



ORIGINAL RESEARCH PAPER

Obstetrics and Gynaecology

PREVALENCE OF MECONIUM STAINED AMNIOTIC FLUID IN RELATION TO GESTATIONAL AGE AND PARITY OF MOTHER

KEY WORDS:

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ABSTRACT

INTRODUCTION: The first demonstrable meconium is found around the third month of the gestational age in the intestines of the fetus as black green color, odorless mass. Multiple conditions of intrauterine fetal distress is said to be causative reason for intrauterine passage of meconium in the amniotic fluid by the fetus. Aspiration of meconium stained amniotic fluid may lead to a gasping breathing pattern which induces hypoxia via airway obstruction, surfactant dysfunction, chemical pneumonitis, and pulmonary hypertension. **AIMS AND OBJECTIVES:** To find the prevalence of various grades of meconium stained amniotic fluid according to gestational age and parity. **CASE STUDY AND RESULTS:** The present study was a prospective observational study. It was conducted in the department of Obstetrics and Gynaecology Great Eastern Medical School and Hospital, Srikakulam, Andhra Pradesh, India during May 2018 to May 2020 on 100 Pregnant women in labour with meconium stained amniotic fluid who delivered or underwent cesarean section in the institute were included in the study. MSAF grade 1 cases were maximum 20/40(50%) in mothers having previous vaginal delivery. MSAF grade 2 cases were maximum 26/34(76%) in primigravida mothers. MSAF grade 3 cases were maximum 10/26(38.46%) in primigravida mothers. Maximum cases of grade 1 MSAF 32/40(80%), grade 2 MSAF 21/34(61.76%) as well as grade 3 MSAF 12/26(46.15%) were in mothers having gestational age between 37-40 weeks at the time of delivery of baby.

INTRODUCTION

Meconium is an odorless black-green color material found in the fetal intestine. It is first demonstrable in the fetal intestine at the third month of gestational age.¹ Meconium is formed by the accumulation of water, intestinal epithelial cells, lanugo, mucous, bile etc.² Majority of healthy full term babies pass meconium within 48 hours of being born. Factors those promote passage of meconium in the amniotic fluid in utero include placental insufficiency, maternal hypertension, oligohydramnios, preeclampsia, infection, maternal drug abuse, acidosis or any other reasons which can cause intrauterine distress.^{3,4} Umbilical cord compression, vascular anomalies of umbilical cord may lead to passage of meconium into the amniotic fluid.⁵ As gestational age of fetus approaches towards the full term, the gastrointestinal tract matures and vagal stimulation or spinal cord compression may cause peristalsis and relaxation of the rectal sphincter leading to meconium passage into amniotic fluid.⁶ Meconium alters the chemical characteristics of amniotic fluid which reduces antibacterial activity and increasing the risk of perinatal bacterial infection. Aspiration of meconium stained amniotic fluid may lead to a gasping breathing pattern which induces hypoxia via airway obstruction, surfactant dysfunction, chemical pneumonitis, and pulmonary hypertension.⁷ In addition intrauterine exposure of fetal respiratory tract to meconium is associated with inflammation of lung tissues.⁸ Meconium deactivates the surfactants and also inhibits the synthesis of surfactants.^{9,10} Free fatty acids present in the meconium strip the surfactants from the alveolar surface causing diffuse atelectasis.¹¹ Passage of meconium into the amniotic fluid and aspiration of meconium stained amniotic fluid into fetal respiratory tract is multifactorial process affected by so many antenatal, intrapartum as well as neonatal factors.

AIMS: To find the prevalence of various grades of meconium stained amniotic fluid as well as meconium aspiration syndrome according to gestational age and parity

MATERIALS AND METHODS:

The present study was a prospective observational study. It was conducted in the Obstetrics and Gynecology department of Great Eastern Medical School and Hospital, Andhra Pradesh during May 2018 to May 2020. A total of 100 mothers in labour with meconium stained amniotic fluid who delivered or underwent cesarean section in the institute were included in the study. All the mothers with Meconium Stained Liquor

(MSL) who gave permission to participate in the study with singleton pregnancies were included in the study. The patients who didn't give consent, mothers, intrauterine fetal death, mothers who had non-cephalic presentation and with multi fetal gestation were excluded.

A structured proforma was used to collect data. The Ethical Review Board approval was taken before starting the study. The study participants were informed about the objectives and benefits of the study following which informed consent was obtained.

The collected data was analyzed using SPSS version 20. Descriptive statistical measures such as frequencies and percentages were generated. For finding associations between different variables, we used two chi-square test. To find the degree of association, Cramer's V was used.

