ASSOCIATION OF GRADE OF MECONIUM STAINED AMNIOTIC FLUID WITH PERINATAL OUTCOME

ABSTRACT

Background: Meconium stained amniotic fluid (MSAF) is frequently observed in term and post-term pregnancies and its divided into grades according to meconium consistency. The study aimed to analyse association between grade of meconium and perinatal outcome.

Method: This was an observational descriptive study.250 women in labour were selected for study. After complete examination, labour was monitored. If meconium was passed,the grade was noted and included in meconium.Obstetric management was done as per protocol. Perinatal outcome was noted.Data collected was analysed and conclusions drawn .

Result: 20% were MSAF women out of which 14% had grade 1, 24% grade 2 and 62% had grade 3. 74.2% of women with Grade 3 had caesarean deliveries. Neonates of mothers with Grade 3 MSAF had 91.7% meconium aspiration syndrome.

Conclusion: Close monitoring of women with MSAF is important. Grade 3 MSAF has very important role in making decision regarding mode of deliveries to improve perinatal outcomes.

KEYWORD: Meconium stained amniotic fluid, Grade of meconium, mode of delivery, perinatal outcomes.

INTRODUCTION : Meconium stained amniotic fluid (MSAF) is observed in approximately 7-20% of all deliveries, predominantly in term and post-term pregnancies.[1] Meconium passage in utero can be a physiological response to maturity but may also indicate foetal hypoxia or distress.[2] The consistency of meconium is typically categorized into 3: Grade 1 - a small amount of meconium diluted in a plentiful amount of amniotic fluid and has only slightly greenish or yellowish discolouration. Grade 2 - mixing of moderate amount of

amniotic fluid and in this fluid looks like green and brown colour. Grade 3 - heavy staining of amniotic fluid resembling pea soup.[3] MSAF is associated with poor perinatal outcomes- meconium aspiration syndrome, transient tachypnea of newborn, acute respiratory distress syndrome, hypoxic ischaemic encephalopathy etc.[4]

The study aimed to analyse association between the grade of meconium and perinatal outcome.

METHOD : This was an observational descriptive study conducted from October 2022 to September 2023 in SMS Medical College,Jaipur. Institutional Review Board and Ethical Committee clearance was taken. Women with single, cephalic presentation, more than 28 weeks admitted in labour room were included.Women with any congenital anomaly were excluded. If meconium was passed,the grade was noted and included in meconium.Obstetric management was done as per protocol. Perinatal outcome was noted.Data collected was analysed, statistical analysis was done by using Medcale 16.4 version software. P-value <0.05 taken as significant.

OBSERVATIONS AND DISCUSSION

250 women were followed in labour. Percentage of women with meconium stained amniotic fluid was 20%.

Mean age of women with clear liquor was 25.63-+ 4.37 and mean age in MSAF group was 25.40+3.89 which was almost similar in both groups. Most women belong to lower middle class and were between 37-40 weeks but not statisticaly significant. 48% women with clear liquor were primigravida and 66% women with MSAF were primigravida ,this was statisticaly significant.

The 50 women with MSAF were categorized into 3 groups based on the consistency of meconium. Grade 1 : translucent , light green in colour meconium-14%

Grade 2 : opalescent meconium with deep green and light yellow in colour - 24%

Grade 3 : opaque and deep green meconium-62% Table 1

In a study conducted by Chhetri UD et. al.(2020), the incidence of MSAF was 13.6% .[5] In similar study, Gurubacharya et. al.(2015) had 14.8% incidence of MSAF.[6] Dohbit et. Al. (2018) reported incidence of MSAF as 11.5%. [7] In a study , Patel et.al. (2020) observed that there were 41% patients who had grade 1 MSAF , 31.5% had grade 2 MSAF whereas 27.5% had grade 3 MSAF .[8] In another study done by Karena ZV et.al. in 2022, MSAF was grouped as thick and thin . Thick meconium stained liquor was 37.6% and thin was 62.4%.[9] In the present study there was high incidence of MSAF.These may be because the centre has a large number of referral cases since it is a tertiary care hospital .

Table 1: Incidence and Grade of Meconium Stained Liquor

Liquor	Number of women (n = 250)		Grade of meconium					
			Grade 1		Grade 2		Grade 3	
	n	%	n	%	n	%	n	%
Clear Liquor	200	80%	-	-	-	-	-	-
MSAF	50	20%	7	14%	12	24%	31	62%

Among women with MSAF, 74.2 % who underwent caesarean had grade 3 meconium.

