International Journal of Contemporary Pediatrics
Raju V et al. Int J Contemp Pediatr. 2018 Sep;5(5):1824-1827
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20183514

Original Research Article

Immediate clinical outcome of newborns with meconium stained amniotic fluid

Raju V., Dhivya Narayani M.*, Vindyarani W. K.

Department of Paediatrics, Sri Muthukumaran Medical College and RI, Mangadu, Chennai, Tamil Nadu, India

Received: 17 May 2018
Accepted: 26 June 2018

***Correspondence:**
Dr. Dhivya Narayani M.,
E-mail: arvindr84@gmail.com

ABSTRACT

Background: The detection of meconium-stained amniotic fluid during labour often causes anxiety in the delivery room because of its association with increased perinatal mortality and morbidity. The aim of the study is to determine whether meconium staining of amniotic fluid had an influence on the neonatal outcome and the factors responsible for meconium-stained amniotic fluid.
Methods: This case-control study was done between March 2015 to October 2017 in the Department of Paediatrics, Sri Muthukumaran Medical College, and RI. 217 newborns who had meconium staining of the amniotic fluid were taken into the study. For each case, two controls were taken. Mode of delivery of baby noted with the grading of meconium either thin or thick meconium. Type of resuscitation done for these babies was noted. Those newborns who were admitted in the newborn unit were followed up till discharge and type of management of these babies were monitored. The outcome of seizures, air leak, MAS etc., were looked for. For each MSAF baby, two newborns without MSAF were recruited and looked for maternal and fetal risk factors.
Results: Incidence of MSAF is 16.9%. Among 217 cases of MSAF, thin meconium constituted 141 cases (64.97%) and thick meconium 76 cases (35.02%). The incidence of thin meconium is more when compared to thick meconium. Of the 217 cases of meconium-stained liquor, 170 (78.7%) cases are vigorous babies and 47 (21.6%) are non-vigorous. Out of 47 babies who were non-vigorous, most of them (70.2%) had thick meconium stained liquor. Most of them, 172 cases (79.2%) required only routine resuscitation, whereas BMV with tracheal toileting required in 18 cases (78.3%) of thick MSAF when compared to 5 cases (21.7%) of thin MSAF.
Conclusions: MSAF is associated with morbidity and mortality when associated with factors like maternal PIH, anemia, oligohydramnios, IUGR babies and CTG showing FHR variability. The majority of which are thick meconium suggesting that consistency of meconium had a direct bearing on the neonatal outcome.

Keywords: Ballord's score, Cardiopulmonary resuscitation, Downe's score, Meconium-stained amniotic fluid

INTRODUCTION

A major goal of obstetric care is to prevent fetal morbidity and to bring down mortality as low as possible. This involves the early identification of the markers of fetal distress.[1] The classical signs or markers of fetal hypoxia are variations in fetal heart rate pattern, the presence of meconium in amniotic fluid, a decrease in scalp pH, the presence of intrapartum molding, sudden increase or loss of fetal movements.[2] Among the above mentioned traditionally, the fetal heart variation and meconium staining of amniotic fluid have been accepted as the most classical indicators of fetal distress. The appearance of meconium during labor has long been considered as a clinical sign of fetal distress.[3] According to the classical conception, this is an indirect sign

representing the response of the fetal gastrointestinal tract to hypoxic conditions.[4] Lately, the appearance of meconium as a sign of fetal distress has been questioned. Yet meconium aspiration is a severe life-threatening illness in the neonate and need a good understanding of the circumstances under which this event occurs.[5]

METHODS

This case-control study was done between March 2015 to October 2017 in the Department of Paediatrics, Sri Muthukumaran Medical College and RI. 217 newborns who had meconium staining of the amniotic fluid were taken into the study. Mode of delivery of baby noted, whether is a labor natural, emergency or elective LSCS or via forceps delivery. If delivered through LSCS, indication for LSCS was noted. Antenatal USG if done noted, with particular mention of amniotic fluid index whether had oligohydramnios or not. The placenta is examined for calcifications. Intrapartum fetal monitoring (CTG) if done was noted for any fetal heart rate variability. Grading of meconium done either as thin or thick meconium. Type of baby noted as either vigorous or nonvigorous baby. Type of resuscitation done for these babies are noted in terms of routine initial steps of resuscitation or required tracheal toileting, bag-mask ventilation or intubation. For each MSAF baby, two newborns without MSAF were recruited and looked for maternal risk factors and fetal risk factors.

These include maternal risks such as PIH, APH, anemia, heart disease, gestational diabetes, maternal malnutrition, jaundice complicating pregnancies and fetal factors include IUGR, postdated babies etc. To study the factors associated with MSAF, OR (95% CI) was arrived by univariate analysis. To adjust for the confounders multivariate analysis was done to arrive at adjusted OR (95% CI).

