IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 24, Issue 9 Ser. 5 (September. 2025), PP 40-43
www.iosrjournals.org

Correlation Between Meconium Stained Liquor And Umbilical Cord Blood Base Deficit

Iflah Akbar, Ruqiya Rashid, Nazima Ashraf, Saima Wani, Imran Mansoor Shah
Department Of Obstetrics And Gynecology SKIMS Srinagar, [2]Medical Officer Health And Medical Education Jammu & Kashmir, India

Abstract
Introduction*: Fetal heart rate monitoring during labor and delivery is important to assess the fetal wellbeing and to predict the outcome. Intrapartum fetal monitoring is done to identify the early signs of fetal hypoxia. The two most common methods of monitoring fetal heart rate are cardiotocography (CTG) and intermittent auscultation. The cut-off of low umbilical cord blood base deficit is ≥12.0 mmol/L. Fetal oxygenation is dependent upon maternal oxygenation and placental perfusion.*
Material and Methods*: After taking informed consent all patients were subjected to history, general physical examination, abdominal and vaginal examination, followed by ultrasonography. Fetal heart monitoring was done by intermittent auscultation and CTG. Patients showing the features of fetal distress during monitoring were posted for emergency LSCS. Immediately following delivery blood collection was performed from isolated segment of umbilical cord and subjected to blood gas analysis.*
Results and Analysis*: A total of 240 patients were enrolled in the study aged between 20 to 40 years. Majority of patients i.e. 104 (43.3%) belonged to the age group of 26-30 years. Majority of women were primigravidae (72.5%). Cord blood analysis showed that base deficit of <12.0mmol/l was present in 189 (78.8%) with a mean base deficit of 9.21±4.07 (7-25). Base deficit >12.0 was seen in babies born to 95.5% mothers with thick meconium. All the 14 (100%) babies born to mothers with base deficit of >12.0 needed hospitalization with ventilator support.*
Conclusion: *Babies born to mothers with thick meconium have base deficit of >12(mmol/L) and are associated with more hospital admissions and need of ventilator support.*
Keywords: *Meconium stained liquor, base deficit, fetal distress*

Date of Submission: 15-09-2025 Date of Acceptance: 25-09-2025

I. Introduction

Fetal distress is defined as progressive fetal hypoxia and/or acidemia secondary to inadequate fetal oxygenation[1]. Fetal heart rate monitoring during labor and delivery is important to assess the fetal wellbeing and to predict the outcome. Intrapartum fetal monitoring is done to identify the early signs of fetal hypoxia. The two most common methods of monitoring fetal heart rate are cardiotocography (CTG) and intermittent auscultation. The cut-off of low umbilical cord blood base deficit is ≥12.0 mmol/L[2]. Fetal oxygenation is dependent upon maternal oxygenation and placental perfusion. The fetus experiences three stages of deterioration when oxygen levels are depleted: transient hypoxia without metabolic acidosis, tissue hypoxia with a risk of metabolic acidosis, and hypoxia with metabolic acidosis[3,4]. Maternal and fetal acid base balance is important to assess the adequacy of fetal oxygenation and fetal well- being in utero. It is important to recognize neonatal acidemia as these neonates are at risk of unfavourable outcome after delivery[5]. Prolonged fetal hypoxia is associated with significant perinatal morbidity and mortality with particular concern for short- and long-term complications including encephalopathy, seizures, cerebral palsy, and neuro developmental delay[6,7].

II. Material And Methods

This observational study was conducted in Dept. of Obstetrics and Gynaecology SKIMS Soura over a period of 2 years. Sample size of the study was selected as per Fishers formula and it was 240.

Inclusion criteria
1. Patient giving informed consent.
2. Patients undergoing emergency LSCS with the indication as fetal distress.
3. Gestational age of 37 weeks

4. singleton pregnancy with cephalic presentation and longitudinal lie.

Exclusion criteria
1. LSCS done for other than fetal distress as indications.
2. Gestational weeks less than 37 weeks
3. Mal-presentations
4. Multiple gestations
5. All high risks pregnancy (anemia, hypertension, thyroid disorders, diabetes epilepsy, asthma)
6. Elective LSCS

After fulfilling the selection criteria and taking informed consent all patients were subjected to history, general physical examination, abdominal and vaginal examination, followed by ultrasonography. Fetal heart monitoring was done by intermittent auscultation and CTG. Patients showing the features of fetal distress during monitoring were posted for emergency LSCS. Immediately following delivery blood collection was performed from isolated segment of umbilical cord and subjected to blood gas analysis.

Statistical Methods

The recorded data was compiled and entered in a spreadsheet (Microsoft Excel) and then exported to data editor of SPSS Version 20.0 (SPSS Inc., Chicago, Illinois, USA). Continuous variables were expressed as Mean±SD and categorical variables were summarized as frequencies and percentages. Graphically the data was presented by bar and pie diagrams. Chi-square test was employed for assessing correlation of non-reassuring CTG with umbilical cord arterial blood pH and base deficit. A P-value of less than 0.05 was considered statistically significant.

