Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/20563
DOI URL: http://dx.doi.org/10.21474/IJAR01/20563

RESEARCH ARTICLE

ASSOCIATION OF GRADE OF MECONIUM STAINED AMNIOTIC FLUID WITH PERINATAL OUTCOME

Babita Panwar[1], Pawan Agarwal[2], Akanshka Verma[1], Nupur Hooja[3], Anchal[1], Sunil Kumar[1] and Heena Panwar[1]

1. Resident, Obst and Gynae Dept, SMS.Medical College, Jaipur, Rajasthan, India.
2. Professor, Obst and Gynae Dept, SMS.Medical College, Jaipur, Rajasthan, India.
3. Senior Professor, Obst and Gynae Dept, SMS.Medical College, Jaipur, Rajasthan, India.

Manuscript Info

Manuscript History
Received: 08 January 2025
Final Accepted: 12 February 2025
Published: March 2025

Key words:-
Meconium Stained Amniotic Fluid, Grade of Meconium, Mode of Delivery, Perinatal Outcomes

Abstract

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

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 meconiumgroup.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. 91.7% neonates of mothers with Grade 3 MSAF had 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 delivery to improve perinatal outcome.

"© 2025 by the Author(s). Published by IJAR under CC BY 4.0. Unrestricted use allowed with credit to the author."

Introduction:-

Meconium stained amniotic fluid (MSAF) is observed in approximately 7-20% of all deliveries, predominantly in term and post-dated pregnancies.[1] Meconium passage 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 normal amount of amniotic fluid and is only slightly greenish or yellowish discoloured. 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-acute respiratory distress syndrome, meconium aspiration syndrome, hypoxic ischaemicencephalopathy,transient tachypnea of newborn, etc.[4]

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

Corresponding Author:- Nupur Hooja
Address:- Senior Professor, Obst and Gynae Dept, SMS. Medical College, Jaipur, Rajasthan, India.

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 foetus in 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 meconiumgroup.Obstetric management was done as per protocol. Perinatal outcome was noted.Data collected was statistically analysed.Medcale 16.4 version software was used. P-value <0.05 taken as significant.

Observations and Discussion:-

Labour of 250 women was followed.Percentage of women having meconium stained amniotic fluid was 20%.

Mean age of women with clear liquor was 25.63+/- 4.37 SD and mean age in MSAF group was 25.40+/- 3.89 SD which was almost similar in both groups. Most women belonged 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 statistically significant.

The 50 women with MSAF were divided into 3 groupson the basis of consistency of meconium.Grade 1 : light green colouredtranslucentmeconium-14%
Grade 2 : deep green and light yellow coloured opalescent meconium - 24%
Grade 3 : deep green opaque meconium-62% Table 1

In a study conducted by Chhetri UD et. al.(2020), MSAF was seen in 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 . Grade 3 meconium stained liquor was noted in 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 3only 25.8% had vaginal delivery. This association was statistically significant (p<.05)Table 2

In a study by Khillanet.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 grade 3 meconium stained group(82.44%) as compared to 17.56% in grade 1 meconium stained liquor group .[9]Niranjan KS et.al.,in their study on MSAF, observed thatin women with thick meconium stained liquor, LSCS was done in 80.70% while LSCS was done only in 38.37% with thin meconium stained liquor.[11] In similar studies done by Singh et al and Qadiret.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 postnatal period . Of these,3% had thick MSAF.[11] Naranget.al. noted a slightly higher perinatal mortality (7.7%) in neonates born through MSAF .[14]Debdaset.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.andGurubacharya 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 done in one centre which was a tertiary care 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. Follow up was done only till discharge from hospital.

Conclusion:-
Close monitoring and grading of meconium isvital. It has an important role in making decision for mode of delivery to improve perinatal outcome.

Declarations
Funding:
No funding sources

Conflict Of Interest:
None declared

Ethical Approval:
The study was approved by the Institutional Research Review Committee

References:-
1. Soni A , Vaishnav GD , Gohil J. Meconium Stained amniotic fluid , it's significance
2. and Obstetric Outcome . Med. Sci. 2015 ; 4(1) : 1861 – 68 .
3. Ash , A.K. Managing patients with meconium – stained amniotic fluid. Hosp. Med. 2000 , 61 , 844 – 848
4. Shaikh EM , Mehmood S , shaikh MA Neonatal outcome in meconium stained of amniotic fluid – one year experience . JPMA . 2010 ; 60 (9) : 711 – 4 .
5. Dani, C; Ciarcia, M; Barone, V; Di Tommaso, M; Mecaci, F; Pasquini, L; Pratesi, S. Neonatal outcomes of Term Infants Born with Meconium – Stained Amniotic Fluid.
6. Chhetri UD , Aryal S. Risk Factors and Perinatal Outcome of Meconium Stained Amniotic Fluid. Journal of Lumbini Medical College. 2020; 8 (1):77 – 82 .
7. Gurubacharya S, Rajbhandari S, Gurung R, Rai A, Mishra M, Sharma KR, et al. Risk Factors and Outcome of Neonates Born through Meconium Stained Aamniotic Fluid in a tertiary Hospital of Nepal. Journal of Nepal Paediatric Society. 2015;35(1):44-8 .
8. Dohbit JS, Mah EM, Essiben F, Nzene EM, Meka EUN, Foumane P et al. Maternal and Fetal Outcomes Following Labour at Term in singleton Pregnancies with Meconium Stained Fluid: A Prospective Cohort Study . Open Journal of Obstetrics and Gynaecology . 2018;8(9):790-802 .
9. Patel S, Patel B, Shah A, Jani S, Jani C. Maternal and fetal characteristics associated with meconium – stained amniotic fluid. Indian J ObstetGynecol Res 2020;7(4):476-481.
10. Karena ZV, Bhat G, Dudhrejiya K, Gorfad D. The Study of Maternal Factors and Perinatal Outcome in meconium stained liquor Int J ReprodContraceptObstetGynecol 2022;11:2364-7.
11. KhillanS,Dahra J, Kaur P et.al. Adverse perinatal outcome and mode of delivery in patients with meconium stained amniotic fluid Int J Clinical Obstet Gynaecol.2018;2(6):22-26.
12. Niranjan KS et al. Int J Reproduction, Contraception Obstet Gynecol. 2019 Nov; 8(11): 4146-4154
13. Singh P, Soren SN, . A study of perinatal outcome in meconium stained amniotic fluid. MedlpulseInt Med J.2017;4(1):6-13.
14. QadirS,Jan S, Chachoo JA, ParveenS.Perinatal and neonatal outcome in meconium stained amniotic fluid. Int J ReprodContraceptObstet Gynecol.2016;5:1400-5.
15. Narang A, Nair PMC, Bhakoo ON, Vashisht K. Management of meconium stained amniotic fluid:a team approach.Indian Pediatr.1993;30:9.
16. Debdas AK, Kaur T, Meconium stained liquor: reappraisal. J ObstetGynaecol India. 1981;31:924-9.
17. Chaudhary R, Sethi RS, Chaurasiya OS, Sethi AS, Study of Meconium Aspiration Syndrome in relation to Birth Weight and Gestational age . Peopal' Jouranal of Scientific Research . 2018;11(2):16-21 .
18. KhillanS,Dahra J, Kaur P et.al. Adverse perinatal outcome and mode of delivery in patients with meconium stained amniotic fluid Int J Clinical Obstet Gynaecol.2018;2(6):22-26.
19. Esphinheria MC et.al. Meconium aspiration syndrome – the experience of tertiary centre . Rev portal pneumol. 2011;17(2): 71-6.