

Fetal Outcome in Meconium Stained Liquor

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Abstract:

Introduction: Meconium stained liquor has been perceived as a sign of fetal distress. Varying grade of MSL may have adverse fetal outcome. Thus, aim of this study was to find the fetal outcome at varying grade of MSL.

Method: This was a descriptive observational study over 153 live, singleton, term pregnancy. MSL was categorised into three groups and fetal outcome was observed in terms of APGAR score at 5 minute, stay of neonates in NICU, and mortality or morbidity of the neonates.

Result: Percentage of neonates having APGAR score less than 4 increased respectively when thickness of MSL increased (10% in thin < 26% in moderate < 52% in thick). Percentage of neonates requiring no stay in NICU continuously decreased (94.7 % > 89.2% > 64.5%) with increasing thickness of the MSL. Neonatal mortality increased with increasing thickness of MSL but it was not significant (P-value=0.185).

Conclusion: Varying grade of MSL had different fetal outcome. Fetal outcome was worst when MSL was thick.

Keywords: Fetal distress, Fetal outcome, Meconium stained liquor.

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I. Introduction:

In 10% of the pregnancy, the fetus passes meconium into the amniotic fluid and in 5% of such pregnancies the meconium gets aspirated into the lungs. (1) Although the exact cause of meconium staining of liquor is unknown, meconium stained liquor (MSL) has been associated with the fetal distress. (2,3) However, Fenton and steer reported that if the fetal heart rate was greater than 110 beats/minute then the passage of meconium was insignificant. (3) But in the country like Nepal where many essential facilities like cardiotocography (CTG) is not available, taking decision about doing vaginal delivery or caesarean section becomes a challenge. (4)

In addition, several conflicts have been reported about the outcome of labours which have been made complicated by the varying grade of the MSL. (5-7) We hypothesize that when the thickness of the MSL increases, fetal outcome becomes poor. Therefore, aim of this research is to determine the fetal outcome when there is varying degree of MSL. This research will help in early decision making and help to reduce the need for neonatal resuscitation and to prevent neonate from complications.

II. Methods and Materials:

This is a descriptive observational study conducted at Bharatpur Hospital, Chitwan, Nepal from 10 January 2019 to 9 June 2019. Ethical approval was obtained from the Bharatpur Hospital Institutional Review Committee (Letter No. 075/076-07A). Study population consisted of all women who were found to be in labour and had meconium stained liquor (MSL) meeting inclusion criteria. Sample of the study were 153 women who had inclusion criteria such as term live pregnancy (>37 weeks), and singleton pregnancy with vertex presentation. Exclusion criteria in this study were eclampsia, antepartum haemorrhage, intrauterine death, congenital malformation, pre-existing maternal heart or lung diseases, pregnancies with IUGR babies, and presentation other than cephalic.

Previous studies have shown various type of classification of MSL. Some author categorised the MSL in two groups like thick and thin. (4) While other categorised as grade 1,2, and 3. (8) In this study, meconium staining of amniotic fluid was visually noticed during artificial or spontaneous rupture of membrane and it was categorized into three groups as thin, moderate, and thick based on the consistency and colour following one of the previous study. (9) Meconium stained liquor which was translucent and light yellow-green in colour was categorized as 'thin', opalescent with deep green and light yellow in colour as 'moderate' and opaque with deep green in colour as 'thick'.

We had hypothesized that greater the thickness of MSL, worse the foetal outcome. In this study, we determined foetal outcome on the basis of APGAR score, hospital stay in NICU after birth, and neonatal death

(NND) after birth. Higher APGAR score is desirable for better outcome. We found the APGAR score at five minute and categorised the score into three group viz; "less than four", "four to six", and "seven to ten". We also divided NICU stay in three group viz; "No stay", "two days to five days", and "greater than five days". About neonatal outcome was divided into two categories which are "neonatal death (NND)" and "Normal". Chi-square test was applied to see the significance value (p value < 0.005) and all the calculation done for the study was through SPSS.

III. Results:

We found that when thickness of MSL increased, percentage of neonates with good APGAR score decreased. Referring to table1, we found that percentage of neonates having APGAR score less than 4 increased respectively when thickness of MSL increased (10% in thin < 26% in moderate < 52% in thick). We also got the result in table 1 that only 10% of neonates had APGAR score less than four while 51% neonates had APGAR score more than 7 when MSL was thin. On the contrary, when MSL was thick we found only 19% neonates had APGAR score more than seven against 52% neonates who had APGAR score less than four.

