

Study of feto-maternal outcome in deliveries with meconium stained amniotic fluid at a tertiary care hospital

Naresh P Motwani¹, Atindra Jain^{2*}

¹Associate Professor, ²Assistant Professor, Department of Pediatrics, Shri Shankaracharya Institute of Medical Sciences (SSIMS), Bhilai
Email: atindrainstinct@gmail.com

Abstract

Background: A fetal condition during labor is usually assessed by fetal heart rate and checking the presence of meconium in the amniotic fluid. The significance of meconium passage claimed to vary between its entirely being physiological to a sign of fetal distress. It has been observed that passage of meconium is 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. As meconium staining amniotic fluid is associated adverse outcome of fetus, we planned this study to assess fetomaternal outcome in deliveries with meconium stained amniotic fluid. **Material and Methods:** This prospective observational study was conducted patients with cephalic presentation and meconium stained amniotic fluid after spontaneous or artificial rupture of membrane irrespective of age, parity and stage of labor. **Results:** A total 168 deliveries were included in present study. Age 20-25 years age group was most common maternal age-group in present study, with 112 (67 %) patients. As per gestational age, term patients were 123 (74 %), followed by post-dated (>40 weeks) patients 31 (18 %) and preterm (34-37 weeks) patients 14(8%). Of these, 104(62%) were delivered by vaginal route, 51(30%) by caesarean section and 13(8%) by instrumental delivery. We noted high risk pregnancies like post-dated pregnancy 31(18%), premature rupture of membranes 28(17%), previous caesarian section 26(15%), pregnancy-induced hypertension (PIH) 23(14%), intrauterine growth retardation (IUGR) 11 (7%) patients. Among these, 66 (39 %) had no antenatally diagnosed high-risk. Neonatal follow-up was done only for early neonatal period. We noted that 131(78%) babies were discharged without any complications. Those with complications, 19(11%) had hypoxic ischemic encephalopathy, 14(8%) developed neonatal jaundice, 8(5%) meconium aspiration syndrome (MAS) and 4(2%) baby died in early neonatal period. **Conclusion:** In utero passage of meconium is associated with adverse neonatal outcome. Early identification of pregnant woman at risk of passage of meconium during labor, intensive fetal surveillance and early intervention may improve neonatal adverse outcome.

Key Words: Meconium-stained amniotic fluid (MSAF), neonate, Hypoxic ischemic encephalopathy.

*Address for Correspondence:

Dr. Atindra Jain, Assistant Professor, Department of Pediatrics, Shri Shankaracharya Institute of Medical Sciences (SSIMS), Bhilai
Email: atindrainstinct@gmail.com

Received Date: 16/10/2019 Revised Date: 23/11/2019 Accepted Date: 22/12/2019

DOI: <https://doi.org/10.26611/10141239>

Access this article online

Quick Response Code:



Website:

www.medpulse.in

Accessed Date:

27 December 2019

INTRODUCTION

A fetal condition during labor is usually assessed by fetal heart rate and the presence of meconium in the amniotic fluid¹. Meconium is a viscous green-black substance that consists of denuded intestinal epithelial cells, ingested lanugo hair, swallowed amniotic fluid, mucus, digestive enzymes, bile acids, and water. It has been suggested that the fetus passes meconium in response to hypoxia and that meconium passage in utero therefore signals fetal compromise. Alternatively, in-utero passage of meconium may represent normal gastrointestinal tract maturation under neuronal control. Meconium passage could also follow vagal stimulation from common but transient umbilical cord entrapment. Passage of meconium by

How to cite this article: Naresh P Motwani, Atindra Jain. Study of feto-maternal outcome in deliveries with meconium stained amniotic fluid at a tertiary care hospital. *MedPulse International Journal of Pediatrics*. December 2019; 12(3): 88-91.
<http://medpulse.in/Pediatrics/index.php>