Meconium stained liquor was categorized in to, Grade I MSL included small amount of meconium diluted in a plentiful amount of amniotic fluid. This gives the fluid only a slightly greenish or yellowish discoloration. Grade II MSL included the moderate meconium staining, when there is a fair amount of amniotic fluid, but it is clearly stained with meconium. In this case it will be 'khaki green' or brownish in color. Grade III MSL was with heavy staining, when there is reduced amniotic fluid and large amount of meconium, making the staining quite thick, with 'pea-soup' consistency.

OBSERVATIONS:

A total of 100 mothers in labour were participated in the present study. Majority of them were between 20-30 years of age (59%). The women between 31-35 years of age were 27%. Participants <20 years of age were 9% and 35 years were 5%.

Out of 100 patients, 50(50%) were primigravida, 26(26%) were having previous vaginal delivery, 24(24%) were having previous cesarean section delivery.

Out of 100 cases, 5(5%) mothers delivered baby at gestational age less than 37 weeks, 65(65%) mothers delivered baby at gestational age between 37-40 weeks while 30(29.5%) mothers delivered baby at gestational age more than 40 weeks. Maximum patients 65(65%) were having gestational age between 37- 40 weeks at the time of delivery of baby.

Out of 100 mothers having fetuses with various grades of

meconium stained amniotic fluid (MSAF), 40(40%) were having MSAF grade 1, 34(34%) were having MSAF grade 2, 26(26%) were having MSAF grade 3. Maximum patients 40(40%) were having MSAF grade 1.

MSAF grade 1 cases were maximum 20/40(50%) in mothers having previous vaginal delivery, while minimal 8/40(20%) in mothers having previous cesarean section delivery. MSAF grade 2 cases were maximum 26/34(76%) in primigravida mothers, while minimal 2/34(5.8%) in mothers having previous vaginal delivery. MSAF grade 3 cases were maximum 10/26(38.46%) in primigravida mothers, while minimal 4/26(15.38%) in mothers having previous vaginal delivery. Out of 50 primigravida patients 26(52%) were having MSAF grade 2, while 10(20%) were having MSAF grade 3. Out of 26 patients having previous vaginal delivery 20(76.92%) were having MSAF grade 1, while 2(7.69%) were having MSAF grade 2. Out of 24 patients having previous cesarean section delivery 10(41.66%) were having MSAF grade 3, while 6(25%) were having MSAF grade 2.

Maximum cases of grade 1 MSAF 32/40(80%), grade 2 MSAF 21/34(61.76%) as well as grade 3 MSAF 12/26(46.15%) were in mothers having gestational age between 37-40 weeks at the time of delivery of baby, while minimal cases of grade 1 MSAF 0/40 (0%), grade 2 MSAF 3/34 (8.82%) as well as grade 3 MSAF 2/26 (7.69%) were in mothers having gestational age less than 37 weeks at the time of delivery of baby. Out of 5 patients having gestational age less than 37 weeks, none were having grade 1 MSAF, while 3 (8.82%) were having grade 2 MSAF. Out of 65 patients having gestational age between 37-40 weeks, 32(49.23%) were having grade 1 MSAF, while 12(18.46%) were having grade 3 MSAF. Out of 30 patients having gestational age greater than 40 weeks, 13(43.33%) were having grade 3 MSAF, while 9(30%) were having MSAF grade 2

Table 1: Patient distribution based on MSAF Grade

S.No	MSAF grade	No. Patients	Percentage
1	1	40	40
2	2	34	34
3	3	26	26
4	total	100	100

Table 2: Association of parity and grades of MSAF

S.no	Parity	MSAF Grade 1	MSAF Grade 2	MSAF Grade 3	total
1	Primigravida	14/50 (28%) 14/40 (35%)	26/50 (52%) 26/34 (76%)	10/50 (20%) 10/26 (38.46%)	50
2	Previous VD	20/26 (76.92%) 20/40 (50%)	2/26 (7.69%) 2/34 (5.8%)	4/26 (15.38%) 4/26 (15.38%)	26
3	Previous CS	8/24 (33.33%) 8/40 (20%)	6/24 (25%) 6/34 (17.64%)	10/24 (41.6%) 10/26 (38.46%)	24
	Total	40	34	26	100

Table 3: Association of gestational age and grades of MSAF

S.No	Gestational Age	Grade 1 of MSAF	Grade 2 of MSAF	Grade 3 of MSAF	Total
1	<37 weeks	0/5 (0%) 0/40 (0%)	3/5 (60%) 3/34 (8.82%)	2/5 (40%) 2/26 (7.69%)	5/100 (5%)
2	37-40 weeks	32/65 (49.23%) 32/40 (80%)	21/65 (32.30%) 21/34 (61.76%)	12/65 (18.46%) 12/26 (46.15%)	65/100 (65%)

