

Fetal Outcome in Meconium Stained Deliveries

RAJLAXMI MUNDHRA¹, MANIKA AGARWAL²

ABSTRACT

Objective: To evaluate the foetal outcome in Meconium Stained Amniotic Fluid (MSAF).

Material and Methods: This prospective observational study was carried out in the Department of Obstetrics and Gynaecology, North Eastern Indira Gandhi Regional Institute of Health And Medical Sciences, Shillong, India, over a period of eighteen months, from January 2010 to June 2011. A total of 355 pregnant women who had completed more than 37 weeks of gestation, with singleton pregnancies and cephalic presentations were included in this study. One hundred and sixty five cases with MSAF, were thus selected and they were compared with 190 randomly selected controls.

Results: Among 165 cases, 27.88 % of the cases had regular visits to the Institute at least 3 times previously, 72.12% cases had no previous visit at all. Primigravidas accounted for a majority

of cases and approximately 50% cases had gestational ages of more than 40 weeks. Pregnancies complicated with pregnancy induced hypertension had statistically significant higher rates of meconium staining among cases (16.97%), as compared to those among controls (7.89%). 21.81% cases had foetal heart rate abnormalities, as were detected by electronic foetal monitoring and presence of foetal bradycardia was statistically higher in cases compared to that in controls. Caesarean section rates were nearly double in cases (49.09%). Neonatal outcome was poor in terms of low Apgar score at birth, birth asphyxia, Meconium Aspiration Syndrome (MAS) and increased neonatal admission among cases as compared to that among controls.

Conclusion: Meconium stained amniotic fluid is really worrisome from both, obstetrician's and paediatrician's points of view, as it increases the caesarean rates, causes birth asphyxia, MAS and increases neonatal intensive care unit admissions.

Keywords: Meconium stained amniotic fluid, Birth asphyxia, Meconium aspiration syndrome

INTRODUCTION

Presence of meconium stained amniotic fluid is seen in 12-16 % of deliveries [1]. In utero, passage of meconium may simply represent the normal gastrointestinal maturation or it may indicate an acute or chronic hypoxic event, thereby making it a warning sign of a foetal compromise. Meconium passage is rare before 34 weeks of gestation and incidence increases steadily beyond 37 weeks of gestation [2]. Factors such as placental insufficiency, maternal hypertension, pre-eclampsia, oligohydramnios or maternal drug abuse (tobacco, cocaine) result in In utero passage of meconium [3].

Infants born through meconium-stained amniotic fluid are about 100 times more likely to develop respiratory distress than those which are born through clear fluid [4]. Even in women who are at very low risk for obstetric complications, meconium-stained amniotic fluid is common and it is associated with a five-fold increase in perinatal mortality as compared with low-risk patients with clear amniotic fluid [1].

Presence of meconium below vocal cord is known as meconium aspiration and it is seen in around 20-30 % of all infants with meconium-stained amniotic fluid [5]. Aspiration can occur in utero with foetal gasping, or after birth, with the first breaths of life. Meconium aspiration syndrome (MAS) is defined as a respiratory distress that develops shortly after birth, with radiographic evidence of aspiration pneumonia and presence of meconium stained amniotic fluid [6]. MAS occurs in about 5% of deliveries with meconium-stained amniotic fluid [5] and death occurs in about 12% of infants with MAS [7].

In recent years, with improvement in the antenatal and intrapartum care, there is a decline in the incidence of still births and this has resulted in a better neonatal outcome. Taking the risks of MSAF

into consideration, this study was done in a centre, where facilities of continuous electronic foetal monitoring were available; with an aim to compare the foetal outcome in deliveries complicated by meconium staining versus clear liquor and also to critically evaluate the associated maternal factors.

MATERIAL AND METHODS

This prospective observational study was carried out in the Department of Obstetrics and Gynaecology, North Eastern Indira Gandhi Regional Institute of Health and Medical Sciences, Shillong, Meghalaya, India; over a period of eighteen months, from January 2010 to June 2011.

Inclusion criteria: Included all pregnant women who had completed more than 37 weeks of gestation, with singleton pregnancies with cephalic presentations and with no known foetal congenital anomalies.

Exclusion criteria: Included pregnancies which had completed less than 37 weeks of gestation; with presentations other than cephalic presentations and with known foetal congenital abnormalities.

Those with meconium stained amniotic fluid (MSAF), detected after spontaneous or artificial rupture of membranes, served as cases and those with clear liquor were taken as control group.

One hundred and sixty five cases with MSAF were thus selected and they were compared with 190 randomly selected controls.