some is considered physiological, exhibiting sign of fetal maturity on one hand and a sign of fetal distress and response to hypoxic insult on the other hand. Aspiration of the meconium into fetal or neonatal lungs is associated with clinical disease ranging from mild respiratory distress to severe respiratory compromise and causes significant increase in perinatal morbidity and mortality². It has been associated with poor perinatal outcome including low Apgar scores chorioamnitis with sepsis and increased incidence of neonatal intensive care admission and high rate of perinatal death. Globally, 7-22% of all live births are complicated by meconium stained amniotic fluid. But meconium aspiration syndrome (MAS) occurs in only 1-3% of all cases of MSAF and in 10-30% of these neonates, meconium is present below the vocal cords^{3,4}. The exact etiology of meconium stained amniotic fluid is not clearly understood. Though previous studies have suggested that obstetric factors such as (prolonged labor, post-term pregnancy, low-birth weight babies, oligohydramnios, intrauterine growth retardation and hypertensive disorders of pregnancy), medical factors (cholestasis of pregnancy and anemia) and socio-demographic and behavioral risk factors (higher maternal age, maternal drug abuse especially tobacco and cocaine use) contribute for the passage of meconium into the amniotic fluid^{5,6}. As meconium staining amniotic fluid is thought to be associated with adverse outcome of fetus, we did this observational study to assess fetomaternal outcome in deliveries with meconium stained amniotic fluid at a tertiary care hospital.

MATERIAL AND METHODS

This prospective observational study was conducted in the Department of Obstetrics and Gynecology and NICU at SSIMS, Bhilai, India over a period of 4 months (August 2019 to November 2019)

Inclusion criteria

Patients with cephalic presentation and meconium stained amniotic fluid after spontaneous or artificial rupture of membrane irrespective of age, parity and stage of labor.

Exclusion criteria

1. Patients with abnormal presentation.
2. Patients with clear liquor after spontaneous or artificial rupture of membrane.
3. Patients with multiple pregnancies, fetal malformation, intrauterine fetal demise, eclampsia, antepartum hemorrhage, Gestational age < completed 34 weeks and patients who refused to give their consent for the participation in the study.

Written informed consent was taken from all the subjects for participation in present study. Patients detailed history

(demographic, obstetric, past medical and surgical), gestational age, per abdominal examination, per speculum and per vaginal examination were recorded in a pre-designed proforma. Fetal heart rate monitoring was done with intermittent auscultation. The rate of cervical dilatation, duration and progress of labor was noted by plotting the parameters on a partogram. If there are any associated complications like PIH, PROM, anemia, the specific treatment was given. The mode of delivery was considered depending on the fetomaternal condition and progress of labor. Delivery (vaginal, instrumental or caesarean section) was attended by a pediatrician to record perinatal events and any resuscitation if required. The APGAR score of neonates at 1 and 5 minutes, NICU admission, the neonates who had meconium aspiration syndrome and birth asphyxia (HIE) were recorded. Statistical analysis of the study data was done with Microsoft excel. Statistical analysis was done using descriptive statistics.

RESULTS

Total 168 deliveries were included in present study. Age between 20-25 years age group was most common maternal age-group in present study, with 112 (67 %) patients.

Table 1: Distribution of cases according to age of patient

AGE (in years)	Number of patients	%
< 20	16	10%
20-25	112	67%
26-30	29	17%
>30	11	7%
TOTAL	168	

Gestational age-wise term patients were 123 (74 %), followed by post-dated (>40 weeks) patients 31 (18 %) and preterm (34-37 weeks) patients 14 (8 %).

Table 2: Distribution according to gestational age during delivery

Gestational age	Number of patients	%
Preterm (34-37 weeks)	14	8%
Term (37-40 weeks)	123	74%
Postdated (>40 weeks)	31	18%

Mode of delivery in present study is shown in table 3. Among them 104(62%) were born by vaginal route, 51(30%) by caesarean section and 13(8%) by instrumental delivery.

Table 3: Distribution of cases according to mode of delivery

Mode of delivery	Number of patients	%
Vaginal	104	62%
LSCS	51	30%
Instrumental delivery	13	8%
TOTAL	168	100

Maternal risk factors are shown in table 4. In present study we noted postdated pregnancy 31(18%), premature rupture of membranes 28(17%), previous caesarian section 26(15%), pregnancy-induced hypertension (PIH) 23(14%), intrauterine growth retardation (IUGR) 11 (7%), anemia 10(6%), cephalopelvic disproportion 8(5%) and gestational diabetes mellitus (GDM) 4(2%). Among these, 66 (39 %) had no antenatally diagnosed high-risk.