RESULTS

The incidence of MSAF is 16.9%. Among 217 cases of MSAF, thin meconium constituted 141 cases (64.97%) and thick meconium 76 cases (35.02%). The incidence of thin meconium is more when compared to thick meconium.

Table 1: Incidence of type of meconium.

Type of meconium	n	%
Thin	141	64.97
Thick	76	35.02

Of the 217 cases of meconium-stained liquor, 170 (78.7%) cases are vigorous babies and 47 (21.6%) are non-rigorous. Out of 47 babies who were non-vigorous, most of them (70.2%) had thick meconium stained liquor when compared to 25.3% among vigorous babies. So thick meconium-stained amniotic fluid was more common among non-vigorous babies. This was found to be statistically significant.

Table 2: Type of babies in MSAF.

Type of baby	N	%	Type of meconium				P value
			Thin		Thick		
			n	%	n	%	
Vigorous	170	78.7	127	74.7	43	25.3	0.00
Non-vigorous	47	21.65	14	29.78	33	70.21	

In MSAF, 41 cases (19.0%), had PIH as a complication in their mother. Of which, 20 (48.8%) had thin meconium staining and 21 (51.2%) had thick meconium staining. 13 cases had anemia as an antenatal risk, of which 8 (61.5%) had thin meconium and 5 (38.5%) had thick meconium. 3 cases had GDM as a complication and all the 3 (100%) had thin meconium staining. Majority of MSAF, i.e., 159 cases (73.1%) had no antenatal risks, otherwise born to a normal mother, of which 110 cases (69.0%) are with thin meconium staining and 49 cases (31.0%) are with thick meconium staining.

Table 3: Antenatal risks in MSAF.

Antenatal risks	N	%	Type of meconium				P value
			Thin		Thick		
			n	%	n	%	
PIH	41	19.0	20	48.8	21	51.2	0.05
Anaemia	13	6.0	8	61.5	5	38.5	
GDM	3	1.4	3	100.0	0	0.0	
CVS	1	0.5	0	0.0	1	100.0	
No risks	159	73.1	110	69.0	49	31.0	

Table 4: Mode of deliveries in two groups.

Mode of delivery	N	%	MSAF		Non-MSAF		OR	95% CI	P Value
			n	%	n	%			
Emergency LSCS	388	58.9	166	42.8	222	57.2	3.2	2.2, 4.6	0.00
Labour naturalis	271	41.1	51	18.8	220	81.2	1.0	Ref	

Emergency LSCS as a mode of delivery is seen in 166 (42.8%) cases of meconium stained liquor and in 222 (57.2%) cases of non- meconium stained liquor. Majority of MSAF 166 cases (76.49%) were delivered through

emergency LSCS and only 51 (23.50%) were born through labournaturalis. Whereas in the non-MSAF group the mode of delivery being emergency LSCS or labour naturalis are equal.

Table 5: Type of resuscitation required in MSAF babies.

Type of resuscitation	N	%	Type of meconium				P value
			Thin		Thick		
			n	%	n	%	
Routine	172	79.2	128	74.3	44	25.7	0.00
Tracheal toileting	21	9.7	8	38.1	13	61.9	
Tracheal toileting with BMV	23	10.6	5	21.7	18	78.3	
BTV	1	0.5	0	0.0	1	100.0	

Of the 217 cases of MSAF, majority i.e., 172 cases (79.2%) required routine initial steps of resuscitation. 23 required tracheal toileting with BMV, 21 required tracheal toileting alone. One case (0.5%) required bag and tube ventilation. Routine, initial steps of resuscitation alone required in 128 cases (74.3%) of thin meconium staining and 44 cases (25.7%) of thick meconium staining. Tracheal toileting needed in 13 (61.9%) cases of thick meconium stained liquor. BTV needed in 1 case (100%) of thick meconium staining. Tracheal toileting with BMV required in 18 cases (78.3%) of thick meconium liquor when compared to 5 cases (21.7%) of thin MSAF. P value is 0.00, which is statistically significant.

Table 6: Outcome of babies delivered through MSAF.

Outcome	N	%	Type of meconium				P value
			Thin		Thick		
			n	%	n	%	
Seizures	34	32.1	16	47.1	18	52.9	0.08
Meconium aspiration	5	4.7	1	20.0	4	80.0	
Air leak	5	4.7	2	40.0	3	60.0	
Death	10	9.4	2	20.0	8	80.0	
Normal	53	49.53	33	62.26	20	37.73	

The outcome of MSAF was normal in 53 cases (49.1%), seizures seen in 34 cases (32.1%), meconium aspiration in 5 cases (4.7%), Airleak in 5 cases (4.7%) and death in 10 cases (9.4%). Among seizure group, there were a higher proportion of babies born with thick meconium stained liquor.

