



MECONIUM IN AMNIOTIC FLUID, POSTNATAL CORD BLOOD PH, APGAR AND NEONATAL OUTCOME, DO THEY INTERRELATE LINEAR-A PROSPECTIVE ANALYSIS.

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ABSTRACT

Meconium in amniotic fluid, low Apgar and low pH of cord blood all have been described as alarming signs of risk to baby wellbeing. **Design:** The study was designed to find interrelations between these risk factors if any. 200 term and near term mothers were included in the study of two groups randomly. Group I with clear liquor and Group II with meconium stained liquor. The presence of risk factors like Apgar, FHR, cord blood pH and neonatal outcome were studied and recorded. **Result:** No definite interrelation could be established between meconium and Apgar, meconium and pH, Apgar and pH. **Conclusion:** We concluded that the risk factors when present in combination were alarming signs of increased neonatal morbidity and mortality.

KEYWORDS

Meconium, Apgar, acidemia

INTRODUCTION

Meconium in amniotic fluid during labor is an alarm to probable postnatal adverse outcome. Meconium staining has been described as a normal physiological event to an ominous sign of fetal hypoxemia, acidemia and probable poor neonatal outcome. Meconium initiates chain of reactions leading to early vaginal or more probable lower segment caesarean section (LSCS) delivery and may probably enhance perinatal morbidity and mortality. Tracing history meconium passage was designated as a sign of impending fetal complications and enhanced morbidity (1). However meconium and fetal distress were stated to have linear relation but later modern studies conclusively stated that meconium without fetal hypoxemia is not a sign of fetal distress. Apgar score (2) originally devised as a rapid and reproducible method of evaluation of neonate at birth and was widely accepted as a marker of perinatal asphyxia lost favors and is not very relevant. Neonatal asphyxia due to failure of gas exchange because of lung or placental insufficiency is determined by umbilical artery blood gases showing a rise in PaCO₂ or fall in PaO₂ precipitating a fall in blood pH (3). This is gold standard for asphyxia with interplay of markers meconium, fetal heart irregularities and APGAR score. As asphyxia implies hypoxia leading to acidosis (4,5). So presence of acidemia at birth provide appropriate tool to evaluate significance of meconium. We decided to measure the acid base of neonates at birth (6) from pregnancies with clear or meconium stained liquor to derive interrelation if any between meconium and APGAR with clinical outcome of neonate at birth and after.

Group I 100 pregnancies with clear liquor
Group II 100 pregnancies presenting with meconium stained liquor

Study was approved by scientific and ethical committees of the institutes. Term and near term cases irrespective of delivery mode were randomly selected. Meconium timing whether in first stage or second stage or during LSCS or when meconium followed birth of baby, was not a factor and all were included. There was no precise timing of rupture of membranes. Meconium stain was categorized as light (light yellow color), moderate (green colored) and thick (green with flakes pea soup). Fetal heart rate and rhythm was continuously monitored. Apgar was determined at 1 and 5 minutes post birth. Umbilical artery and vein blood was collected in heparinized syringe immediately at birth after cord clamp. Events of intrapartum asphyxia presenting as neonatal seizures, hypotonia, and end organ dysfunction and meconium aspiration syndrome were recorded.

Observations

Age range in two groups was 18-35 and mean age of mothers in Group I was 26.14 (4.07) years and 24.64 (3.44) in group II. 44% cases in Group I were booked cases and rest 56% were unbooked and in Group II figures were 38% booked and 62% unbooked. Number of primi (G1) first gravida were 34% in Group I and 48% in Group II. Similarly number of nullipara patients was 42% in Group I and 52% in Group II. 84 % patients in Group I and 74% in Group II had gestational age between 38-40 weeks and mean gestational age was 39.086 (1.172) in Group I and 39.316 (1.5) in Group II.

46% mothers in Group I had vaginal delivery and 54% had to undergo LSCS. In Group II 52% delivered vaginally and 48% by caesarean. Average birth weight of babies in Group I was 2894.5 (341.47) grams vs. 2838.7 (431.127) in Group II. 14 % mothers to be had light meconium, 34% had moderate and rest 52% showed thick meconium. Apgar at 1 minute in Group I babies was 6.82 (0.68) and 6.08 (0.07) in Group II. At 5 minutes Apgar improved to 8.9 (0.3) in Group I and 8.2 (0.6) in Group II.