All the information regarding cases and controls were noted in systematic way in a pre designed proforma. The patients were carefully watched for progress of labour and they were strictly monitored for foetal heart rates by doing intermittent auscultations. Presence of meconium after spontaneous or artificial rupture of membranes was followed by cardiotocography for 20 minutes. Mode of delivery was

decided, considering all obstetric conditions. If a vaginal delivery was decided on, then continuous electronic foetal monitoring was done. Foetal outcome in terms of foetus being apparently healthy, Apgar score at 1 minute and at 5 minutes, birth weight, neonatal intensive care admission (NICU), birth asphyxia, meconium aspiration syndrome (MAS) and early neonatal death (death within seven days of birth), were noted.

Chi-square test was used for statistical analysis of results.

RESULTS

A total of 355 pregnant women who had completed more than 37 weeks of gestation, with singleton pregnancies and cephalic presentations, were included in this study. Women were divided into two groups: 165 women with MSAF served as cases, while 190 women with clear liquor were taken as control group.

Among 165 cases with meconium stained amniotic fluid (MSAF), 72.12% were unbooked and only 27.88% were booked (at least 3 visits, with first visit in first trimester). 65.45% women were of 20-30 years age-group. Approximately 50% cases had gestational ages of more than 40 weeks as compared to 14.2% controls who showed similar gestational ages, suggesting that advancing gestation increased meconium staining of amniotic fluid [Table/Fig-1].

[Table/Fig-2] shows that severe anaemia was seen in around 7.27% cases, pregnancy induced hypertension (PIH) was seen in 16.97% cases and that pre labour rupture of membranes was seen in 11.51% cases. Pregnancies complicated with PIH had statistically significant higher rates of meconium staining among cases (16.97%) as compared to those among controls (7.89%). 21.81% cases had foetal heart rate abnormalities which were detected by electronic foetal monitoring and presence of foetal bradycardia was statistically higher in cases as compared to that in controls.

Caesarean section was very commonly done in MSAF cases and it accounted for 49.09% cases as compared to 25.79% cases in control group, rates being nearly double and difference being statistically significant. Approximately 10% cases had instrumental deliveries as compared to 4.21% cases among controls, which underwent such deliveries ($p=0.036$) [Table/Fig-3].

In 80% cases, babies were asymptomatic at birth as compared to 93.16% cases among controls ($p<0.0001$). Infants with MSAF had low Apgar scores at birth and 21.21% cases needed intensive care unit admissions. Meconium aspiration was seen in 5 cases and 5 babies who were born to cases had early neonatal deaths, though the difference was not statistically significant as compared to controls. Incidence of birth asphyxia and NICU admissions were statistically higher among babies born to cases as compared to those who were born to control group [Table/Fig-4].

[Table/Fig-5] shows that no significant difference was observed in terms of birth weight between cases and controls.

DISCUSSION

Meconium passage prior to birth occurs in up to 20% of term deliveries, meaning that the frequency of MSAF was one for every five deliveries, thereby making it a very common finding. But, in spite of it being so common, it can really disturb an obstetrician, as it is a very frequent cause of poor foetal outcomes and as it increases the number of neonatal intensive care unit admissions.

This study, in accordance with the study done by Bhide et al., [8] showed that a majority of cases with MSAF were unbooked. We also found that the incidence of MSAF was higher in the age group of 20-30 years, which was quite similar to that which was seen in the studies done by Sandu SS et al., [9] but this seemed to be an incidental finding.

Incidence of MSAF increases with gestational age and this was very evident in this study. 50% cases had gestational ages of more than 40 weeks. A majority of the cases were unbooked and they

Parameters	Cases(%)	Control(%)	
Booked mothers	46(27.88)	78(41.05)	
Unbooked mothers	119(72.12)	112(58.95)	
Maternal age	<20 years	19(11.52)	15(7.89)
	20-30 years	108(65.45)	125(65.79)
	>30 years	38(23.03)	50(26.32)
Parity	Primi	80(48.48)	76(40)
	G2-G5	60(36.37)	87(45.79)
	G6-G10	20(12.12)	22(11.58)
	G11-G15	5(3.03)	5(2.63)
Gestational age	37-38weeks	21(12.73)	25(13.16)
	>38-39	28(16.97)	58(30.53)
	>39-40	33(20)	80(42.10)
	>40-41	31(18.79)	18(9.47)
	>41-42	42(25.45)	9(4.74)
>42	10(6.06)	0	

[Table/Fig-1]: Prevalence of MSAF in relation to booking status, maternal age, parity and gestational age

Parameters	Cases (%)	Control (%)	p-value
Anemia (hemoglobin <7 gram %)	12(7.27)	8(4.2)	0.25
Pregnancy induced hypertension	28(16.97)	15(7.89)	0.014
Prelabour rupture of membrane	19(11.51)	30(15.79)	0.28
Fetal bradycardia	29(17.57)	3(1.58)	<0.0001
Fetal tachycardia	7(4.24)	5(2.63)	0.55