Table1: Frequency distribution across APGAR score and MSL (n=153)

APGAR Score at 5 min	MSL						Total		p- value
	Thin		Moderate		Thick				
	N	%	N	%	N	%	N	%	
<4	6	10	17	26	16	52	39	26	0.001
4-6	22	39	23	35	9	29	54	35	
7-10	29	51	25	39	6	19	60	39	
Total	57	100	65	100	31	100	153	100	

About length of stay in NICU in Table2, we found that percentage of neonates requiring no stay in NICU continuously decreased (94.7 % > 89.2% > 64.5%) with increasing thickness of the MSL. Conversely, percentage of neonates having need to stay in NICU for more than five days also increased (1.8% in thin < 7.7% in moderate < 29% in thick) when thickness of MSL increased.

Table2: frequency distribution of stay in NICU across the MSL (n=153)

NICU stay in days	MSL						Total		P-value
	Thin		Moderate		Thick				
	N	%	N	%	N	%	N	%	
No stay	54	94.7	58	89.2	20	64.5	132	86.3	0.001
2-5	2	3.5	2	3.1	2	6.5	6	3.9	
>5	1	1.8	5	7.7	9	29	15	9.8	
Total	57	100	65	100	31	100	153	100	

Table3 shows mortality and morbidity of neonates after birth across varying MSL. We found that neonatal death (NND) increased from zero to 3.1% and then to 6.5% when MSL viscosity changed from thin to moderate then to thick. Although the percentage has shown increased incidence of neonatal death when thickness increased, it is not significant (p-value = 0.185) and cannot be associated.

Table3: Frequency distribution of neonatal outcome across MSL

Neonatal outcome	MSL						Total		P- value
	Thin		Moderate		Thick				
	N	%	N	%	N	%	N	%	
NND	0	0	2	3.1	2	6.5	4	2.6	0.185
Normal	57	100	63	96.9	29	93.5	149	97.4	
Total	57	100	65	100	31	100	153	100	

IV. Discussion:

It has been thought that meconium passes from the fetal gastrointestinal tract as a response to hypoxia, mesenteric vasoconstriction induced gut peristalsis, falling umbilical venous saturation, vagal stimulation and normal physiological function of mature fetus.(10) Labour should be monitored closely when it gets complicated by meconium because MSL has long been accepted as a sign of fetal distress. Meconium stained liquor occurs in 12-20% of labour although the cause is unknown.(11) Availability of facilities like CTG and fetal blood sampling may be supportive in reducing unnecessary intervention but requires additional expertise and generates discomfort to mother. (12)

Previous studies had categorised the MSL in various way. A study conducted in Nepal categorised the MSL in thick MSL and thin MSL.(4) Another study categorised as grade 1 MSL, grade 2 MSL, and grade 3 MSL with increasing consistency of the meconium in the liquor while there is a study categorising the MSL as "Thin", "Moderate", and "Thick" which is being followed in this study.(8,9)

In this study, we found that APGAR score was lower when thickness of MSL increased. We found that only 19% had APGAR score more than seven when MSL was thick and others had APGAR score more than seven only when MSL was thin or moderate. The result was similar with the study conducted by Gupta SN et.al who found almost 21% had APGAR score less than seven. (4) The result is also similar to the result found by Vaghela HP et.al. (9)

Regarding NICU stay, our study is similar to that of Vaghela HP et.al. They found that about 4% had to stay in NICU when MSL was thin, 13% when MSL moderate and 13% when MSL was thick.(9) likewise, we found that 5% did not have to stay when MSL was thin, almost 10% did not have to stay when MSL was moderately thick and about 35% did not have to stay when MSL was thick. This result is similar to those of Gupta SN et. Al and also with Ziadeh and Scott. (4,13,14)

In the present study total neonatal death among MSL was 2.6%. No neonatal death occurred in thin MSL. Among moderate MSL 3.1% had neonatal death and among thick MSL, it was 6.5%. The SPSS output yield a p-value of 0.185. Since this p-value is higher than 0.05, there is no significant relationship between Neonatal outcome and MSL. Even though the data is not significant statistically, it is higher with increasing grade of meconium. In a study conducted by Mundhara R et al the incidence of NND was 3.03% almost comparable to my study.(15) In a study conducted by Khatun MHA et.al neonatal mortality rate was 3.8%. (16)

Limitations:

This was a descriptive study which does not ensure the association. Therefore, further study with regression analysis should be done.

V. Conclusion:

Meconium stained liquor is descriptively associated with an adverse neonatal outcome. Increasing grade of MSL is associated with an increased adverse fetal outcome.