3	>40 weeks	8/30 (26.66%) 8/40 (20%)	9/30 (30%) 9/34 (26.47%)	13/30 (43.33%) 13/26 (50%)	30/100 (30%)
	Total	40/100 (40%)	34/100 (34%)	26/100 (26%)	100

DISCUSSION:

Neonate passes about 60 to 200 gm of meconium at birth.¹² MSAF is found in about 8-20% of newborn and out of which 2-9% suffers from MAS.¹³ The passage of meconium into the amniotic fluid may be a physiological event due to maturity of fetus or may be due to umbilical cord compression or fetal hypoxia. Osava RH et al¹⁴ studied meconium stained amniotic fluid and maternal and neonatal factors associated with it. In their study, 175 out of 1222(14.3%) primigravida patients were having MSAF, while 113 out of 1178(9.6%) multigravida patients were having MSAF. In their study, out of 98 women having gestational age less than 37 weeks, 4(4.2%) were having MSAF, out of 2020 women having gestational age between 37-41 weeks, 224(11.2%) were having MSAF, while out of 291 women having gestational age greater than 41 weeks, 60(20.6%) were having MSAF. Addisu D et al¹⁵ studied prevalence of meconium stained amniotic fluid and its associated factors among women who gave birth at term in Felege Hiwot comprehensive specialized hospital, North West Ethiopia, in their study, the prevalence of meconium stained amniotic fluid was 17.8%. Out of 426 women having gestational age 37-40 weeks, 71(16.7%) were having MSAF, while out of 69 women having gestational age 41 weeks, 17(24.6%) were having MSAF.

Dr Meena PV et al¹⁶ studied meconium stained amniotic fluid and its fetal outcome in 2124 patients in Tamilnadu, India. They found meconium stained amniotic fluid in 250(11.77%) patients out of total 2124 patients studied. Out of these 250 patients having meconium stained amniotic fluid, 86(34.5%) were having grade 1 MSAF, 102(40.8%) were having grade 2 MSAF and 62(24.8%) were having grade 3 MSAF. In present study, out of 100 patients having meconium stained amniotic fluid, we found 40(40%) were having grade 1 MSAF, 34(34%) were having grade 2 MSAF and 26(26%) were having grade 3 MSAF. 40% of patients were having grade 1 MSAF in the present study as compared to 34.5% in the study done by Dr Meena et al. 34% of patients were having grade 2 MSAF in the present study as compared to 40.8% in the study done by Dr Meena et al. 26% of patients were having grade 3 MSAF in the present study as compared to 24.8% in the study by Dr Meena et al. Khillan S et al¹⁷ studied adverse perinatal outcome and mode of delivery in patients with meconium stained amniotic fluid in 4653 patients in Patiala, Punjab, India. They found meconium stained amniotic fluid in 609(13.09%) patients out of total 4653 patients studied. Out of these 609 patients having meconium stained amniotic fluid, 208(34.1%) were having grade 1 MSAF, 249(40.8%) were having grade 2 MSAF and 152(24.9%) were having grade 3 MSAF. Desai DP et al¹⁸ studied fetal heart rate patterns in patients with thick meconium staining of amniotic fluid and its association with perinatal outcome in 136 patients in Vadodara, Gujarat, India. They found significant association between the gestational age more than 40 weeks and MSAF. In our study, we found maximum number of cases of MSAF 65/100 (65%) in patients having gestational age between 37-40 weeks.

Rathoria R et al¹⁹ studied risk factors and perinatal outcome in meconium stained deliveries from a district of Uttar Pradesh, India. In their study, out of 110 cases of MSAF, 57(51.82%) pregnant female were primigravida, while 53(48.18%) were multigravida. 30(27.27%) cases of MSAF were having gestational age between 41-42 weeks.

CONCLUSION:

In the present study, grade 1 meconium stained amniotic fluid

is more frequent in multigravida patients having previous vaginal delivery and having gestational age between 37-40 weeks at the time of delivery. Grade 2 and 3 meconium stained amniotic fluid are more frequent in primigravida patients having gestational age between 37-40 weeks at the time of delivery. Meconium stained amniotic fluid as well as meconium aspiration syndrome is the signs suggestive of fetal distress and worrisome for the better prognosis of patients. Constant monitoring during pregnancy and labor, early detection as well as timely intervention will reduce the chances of meconium stained amniotic fluid and meconium aspiration syndrome. This will help in reduction of the neonatal morbidity as well as mortality due to respiratory complications of meconium aspiration syndrome.

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