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RESEARCH ARTICLE

PERINATAL OUTCOMES ASSOCIATED WITH MECONIUM STAINED NON VIGOROIUS BABIES IN A TERTIARY CENTRE OF UTTARAKHAND (INDIA)

Sumit Jeena[1]*, Amit Singh[2], Ajay Arya[3]

[1]P.G Jr. III[rd] year, Department of Pediatrics, Government medical college & Hospital, Haldwani, Distt- Nainital (Uttarakhand) India

[2]Assistant Professor, Department of Pediatrics, Government medical college & Hospital, Haldwani, Distt- Nainital (Uttarakhand) India

[3]Professor and Head, Department of Pediatrics, Government medical college & Hospital, Haldwani, Distt- Nainital (Uttarakhand) India

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ABSTRACT

We examined the perinatal outcomes in singleton pregnancies associated with meconium-stained amniotic fluid (MSAF) in non vigorous neonates.The study was performed during one year (2012-2013) in new borns admitted at our tertiary referral centre, department of pediatrics Dr. Sushila Tiwari government hospital (Government medical college & hospital) Haldwani distt- nainital (Uttarakhand) India . Mothers in labour were studied when meconium was found at the time of rupture of membranes or clear amniotic fluid turned meconium stained during course of labour. Number of cases were 75 and number of controls were 100. The incidence of non vigorous MSAF newborns was 4.9%. The incidence of intrauterine fetal death, low Apgar score, low umbilical artery pH and need of NICU admission at delivery in cases with MSAF were significantly higher than those without MSAF. Incidences of early neonatal death were higher in study group (18.66%) as compared to control group (2%). Obstetric management should be affected by meconium in the amniotic fluid.

INTRODUCTION:

Meconium' is the thick, dark green, sticky,tar like substance passed as the baby's first bowel motion after birth. At times this can be passed before the baby is born, discolouring the waters.

Meconium stained liquor is usually associated with a response from the baby to having a temporarily reduced oxygen supply at some point of time (usually during labour) or a slowly reducing level of oxygen over a period of time. MSL as fetal distress is a lowering of the heart rate. One sign of possibility of baby being unwell or distressed when inside the uterus the other sign linked to what is referred to as Fetal Distress is a lowering of heart rate.

1. Because their digestive system has reached maturity and the bowel has begun working. This is the most common reason and 30-40% post term babies will have passed meconium in uterus.
2. Fetal distress resulting in hypoxia. However the exact relationship between fetal distress and MSL is uncertain. The theory is that intestinal ischaemia relaxes the anal sphincter and increases GIT peristalsis-passage of meconium. However fetal distress can be present without meconium and meconium can be present without fetal distress.
3.Fetal distress resulting in hypoxia however the exact relationship between fetal distress and MSL is uncertain. The theory is that intestinal ischemia relaxes the anal sphincter and increase GIT peristalsis=passage of meconium, however fetal distress can be be present without meconium and meconium can be present without fetal distress

Meconium stained amniotic fluid (MSAF), which occurs in about 10-15% of all pregnancies [1], is common in term births and especially in post-dated deliveries. The etiology and pathophysiology of MSAF is poorly understood [2]. While the more advanced maturation process of the gastrointestinal tract may account for the higher rates of MSAF in post-dated deliveries, it is generally believed that the presence of MSAF in other circumstances is a marker of fetal distress and may be associated with adverse fetal and neonatal outcome. [3][4]
A relationship of MSAF with stillborn infants, abnormal fetal heart-rate (FHR) tracings, neonatal encephalopathy, respiratory distress (meconium aspiration syndrome, MAS) and abnormal neurologic outcome is reported in

*Corresponding author: Sumit Jeena |

the literature [5]. The finding of MSAF is associated with multiple markers of fetal distress, as meconium-stained infants have in general lower scalp pH and lower umbilical cord artery pH in comparison with infants born through clear amniotic fluid [6][7]. Additionally, infants born through MSAF have lower Apgar scores in the first and fifth minute after delivery [8] [9]. However, in the vast majority of cases, no major problems occur in infants born through MSAF.

MATERIAL AND METHODS:

This is a prospective study.It was performed during one year (2012-2013) on new borns of Susheela Tiwari Government Hospital (1520 newborns). Preterm babies with congenital anomalies, Preterm labour (<37 weeks) and Intrauterine fetal death were the exclusion criteria. Mothers in labour were studied when meconium was found at the time of rupture of membranes or clear amniotic fluid turned meconium stained during course of labour. Number of cases were 75 and number of control were 100.

The character-istics of perinatal outcomes such as IUFD, neonatal Ap-gar score at 1 and 5 minutes and umbilical artery pH were observed. Cases and controls were compared by x2 test for cate-gorical variables. Differences with P < 0.05 were considered significant.