Table 4: Maternal Risk Factors

Maternal risks	Number of patients	%
No risk	66	39%
Postdated Pregnancy	31	18%
Premature rupture of membranes	28	17%
Previous Caesarian Section	26	15%
Pregnancy-induced hypertension (PIH)	23	14%
Intrauterine growth Retardation (IUGR)	11	7%
Anemia	10	6%
Cephalopelvic Disproportion	8	5%
Gestational diabetes mellitus (GDM)	4	2%

Neonatal follow-up was done for only early neonatal period. We noted that 131(78%) babies were discharged without any complications, 14(8%) developed neonatal jaundice, 8(5%) meconium aspiration syndrome (MAS), 6(4%) had aspiration pneumonia, 4(2%) baby died in early neonatal period 3(1.91%), 3(2%) septicemia and 19(11%)hypoxic-ischemic encephalopathy (HIE).

Table 5: Outcome of Neonates

Neonatal outcome	Number of patients	%
Discharged Without Any complications	131	78%
Neonatal Jaundice	14	8%
Meconium Aspiration Syndrome	8	5%
Aspiration Pneumonia	6	4%
Early Neonatal Death	4	2%
Septicemia	3	2%
Hypoxic ischemic Encephalopathy (HIE)	19	11%

DISCUSSION

Meconium stained liquor (MSL) is the passage of meconium by a fetus in utero during the antenatal period or in labor. Intrauterine distress cause relaxation of anal sphincter leading to the passage of meconium into the amniotic fluid. There are so many predisposing risk factors that promote the passage of meconium into the amniotic fluid in utero like utero-placental insufficiency, maternal hypertension, cord around neck, oligohydramnios, diabetes mellitus, heavy smoking, post term pregnancy and intra uterine growth restriction, antepartum hemorrhage and anemia. The detection of MSAF during labor often causes apprehension and anxiety for the patient as well as for the health provider as it is often considered an indication of fetal distress. The cause for

the passage of meconium in the amniotic fluid is not well understood. It could reflect the state of compensated fetal distress as seen in babies who are actually acidotic during labor. Acute or chronic fetal hypoxia can result in the passage of meconium in utero^{5,7}. According to Royal College of Obstetricians and Gynecologists (RCOG) intrapartum care guideline, meconium stained amniotic fluid is classified as significant MSL and non-significant MSL. Non- significant MSL is defined as a thin yellow or greenish tinged fluid; containing non-particulate meconium whereas significant MSL is explained as dark green or black amniotic fluid that is thick and tenacious and consists lumps of meconium⁸. In our study age group 20-25 years was most common maternal age-group with 112 (67 %) patients. Of the total, 84 % of patient belonged to age group 21-30 years correlating to with study conducted by Gokhroo K (86.6%)⁹ and Sandhu SK (80%)¹⁰. Other studies noted high incidence of MSAF was noted in primigravida's such as Surekha (71.66%)¹¹ and Gokhroo K (54%)¹⁰ *et al*. This may be due to increased duration of labor and increased incidence of post-dated pregnancies in primigravida. In our study 8% neonates were less than 37 weeks of gestation, 74% of neonates were between 37-40 weeks and 18% were more than 40 weeks. In study conducted by Urvashi *et al*¹², 5% neonates were less than 37 weeks of gestation, 77.50% of neonates were between 37-40 weeks and 17.50% were more than 40 weeks and was consistent with our study. Due to better facilities to assess fetal wellbeing, we reported lower rates of caesarean (30%) and instrumental deliveries (8%) in present study. Naveen S *et al*¹³, Patil *et al*¹⁴ and Unnisa S¹⁵ reported a caesarian section rate of 49.1%, 42% and 45% respectively. Becker¹⁶ reported that all sorts of operative interventions are more frequent in MSAF group. In their study 17.4 % of patients in meconium group had caesarean section as compared to 9.6 % of control group (P value 0.01). The significant high rate of emergency caesarean section partly reflects the care providers dilemma in managing such labors as they become more concerned about the fetuses and any minute alterations in normal labor patterns end up in caesarean sections¹⁷. In the present study, postdated pregnancy was a major risk factor was observed in 18% of the cases. In a study by Ramakishore *et al*, it was observed that fetal distress as a major risk factor was observed in 28% of the cases followed by anemia which was 22% of the cases¹⁸. Whereas Chandran *et al* noted anemia as a major risk factor which was observed in 23% of the cases¹⁹. In present study 14(8%) developed neonatal jaundice, 8(5%) meconium aspiration syndrome (MAS), 6(4%) had aspiration pneumonia, 4(2%) baby died in early neonatal period 3(1.91%), 3(2%) septicemia and 19(11 %) hypoxic-ischemic

encephalopathy (HIE). Ashtekar S *et al*²⁰ in their study concluded that HIE (42%), Sepsis (23.2%), and Jaundice (23.2%) and others (7.8%) including intraventricular hemorrhage and Necrotizing Enterocolitis were complications seen in neonates born with meconium stained amniotic fluid.

