of labour , and Operative delivery . So binary logistic regression was done to see the effect of those independent variables which are associated with meconium staining on perinatal outcome. None of those independent variables has an association with perinatal outcome, and the adverse perinatal outcomes are solely associated with MSAF.(Table 1, 2)

Discussion

In the current study, participants had similar baseline characteristics except for primigravida and induced labour which are associated more with MSAF. This might be because of slow and protracted progress of labour among primigravida's increasing the possibility of meconium development. Saunders et al. [13] reported that cesarean sections were performed twice as frequently in subjects with meconium-stained amniotic fluid. Naveen S et al. [14] also reported a cesarean section rate of 49.1% in MSAF. The current study also showed the stained fluid groupwas two times more likely to undergo operative delivery compared to the non-stained fluid group. Our study also highlighted that 86% of the thick stained amniotic fluid group (grades two and three) undergoes operative delivery which indicates the risk of fetal heart rate abnormality with meconium staining and cesarean section being used as a rescue for infants who are about to develop MAS.This is in line with other studies showing a higher risk of complications with thick meconium staining [5, 15,16]. This study was conducted at teaching hospital located in the city Cuttack . The possible limited access to health care in rural population might result in late presentation despite poor progress of labour resulting in high MAS. Therefore, since the current study was conducted at tertiary urban based hospital with relatively good obstetric care among relatively literate and wealth population with easy access to care might limit its generalizability to other centers and the wider population. This highlights that it is imperative to conduct multicenter study incorporating all levels of care.

Conclusions

Meconium stained amniotic fluid is worrisome as it is associated with increased frequency of operative delivery, birth asphyxia, neonatal sepsis, and neonatal intensive care unit admissions compared to clear amniotic fluid which was seen in the current study. Therefore, management requires appropriate intrapartum care with a continuous or strict one to one fetal heartbeat follow up. Furthermore, knowing the high risk of early neonatal death we advise early postnatal follow up should be considered for infants born to mothers with thick MSAF. Finally, we recommend well-controlled studies comparing the perinatal outcome of thick and thin stained amniotic fluid to stratify management accordingly.

TABLE 1: DEMOGRAPHIC CHARACTERS

Variables	Categories	Number	Percentage
Age	<20years	40	7.1
	20-35	494	88.8
	>35	22	3.9
Education	Illiterate	20	3.59
	Primary school	400	71.94
	Highscool	100	17.98
	College and above	36	6.4

TABLE 2: ANTENATAL AND INTRANATAL AND POSTNATAL FACTORS

Variables	Number	Percentage
Primi gravida	278	50
Gravida 2	200	35.9
Gravida 3 or more	78	14.01
Labour duration <12hrs	344	61.87
12-24hrs	120	21.58
>24hr	92	16.54
Vaginal delivery	257	46.22
Operative delivery	55	9.8
LSCS	244	43.88
NICU Admission	111	19.96
MAS	35	6.2
Low Apgar	204	36.8
Birth asphyxia	50	9
Neonatal sepsis	6	1
Neonatal death	5	1

References

1. Mundhra R, Agarwal M. Fetal outcome in meconium stained deliveries. Journal of clinical and diagnostic research: JCDR. 2013; 7(12):2874. https://doi.org/10.7860/JCDR/2013/6509.3781 PMID: 24551662
2. Wong S, Chow K, Ho L. The relative risk of fetal distress' in pregnancy associated with meconiumstained liquor at different gestation. Journal of Obstetrics and Gynaecology. 2002; 22(6):594–9. https:// doi.org/10.1080/0144361021000020333 PMID: 12554243
3. Monen L, Hasaart T, Kuppens S. The etiology of meconium-stained amniotic fluid: pathologic hypoxia or physiologic foetal ripening? Early human development. 2014; 90(7):325–8. https://doi.org/10.1016/j. earlhumdev.2014.04.003 PMID: 24794302
4. Lee J, Romero R, Lee KA, Kim EN, Korzeniewski SJ, Chaemsaithong P, et al. Meconium aspiration syndrome: a role for fetal systemic inflammation. American journal of obstetrics and gynecology. 2016; 214(3):366. e1–.e9. https://doi.org/10.1016/j.ajog.2015.10.009 PMID: 26484777
5. Divia A. Study on risk factors and perinatal outcome in meconium-stained liquor in IOG: Madras Medical College, Chennai; 2018.
6. ELMeneza SA, Bahgat SA, Elnady HG, Sabry RN, Megawer AS, Sreah WMA. Fetal outcome of meconium-stained infants resuscitated by endotracheal suction versus oropharyngeal suction at birth. Medical Research Journal. 2014; 13(2):80–5.
7. Hutton EK, Thorpe J. Consequences of meconium-stained amniotic fluid: what does the evidence tellus? Early human development. 2014; 90(7):333–9. \ https://doi.org/10.1016/j.earlhumdev.2014.04.005 PMID: 24794305

8. Kumari R, Srichand P, Devrajani BR, Shah SZA, Devrajani T, Bibi I, et al. Foetal outcome in patients with meconium-stained liquor. JPMA. 2012; 62(474):474–6. PMID: 22755313
9. Naqvi SB, Manzoor S. Association of meconium-stained amniotic fluid with perinatal outcome in pregnant women of 37–42 weeks gestation. Pak J Surg. 2011; 27(4):292–8.
10. Klingner MC, Kruse J. Meconium aspiration syndrome: pathophysiology and prevention. The Journal of the American Board of Family Practice. 1999; 12(6):450–66. https://doi.org/10.3122/jabfm.12.6.450 PMID: 10612363
11. Sippola T, Aho H, Peuravuori H, Lukkarinen H, Gunn J, Ka¨a¨pa¨ P. Pancreatic Phospholipase A 2 Contributes to Lung Injury in Experimental Meconium Aspiration. Pediatricresearch. 2006;59(5):641.https://doi.org/10.1203/01.pdr.0000214685.31232.6a PMID: 16627874
12. Davis P, Shekerdemian L. Meconium aspiration syndrome and extracorporeal membrane oxygenation. Archives of Disease in Childhood-Fetal and Neonatal Edition. 2001; 84(1):F1–F3. https://doi.org/10. 1136/fn.84.1.f1 PMID: 11124912
13. Saunders K. Should we worry about meconium? A controlled study of neonatal outcome. Tropical doctor. 2002; 32(1):7–10.
14. Naveen S, Kumar SV, Ritu S, Kushia P. Predictors of meconium-stained amniotic fluid: a possible strategy to reduce neonatal morbidity and mortality. J Obstet Gynecol India. 2006; 56(6):514–7.
15. Adda AB. Factors Influencing Meconium Stained Amniotic Fluid (MSAF) Delivery Outcomes At Ridge Hospital, Accra: University of Ghana; 2017.
16. Tolu LB, Birara M, Teshome T, Feyissa GT (2020) Perinatal outcome of meconium stained amniotic fluid among labouring mothers at teaching referral hospital in urban Ethiopia. PLoS ONE 15(11): e0242025. https://doi.org/10.1371/journal.pone.0242025