Reference:

- [1]. Ashfaq F, Shah AA. Effect of amnioinfusion for meconium stained amniotic fluid on perinatal outcome. JOURNAL-PAKISTAN MEDICAL ASSOCIATION. 2004 Jun 1;54(6):322-4.
- [2]. Aseri R, Mehta K, Bhati I. Study of Meconium Stained Liquor and Its Fetal Outcome in pregnant patient-retrospective study.
- [3]. Fenton AN, Steer CM. Fetal distress. American Journal of Obstetrics and Gynecology. 1962 Feb 1;83(3):354-62. [https://doi.org/10.1016/S0002-9378\(16\)35842-2](https://doi.org/10.1016/S0002-9378(16)35842-2)
- [4]. Kumar S, Gupta SN, Mahato IP, Giri R, Yadav A, Thakur A, Thapa K. Maternal and fetal outcome in term labour with meconium stained amniotic fluid. Health Renaissance. 2012 Dec 4;10(3):198-202. <https://doi.org/10.3126/hren.v10i3.7135>
- [5]. Low JA, Pancham SR, Worthington D, Boston RW. The incidence of fetal asphyxia in six hundred high-risk monitored pregnancies. American Journal of Obstetrics and Gynecology. 1975 Feb 15;121(4):456-9. [https://doi.org/10.1016/0002-9378\(75\)90074-5](https://doi.org/10.1016/0002-9378(75)90074-5)
- [6]. Meis PJ, Hall III M, Marshall JR, Hobel CJ. Meconium passage: a new classification for risk assessment during labor. American Journal of Obstetrics and Gynecology. 1978 Jul 1;131(5):509-13. [https://doi.org/10.1016/0002-9378\(78\)90111-4](https://doi.org/10.1016/0002-9378(78)90111-4)
- [7]. Abramovici H, Brandes JM, Fuchs K, Timor-Tritsch I. Meconium during delivery: a sign of compensated fetal distress. American journal of obstetrics and gynecology. 1974 Jan 15;118(2):251-5. [https://doi.org/10.1016/0002-9378\(74\)90556-0](https://doi.org/10.1016/0002-9378(74)90556-0)
- [8]. Priyadarshini M, Panicker S. Meconium stained liquor and its fetal outcome-retrospective study. IOSR-JDMS. 2013 Apr;6(2):27-31. <https://doi.org/10.9790/0853-0622731>
- [9]. Vaghela HP, Deliwala K, Shah P. Fetal outcome in deliveries with meconium stained liquor. Int J Reprod Contracept Obstet Gynecol. 2014 Dec 1;3(4):909-12. <https://doi.org/10.5455/2320-1770.ijrcog20141207>
- [10]. Schoeman LK. Meconium-stained amniotic fluid-what is the evidence?. In Obstetrics and Gynaecology Forum 2009 Oct 1 (Vol. 19, No. 4, pp. 135-138). In House Publications. <https://doi.org/10.4314/ogf.v19i4.48510>
- [11]. Cunningham FG. Abnormalities of the placenta, umbilical cord, and membranes. Williams obstetrics. 2010:577-87.
- [12]. Steer PJ, Eigbe F, Lissauer TJ, Beard RW. Interrelationships among abnormal cardiotocograms in labor, meconium staining of the amniotic fluid, arterial cord blood pH, and Apgar scores. Obstetrics and Gynecology. 1989 Nov 1;74(5):715-21. <https://doi.org/10.1097/00132582-199004000-00013>

- [13]. Ziadeh SM, Sunna E. Obstetric and perinatal outcome of pregnancies with term labour and meconium-stained amniotic fluid. *Archives of gynecology and obstetrics*. 2000 Sep;264:84-7. <https://doi.org/10.1007/s004040000088>
- [14]. Kumar S, Gupta SN, Mahato IP, Giri R, Yadav A, Thakur A, Thapa K. Maternal and fetal outcome in term labour with meconium stained amniotic fluid. *Health Renaissance*. 2012 Dec 4;10(3):198-202. <https://doi.org/10.3126/hren.v10i3.7135>
- [15]. Mundhra R, Agarwal M. Fetal outcome in meconium stained deliveries. *Journal of clinical and diagnostic research: JCDR*. 2013 Dec;7(12):2874. <https://doi.org/10.7860/JCDR/2013/6509.3781>
- [16]. Khatun MH, Arzu J, Haque E, Kamal MA, Al Mamun MA, Khan MF, Hoque MM. Fetal outcome in deliveries with meconium stained liquor. *Bangladesh Journal of child health*. 2009;33(2):41-5. <https://doi.org/10.3329/bjch.v33i2.5675>

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