[Table/Fig-2]: Relation of ante partum and intrapartum factors with meconium stained amniotic fluid

Mode of delivery	Cases (%)	Control (%)	p-value
Spontaneous vaginal delivery	67(40.61)	133(70)	<0.0001
Instrumental delivery	17(10.30)	8(4.21)	0.036
Caesarean section	81(49.09)	49(25.79)	<0.0001

[Table/Fig-3]: Mode of delivery

Parameter	Cases (%)	Control (%)	p-value
Asymptomatic at birth	132(80)	177(93.16)	<0.0001
Apgar score at 1 minute (<7)	33(20)	13(6.84)	<0.0001
Apgar score at 5 minute(<7)	16(9.69)	12(6.31)	0.24
Meconium aspiration syndrome	5(3.03)	2(1.05)	0.257
Birth asphyxia	25(15.15)	10(5.26)	0.002
Neonatal sepsis	4(2.42)	4(2.10)	1
Neonatal intensive care unit admission	35(21.21)	16(8.42)	0.0001
Early neonatal death	5(3.03)	5(2.63)	1

[Table/Fig-4]: Perinatal outcome

Weight	Cases (%)	Control (%)
=<2.5 kilograms	18(10.91)	22(11.58)
>2.5, <=3kilograms	84(50.91)	94(49.47)
>3 kilograms	63(38.18)	74(38.95)

[Table/Fig-5]: Birth weight

were most likely postdated, because those mothers had previous successful home deliveries. So, they had waited for a longer time and had come to hospital only when their pregnancies had crossed 10 months or beyond and when they had felt that it was high time to deliver. Naveen S et al., [10] conducted a study on 1500 deliveries to identify predictors of MSAF in India and they observed that a postdated pregnancy was one of the risk factors for MSAF.

Pregnancy induced hypertension (PIH) was associated with MSAF, but the incidence in our study was 16.97%, unlike the incidence

of 13% in studies of Bhide et al., [8] and Hosna Ara Khatun et al., [11]. Association of PIH with MSAF is caused by an underlying utero placental insufficiency, which causes foetal hypoxia, resulting in meconium passage.

Saunders et al., [12] reported that caesarean sections were performed twice as frequently in subjects with meconium stained amniotic fluid. This higher rate may be due to lack of facilities such as, foetal scalp pH monitoring and tracings of foetal electronic monitoring. In accordance with their study results, our study also showed nearly double caesarean section rates as compared to controls. The current study had a caesarean rate of around 50%. Such higher rates partly reflect the abnormal foetal heart rate patterns associated with MSAF and they partly reflect the obstetricians' dilemma in managing such labour, as at this time, they become more concerned about the foetuses and any minute alterations in normal labour patterns end up in caesarean sections. In contrast to our study, Wong SF [13] found that 13.2% of MSAF had undergone caesarean sections as compared to 8.8% cases who had undergone them in clear amniotic fluid. Such lower rates of caesarean section could be due to incorporation of scalp pH sampling in their study, unlike ours. Naveen S et al., [10] also reported a caesarean section rate of 49.1% in MSAF.

The consistency of meconium has a direct correlation with foetal outcome. The risk of perinatal death is increased five to seven times when a thick meconium is present at the onset of labour [14]. Infants with thin meconium are more likely to have passed meconium as a physiologic maturational process and they are more likely to be healthy at birth [5], however, they still require intensive foetal monitoring. In the present study, we did not divide the cases based on consistency of meconium.

In this study, 80 % infants were asymptomatic at birth, 20 % had low Apgar scores and 3.03 % had meconium aspiration syndrome. As in our study, Patil et al., [15] reported that 19% babies with MSAF had unsatisfactory Apgar scores. The perinatal outcome was poor with MSAF, as was noted in this study, with NICU admissions of 21.21%. In our study, MAS was diagnosed in 3.03 % babies who were born to MSAF, unlike 12.8% babies with MSAF in the study done by Patil et al., [15]. Meconium aspiration was the cause of death in around 4 cases and one died due to severe birth asphyxia with hypoxic ischaemic encephalopathy.

CONCLUSION

Meconium stained amniotic fluid is really worrisome from both obstetrician's and paediatrician's point of view, as it increases the caesarean rates, causes birth asphyxia, MAS and increases neonatal intensive care unit admissions, which were clearly seen in this study. Presence of MSAF requires intensive foetal monitoring, so as to decrease perinatal morbidity and mortality.

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PARTICULARS OF CONTRIBUTORS:

1. Senior Resident Guru Teg Bahadur Hospital, Delhi, India.
2. Assistant Professor, NEIGRIHMS, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Rajlaxmi Mundhra,
Flat No. 26-D, Pocket-E, Dilshad Garden, Delhi-95, India.
Phone: 7503442337, E-mail: rmundhra54@yahoo.com

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