III. Results And Analysis

Table 1 Age distribution

Age in years	Number	%age
20–25	38	15.8
26–30	104	43.3
31–35	88	36.6
36–40	10	4.1
Total	240	100

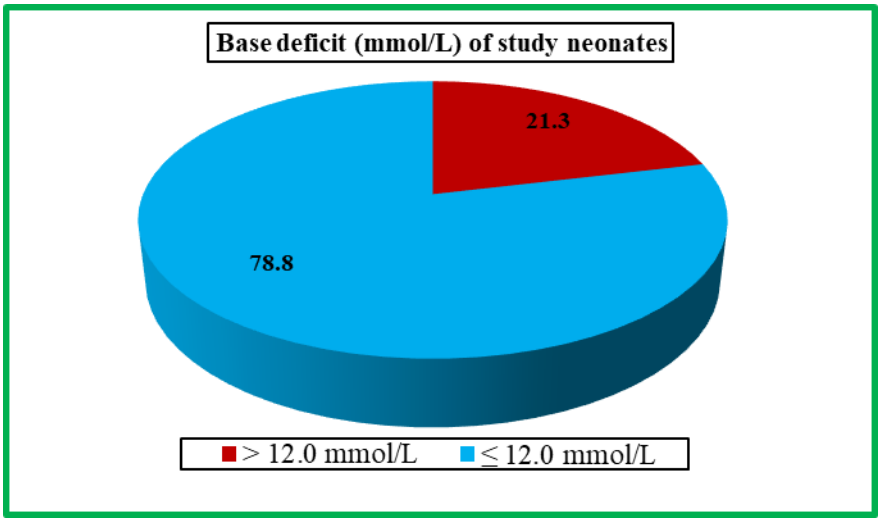
Table 2: Parity distribution of study patients

Parity	Number	%age
Primi	188	78.3
Multi	52	21.6
Total	240	100

Table 3: Distribution as per Color of liquor

Color of liquor	No.	%age
Thick meconium(deep green)	164	68.3
Thin meconium(yellow)	60	25
Clear	16	6.7
Total	240	100

Table 3 shows that majority i.e. 164(68.3%) had thick meconium (deep green), 60 (25%) patients had thin meconium (yellow) stained liquor and 16 (6.7%) had clear liquor.



Mean ± SD (Range) = 9.21 ± 4.07 (7-25)

Above pie diagram shows cord blood analysis with base deficit of <12.0mmol/l in 189 (78.8%) with a mean base deficit of 9.21±4.07 (7-25).

Table 4: Correlation of color of liquor with base deficit (mmol/L) among study neonates

Color of liquor	Base Deficit > 12.0		Base Deficit ≤ 12.0		P-value
	No.	%age	No.	%age	
Thick meconium (deep green)	21	95.5	1	4.5	<0.001*
Thin meconium (yellow)	18	32.7	37	67.3	
Clear	12	7.4	151	92.6	
Total	51	21.3	189	78.8	

*Statistically Significant (P-value <0.05)

Table 4 shows base deficit >12.0 was seen in babies born to 95.5% mothers with thick meconium (deep green) followed by 32.7% mothers with thin meconium (yellow) and 7.4% mothers with clear color. Base deficit <12.0 was observed in babies born to 92.6% mothers with clear liquor, 67.3% mothers with thin meconium(yellow) and 4.5% mothers with thick meconium (deep green). The correlation was found to be statistically significant with p value of < 0.001.

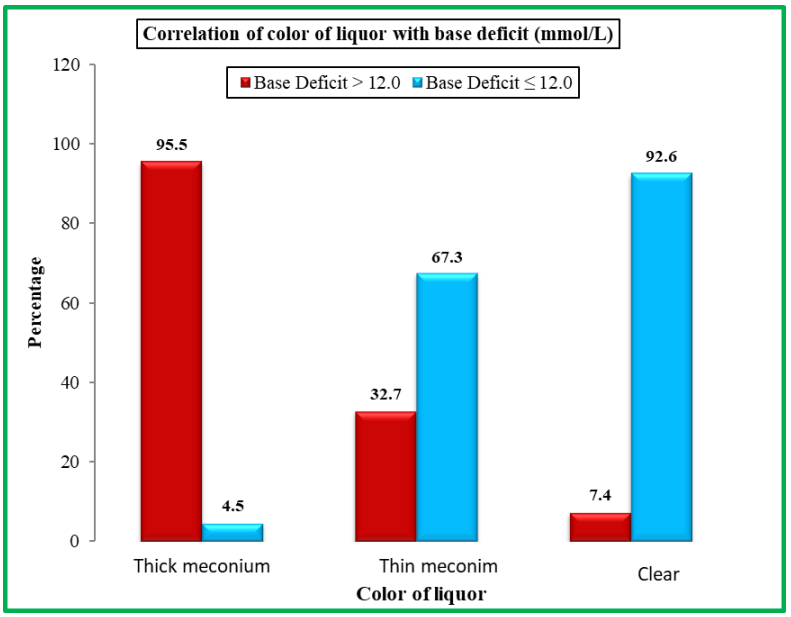


Table 5: Correlation of perinatal outcome with base deficit (mmol/L)					
Perinataloutcome	**Base Deficit > 12.0**		**Base Deficit ≤ 12.0**		**P-value**
	No.	**%age**	**No.**	**%age**	
Not hospitalized	102	61.8	63	38.2	
Hospitalized without need of ventilator	59	96.7	2	3.3	
Hospitalized withneed of ventilator	14	100.0	0	0.0	
Total	175	72.9	65	27.1	<0.001*