18% and 30% babies in Group I and II had cord blood pH < 7.2 exhibiting acidemia and 10 babies revealed pH < 7 indicating severe acidosis. Rest 82% in Group I and 70 % in Group II had pH > 7.2. All neonates of Group I were discharged from NICU after 24 hours time and no further morbidity or mortality was reported at 7 days after birth. However 18 babies from Group II were admitted in NICU, 8 of these neonates were ventilated and 4 died in immediate postnatal period. 50% babies who passed thick meconium, 30% in moderate and 14% in light meconium had Apgar 6 or less at 1 minute. At 5 minutes Apgar was assessed 6 or less in 6 neonates and all had passed thick meconium at delivery. A definite correlation was observed between Apgar and meconium though not a linear one. 31% neonates of thick meconium category had cord blood pH < 7.2 while 29% and 28% born with moderate and light meconium had similar pH assessed and thus no correlation could be established between type of meconium and pH value. Table 1

Apgar Sign	2	1	0
Appearance (Skin Color)	Normal color all over (hands and feet are pink)	Normal color (but hands and feet are bluish)	Bluish-gray or pale all over
Pulse (Heart rate)	Normal (above 100 beats per minute)	Below 100 beats per minute	Absent (no pulse)
Grimace (Reflex irritability)	Pulls away, sneezes, coughs, or cries with stimulation	Facial movement only (grimace) with stimulation	Absent (no response to stimulation)
Activity (Muscle tone)	Active, spontaneous movement	Arms and legs flexed with little movement	No movement, "floppy" tone
Respiration (Breathing)	Normal rate and effort, good cry	Slow or irregular breathing, weak cry	Absent (no breathing)

APGAR Score System

Design

The study was taken up at SBIMS, Raipur and JLN Hospital & RC Bhilai during February 2021 to April 2022. Term and near term pregnancies determined by Naegle's rule were included and divided in two groups.

Table 1: Showing Various Observations Recorded In Two Groups.

	MECONIUM			DELIVERY		APGAR		Acidemia pH		
	Light	Moderate	Thick	Vaginal	LSCS	1 minute	5 minutes	> 7.2	< 7.2	< 7
GROUP I				58	42	6.82(0.68)	8.98(0.21)	82	18	0
GROUP II	14	34	52	36	64	6.01(0.07)	8.01(1.89)	70	20	10
						Mean (SD)				

Mode of delivery vaginal or LSCS did not affect incidence of acidemia. Acidosis observed was majorly mixed with sporadic metabolic or respiratory.

DISCUSSION

Traditionally in midwifery care noticing meconium and assessing Apgar were commonly used to predict neonatal outcome. Fetal heart rate was the major parameter. With improved quality of fetal monitoring and advent of electronic fetal heart monitors, tococardiography, fetal scalp pH monitoring and fetal cord blood acid base analysis all have helped to substantiate objectively the diagnosis of fetal wellbeing and possibly predict neonatal outcome. One would imagine if meconium was the sign of antecedent fetal hypoxemia then newborn would exhibit metabolic acidosis at birth. But infrequent manifestation of acidemia in cord blood suggests meconium seldom signifies antecedent asphyxia. Clearly meconium alone is not adequate marker of neonatal hypoxemia. In same stead definite correlation between meconium, Apgar at 1 and 5 minutes and umbilical cord pH could not be established. Drawing inference from study isolated finding of fetal heart irregularities, meconium, low Apgar or acidosis do not predict neonatal outcome comprehensively. But when they coexist risk of poor fetal outcome increases manifold. To conclude meconium at birth correlates poorly with Apgar at 1 minute though meconium babies have greater tendency to record low Apgar scores, acidemia does not always accompany meconium though it is more in babies with meconium. Low Apgar score does not always predict acidemia. However meconium, low Apgar, low pH in combination do indicate stormy neonatal outcome and enhanced morbidity and mortality.

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