CONCLUSION

Early identification of pregnant woman at risk of passage of meconium during labor, intensive fetal surveillance and early intervention may improve neonatal adverse outcome. Strict monitoring of neonate is required to reduce morbidity and mortality, as symptoms may appear after 48 hours. Postdated pregnancies should be delivered at a tertiary care hospital, due to increased incidence of in-utero passage of meconium and these patients may require emergency caesarian section.

REFERENCES

1. Gee H Routin intrapartum care: an overview. In: Luesley dm, Barker pn Obstetrics and gynecology : an evidence based test for MRCOG, 2nd edition.Hodder Arnold 2010:287-295.
2. Mukhopadhyay P N, Dalui R, Hazra S; *et al* Role of Intrapartum amnioinfusion in meconium stained amniotic fluid. The Journal of Obstetrics and Gynaecology of India 2006 ; 56 3, 230-232
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. Bhatia P, Ela N. Fetal and neonatal outcome of babies in meconium stained amniotic fluid and meconium aspiration syndrome. J Obstet Gynecol India. 2007;57:501-4.
5. 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.
6. Mahapatro A. obstetrics outcome at term in meconium stained amniotic fluid -A retrospective delivery. Inte J pharm bio sci. 2014;5(2):866-71.
7. Stark A Meconium aspiration. Manual of neonatal care 2003; 5:402-403.
8. Sarah M. In: SP SM, *et al.*, editors. managments of meconium stained liquor. Cyprus: RCOG; 2016. p. 1-10.
9. Gokhroo K, Sharma U, Sharma M. Various maternal factors responsible for meconium stained amniotic fluid. J Obstet Gynaecol India. 2001;52(6):40.
10. Sandhu SK, Singh J, Khura H, Kaur H. Critical evaluation of meconium staining of amniotic fluid and foetal outcome. J Obstet Gynaecol India. 1993;43:528-3.
11. Tayade S. The significance of meconium stained amniotic fluid-A cross sectional study in a rural setup. IJBAR. 2012;12(3):861-6.
12. Sharma U, Garg S, Tiwari K, Hans PS, Kumar B. Perinatal outcome in meconium stained amniotic fluid. J Evol Med Dent Sci. 2015;(48):8319-27.
13. 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;56:514-7.
14. 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.
15. Unnisa S, Sowmya BS, Rao SB, Rajagopal K. Maternal and fetal out come in meconium stained amniotic fluid in a tertiary centre. Int J Reprod Contracept Obstet Gynecol. 2016;5:813-7.
16. Becker S, Solomayer E, Doganet C. Meconium stained amniotic fluid-perinatal outcome and obstetrical management in a low risk suburban population. Eur J Obstet Gynecol Reprod Biol. 2007;132:46-50.
17. Mundhra R, Agarwal M. Fetal outcome in meconium stained deliveries. J clinical Diagnostic Research. 2013;7:2874-6.
18. Ramakishore *et al*, A study on meconium aspiration syndrome cases attending to Government general hospital, Anantapuramu, Andhra Pradesh. Int J Res Health Sci. 2015;3(1):169-73.
19. Chandran JR, Uma DN, Rajeshwary U. Risk factors for meconium aspiration and MAS (meconium aspiration syndrome) in neonates born through meconium stained amniotic fluid (MSAF) in a tertiary care centre in Malabar (Kerala). J Evolut Med Dent Sci. 2013;2(49):9489-95.
20. Ashtekar SD, Gaikwad RSNK. Clinical study of meconium aspiration syndrome in relation to birth weight and gestational maturity at general hospital Sangli. Internat Med J. 2014;1(5):189-92.

Source of Support: None Declared
Conflict of Interest: None Declared