Similarly, in other outcomes like meconium aspiration, air leak, and death, there were higher proportions of babies with thick meconium staining when compared to thin meconium staining. So, thick MSAF indicates a high-risk fetal condition. P value is 0.08 which is statistically insignificant.

DISCUSSION

In our study, with respect to the parity of mother the meconium-stained amniotic fluid had 146 (67.28%) cases of primigravidae when compared to multigravidae (15.20%) and second gravidae. Thus primiparity is associated to MSAF, which is similar to the study conducted by Gooding CA et al.[6] Majority of MSAF are delivered through emergency LSCS in the present study with 76.49% incidence.

This indicates that majority of MSAF is being delivered through a cesarean section which is similar to the study of Gupta V et al.[7] In the present study, the major indication for LSCS in MSAF group is fetal distress, which is reported in 75 cases (48.38%). This is higher when compared to the study of Holtzman BR et al, where the indication of LSCS for fetal distress was only 10.5%. There is no antenatal risk in 158 cases (74.17%) in meconium stained group. 42 cases (19.71%) had PIH as an antenatal risk and anemia in 13 cases (6.10%).[8] This is similar to the study of Krishnan L et al, where PIH was the main antepartum complication leading to meconium stained liquor. Other factors like hepatitis in mother, asthma, APH which were significant in their study was not so in the present study.[9]

Among 10 cases who presented with respiratory failure, 8 cases (80%) had thick meconium staining and only 2 (20%) with thin meconium. 18 cases (54.5%) of thick meconium required anticonvulsants along with O2, IVF and antibiotics. The need for mechanical ventilation also high in thick meconium group. Out of 10 cases which needed mechanical ventilation 8 (80%) are associated with thick meconium and only 2 (20%) with thin meconium. Seizures, MAS, air leaks are more observed in thick meconium group. Out of 10 death, 8 (80%) cases are with thick meconium. This morbidity with thick meconium is similar to the study of Narang Ar et al. Outcome of MSAF in the present study is seizure in 32.1% MAS in 4.7%, air leak in 4.7%, and death in 10% of cases. This is similar to the study of Narang A et al with seizures in 25.64%, air leak in 12.8% and death in 10.25% cases.[10]

CONCLUSION

The meconium-stained amniotic fluid becomes a significant factor when associated with factors like maternal PIH, anemia, oligohydramnios, IUGR babies, CTG showing FHR variability and placental calcifications. In these cases, MSAF is associated with morbidity and mortality; the majority of which are thick meconium suggesting that consistency of meconium had a direct bearing on the neonatal outcome.

Although the mode of delivery in MSAF does not prevent meconium aspiration, the majority of them are delivered through a cesarean section which is questionable.

ACKNOWLEDGEMENTS

Authors would like to thank the Pediatric Department Faculty, Sri Muthu Kumaran Medical College, Chennai.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Bochner CJ, Mcdcaris AL, Ross MJ. The role of antepartum testing in the management of post-term pregnancies with heavy meconium in early labor. Obstet Gynecol. 1987;69:903-7.
2. Carson BS, Losey RW, Boves WA. Combined obstetric and pediatric approach to prevent MAS. Am J Obstet Gynecol. 1976;126:712-4.
3. Carson BS, Losey RW, Bowes WA, Simmons MA. Combined obstetric and pediatric approach to prevent meconium aspiration syndrome. Am J Obstet Gynecol. l 976;126:712-5.
4. Cleary GM, Wiswell TE. Meconium-stained amniotic fluid and the meconium aspiration syndrome: An update. Pediatr Clin North Am. 1998;45:511-29.
5. Dye T, Aubry R, Gross S, Artal R. Amnioinfusion and the intrauterine prevention of meconium aspiration. Am J Obstet Gynecol. l994;171:1601-5.
6. Gooding CA, Gregory GA. An experimental model for the study of meconium aspiration of a newborn. Radiol. 1971;100:137-40.
7. Gupta V, Bhatia BD, Mishra OP. Meconium-stained amniotic fluid: antenatal, intrapartum and neonatal attributes. Indian Pediatr. 1996;33:293-7.
8. Holtzman BR, Banzhaf WC, Silver RK, Hageman RJ. Perinatal management of meconium-stained amniotic fluid. Clin Perinatol. 1989;16:825-38.
9. Krishnan L, Prabhakar NP, Bhaskaranand N. Routine cover for newborns intubated for aspiration of meconium: is it necessary? Ind Pediatr. 1995;32:529-31.
10. Narang A, Nair PM, Bhakoo ON, Vashishi K. Management of meconium-stained amniotic fluid: a team approach. India Pediatr. 1993;30:9-13.

Cite this article as: Raju V, Narayani DM, Vindyarani WK. Immediate clinical outcome of newborns with meconium stained amniotic fluid. Int J Contemp Pediatr 2018;5:1824-7.