***Statistically Significant (P-value <0.05)**

Table 5 shows correlation of perinatal outcome with base deficit (mmol/L). 102 (61.8%) babies born to mothers with base deficit of >12.0 do not required hospital admission compared to 63 (38.2%) babies born to mothers with base deficit of <12.0. Hospitalization without the need of ventilator was required by 59 (96.7%) babies with mothers base deficit of >12.0 compared to only 2 (3.3%) babies with mothers base deficit of <12.0. All the 14 (100%) babies born to mothers with base deficit of >12.0 needed hospitalization with ventilator support. The difference observed was statistically significant with a p value of <0.001.

IV. Discussion

A total of 240 patients were enrolled in the study aged between 20 to 40 years. Majority of patients i.e. 104 (43.3%) belonged to the age group of 26-30 years followed by 88 (36.6%) patients who were between 31-35 years of age. 38 (15.8%) patients were aged between 20-25 years while 10 (4.1%) patients were 36-40 years of age. Majority of women were primigravidae (72.5%) and 27.5% multigravidae in the present study. Our results are consistent with the findings of Kumar N et al**.** (2016)[8] where 70% (n=21) women were primigravida, 26.67% (n=8) were gravida 2 and 3.34% (n=1) were gravida 3. In the present study, majority i.e. 164(68.3%) had thick meconium(deep green), 60(25%) patients had thin meconium(yellow) stained liquor and 16 (6.7%) had clear liquor. The study conducted by Ramapraba S (2018)[9] showed that 61 had clear liquor, 20 patients had a grade I meconium stained liquor, 10 patients had a grade Il Meconium stained liquor, 9 had a Grade III meconium stained liquor of 100 patients. Cord blood analysis showed that base deficit of <12.0mmol/l was present in 189 (78.8%) with a mean base deficit of 9.21±4.07 (7-25). Present study showed that base deficit >12.0 was seen in babies born to 95.5% mothers with thick meconium (deep green) followed by 32.7% mothers with thin meconium(yellow) and 7.4% mothers with clear color. Base deficit <12.0 was observed in babies born to 92.6% mothers with clear liquor, 67.3% mothers with thin meconium(yellow) and 4.5% mothers with thick meconium(deep green). The correlation was found to be statistically significant with p value of < 0.001.102 (61.8%) babies born to mothers with base deficit of >12.0 do not required hospital admission compared to 63 (38.2%) babies born to mothers with base deficit of <12.0. Hospitalization without the need of ventilator was required by 59 (96.7%) babies with mothers base deficit of >12.0 compared to only 2 (3.3%) babies with mothers base deficit of <12.0. All the 14 (100%) babies born to mothers with base deficit of >12.0 needed hospitalization with ventilator support. The difference observed was statistically significant with a p value of <0.001.

V. Conclusion

From this study we concluded that babies born to mothers with thick meconium have base deficit of >12(mmol/L) and are associated with more hospital admissions and need of ventilator support.

References

[1]. Parer JT, Livingston EG. What Is Fetal Distress? Am J Obstet Gynecol 1990;162:1421–5, Discussion 5–7.
[2]. Kumar N, Suman A, Sawant K. Relationship Between Immediate Postpartum Umbilical Cord Blood Ph And Fetal Distress. Int J Contemp Pediatr 2016;3(1):113–19.
[3]. Martin Jr CB. Normal Fetal Physiology And Behavior, And Adaptive Responses With Hypoxemia. Sem Perinatol 2008;32:239–42.
[4]. Murray M. Antepartal And Intrapartal Fetal Monitoring. 3rd Ed. New York: Springer Publishing Company, LLC; 2007.
[5]. Ferreira CS, Melo A, Fachada AH. Umblical Cord Blood Gas Analysis, Obstetric Performance And Perinatal Outcome. Rev Bras Ginecol Obstet 2018; 40(12): 740-48.
[6]. Executive Summary: Neonatal Encephalopathy And Neurologic Outcome, Second Edition, Report Of The American College Of Obstetricians And Gynecologists' Task Force On Neonatal Encephalopathy. Obstet Gynecol 2014;123: 896–901.
[7]. Hankins GD, Speerm. Defining The Pathogenesis And Pathophysiology Of Neonatal Encephalopathy And Cerebral Palsy. Obstet Gynecol 2003;102:628–36.
[8]. Kumar N, Suman A, Sawant K. Relationship Between Immediate Postpartum Umbilical Cord Blood Ph And Fetal Distress. Int J Contemp Pediatr 2016;3:113-9.
[9]. Ramapraba S. Correlation Of Non-Reassuring Fetal Heart Rate Pattern With Cord Blood Ph And Its Perinatal Outcome. ASMS 2018; 2(3): 49–52.