In women with grade 1 MSAF, 71.4% women had vaginal delivery whereas of the women with grade 2,50 % vaginal delivery in women with MSAF grade 3 only 25.8 % had vaginal delivery. This association was found to be statistically significant ($p<.05$) Table 2

In a study by Khillan et.al., they observed that with Grade 1 MSAF 26.4% women had LSCS , with Grade 2 MSAF 45.7% had LSCS and with Grade 3 MSAF had LSCS . Overall LSCS rate was 48.1%.[10] Kareena ZV et.al. reported that incidence of LSCS was

highest in thick group 82.44% compared to 17.56% in thin meconium stained liquor group .[9] Niranjan KS et.al.,in their study on MSAF, observed that in women with thick meconium stained liquor, 80.70% delivered by LSCS while 38.37% patients with thin meconium stained liquor delivered by LSCS.[11] In similar study done by Singh et al and Qadir et.al., 60% and 56.2% women with thick MSAF were delivered by LSCS.[12,13]

Table 2: Association of Mode of Delivery with Grade of Meconium

MSAF Grade	Vaginal Delivery(n=19)		Caesarean delivery (n=31)		Test of significance
	No.	%	No.	%	
Grade 1 (n=7)	5	26.3	2	6.5	X^2=6.01
Grade 2 (n=12)	6	31.6	6	19.4	Df=2
Grade 3(n=31)	8	42.1	23	74.2	p=.04954

26% neonates had APGAR <7, 69% of these had grade 3 MSAF. This association was statistically significant (p<.05). There were 4 stillbirth in women with MSAF , all of had grade 3 meconium, , these were due to referred cases, who had a meconium detection and delivery interval > 2 hours .Neonates with MSAF grade 2, had 2 times higher odds of having APGAR score <7, and with MSAF grade 3 had 2.45 times higher odds of having APGAR score <7 compared to cases with grade 1 (p>0.05) Table 3

In their study Niranjan KS et. observed that out of 200 MSAF newborn 4.5% died during perinatal period . Out of these 3% had thick MSAF.[11] Narang et.al. noted a slightly higher perinatal mortality (7.7%) in neonates born through MSAF .[14] Debdas et.al., reported similar perinatal mortality 3% .[15] Perinatal mortality in study by Kareena ZV et.al. was 27.15% .[9]

Neonatal mortality rate varied from 11% to 24% in studies done by Chaudhary R et.al. and Gurubacharya S et al. [16,6]

As grade of meconium increases , risk of lower APGAR score increases , reflecting poorer neonatal outcomes . This indicates importance of monitoring and managing high grades of MSAF .

Table. 3: Correlation of APGAR Score with Grades of MSAF

MSAF Grade	APGAR score ≥7 (n=37) 74%		APGAR Score <7 (n=13) 26%		Odd's ratio
	No.	%	No.	%	
Grade 1 (n=7)	6 85.7	16.21	1	7.69	1
Grade 2 (n=12)	9 75	24.32	3	23.07	2.000 (0.1662-24.07)
Grade 3 (n=31)	22 70.9	59.45	9	69.23	2.45 (0.2575-23.3960)

Meconium aspiration syndrome (MAS) developed in 91.7 % neonates with grade 3 Meconium and 8.3 % had grade 2.This association was statistically significant ($p<0.05$). Neonates with grade 2 had 1.9565 times odds of developing MAS and those with grade 3 meconium had higher odds (8.414) of developing MASF. Table 4

In their studies Khillan S et.al.observed that Grade 1 cases neonates had least MAS , Grade 3 case had highest rate of MAS. [17] Esphinheira MC et.al., in his study observed 5% neonates had MAS .[18]

MAS mostly occurred in grade 3 MSAF neonates.Perinatal outcome depends on variable factors like interval between detection of MSAF and delivery , grade of meconium , detection of MSAF during which stage of labour , parity etc .

Grading of MSAF is a very important factor affecting perinatal outcome .

Table 4: Association of MAS With Grade of MSAF

MSAF Grade	No MAS (n=38)		MAS Present (n=12)		Odd's ratio
	No.	%	No.	%	
Grade 1 (n=7)	7	18.4	-	-	
Grade 2(n=12)	11	28.9	1	8.3	1.9565 (0.0700 to 54.6754)
Grade 3(n=31)	20	52.6	11	91.7	8.4146 (0.4393 to 161.1612)

LIMITATIONS OF THE STUDY

The study was performed in a single centre which is a tertiary referral centre and hence not reflective of general population,as there are high number of referred cases in the hospital,Also,due to time limitations. perinatal outcome was followed only till neonates were discharged.

CONCLUSION

Close monitoring and grading of meconium is vital. It has an important role in making decision for mode of deliveries to improve perinatal outcomes.

DECLARATIONS

FUNDING: No funding sources

CONFLICT OF INTEREST: None declared

ETHICAL APPROVAL: The study was approved by the Institutional Research Review Committee

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