RESULTS:

TABLE 1: INCIDENCE OF MECONIUM STAINED NON VIGOROUS CASES

NO. OF DELIVERIES DURING PERIOD OF STUDY	NO. OF MECONIUM STAINED NON VIGOROUS CASES	% OF MECONIUM STAINED NON VIGOROUS CASES
1520	75	4.9%

Table 2: FREQUENCY OF NON VIGOROUS BABY BORN THROUGH THIN AND THICK AMNIOTIC FLUID

Amniotic Fluid	No. of cases	Percentage
Clear AF	1445	95.06%
Thin meconium study group	51	3.3%
Thick meconium study group	24	1.5%
Total	1520	100

Table 3: CORELATION OF GESTATIONAL AGE IN MECONIUM STAINED CASES AND CONTROL GROUP

Gestational age group in weeks	Meconium stained group			Control group		
	No. of cases	Percentage	Mean gestational age in weeks	No. of cases	Percentage	Mean gestational age in weeks
37 – 38 weeks	14	18.66	39.6 weeks	18	18	38.9 weeks
39 – 40 weeks	31	41.33		74	74	
41 – 42 weeks	30	40		8	8	

In this table (3) it is shown that in study group maximum number of cases were reported in gestational age 39 - 40 weeks and mean gestational age was 39.6 weeks .Similarly maximum number of control were also reported in 39 – 40 weeks and mean gestaional age was 38.9 weeks in control group.Mean gestional age of study group was more in study group than control group.

Table 4: SHOWS APGAR SCORE AT 1 MIN IN STUDY GROUP AND CONTROL GROUP

		APGAR at 1 minute					
		≤ 3		4 - 7		>7	
		No.	%	No.	%	No.	%
STUDY GROUP	Thin meconium(n= 51)	8	15.68	25	49.02	18	35.29
	Thick meconium(n=24)	7	29.16	12	50	5	20.83
CONTROL GROUP(n=100)		2	2	20	20	78	78

P value 0.021

This table (4) shows that incidence of severe birth asphyxia was reported to be 15.68% and moderate birth asphyxia was 49.02% in thin meconium stained group whereas in thick meconium severe birth asphyxia was 29.16% and moderate birth asphyxia was 50% reported by APGAR score at 1 minute.

Table 5: SHOWS APGAR SCORE AT 5 MIN IN STUDY GROUP AND CONTROL GROUP

		APGAR at 5 minute					
		≤ 3		4 – 7		>7	
		No.	%	No.	%	No.	%
STUDY GROUP	Thin meconium(n=51)	3	5.88	10	19.60	38	74.51
	Thick meconium(n=24)	4	16.66	6	25	14	58.33
CONTROL GROUP(n=100)		0	0	5	5	95	95

P value 0.034

This table (5) shows that incidence of severe birth asphyxia was reported to be 5.88% and moderate birth asphyxia was 19.6% in thin meconium stained group whereas in thick meconium severe birth asphyxia was 12.5% and moderate birth asphyxia was 20.83% reported by APGAR score at 5 minute.

Table 6: SHOWS DIFFERENT CAUSES OF NEONATAL MORBIDITY IN STUDY GROUP AND CONTROL GROUP

Causes	Study group				Control group		p value
	Thin meconium (n=51)		Thick meconium (n=24)				
	No.	%	No.	%	No.	%	
Hypoxic Ischemic Encephalopathy	12	23.52	8	33.33	0	0	<.001
Meconium Aspiration Syndrome	11	21.56	7	29.16	0	0	<.001
Physiological Jaundice	15	29.41	12	50	10	10	.017
Blood culture positive sepsis	9	17.64	7	29.16	4	4	. 011
Convulsions	12	23.52	8	33.33	2	2	<.001
Pneumonia	9	17.64	6	25	6	6	. 120
Pneumothorax	-	-	2	8.33	0	0	.123
Meningitis	3	5.88	2	8.33	2	2	.121
Hydrocephalous	3	5.88	2	8.33	0	0	.011
Abnormal neurological examination at discharge	8	15.68	4	16.66	2	2	.013

This table (6) shows that morbidity pattern of study group was high as compared to control group

Table 7: FREQUENCY OF NICU CARE NEEDED BY STUDY GROUP AND CONTROL GROUP

NICU STAY IN DAYS	Study group				Control group	
	Thin meconium (n=51)		Thick meconium (n=24)			
	No.	%	No.	%	No.	%
1 – 7 days	30	58.82	5	20.83	7	7
7 – 14	15	29.41	12	50	4	4
>14	6	11.76	7	29.16	2	2
Mean NICU stay	8 ± 1.2 days		11 ± 1.1 days		4 ± .1 days	

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This table (7) shows that in thin stained study group most of the babies (58.82%) needed 1 – 7 days NICU care whereas in thick stained study group most of the babies (50%) needed 7 – 14 days NICU care.

Table 8: SHOWS INCIDENCE OF NEONATAL MORTALITY IN STUDY GROUP AND CONTROL GROUP

	Total	Still birth		Early neonatal death	
		No.	%	No.	%
Meconium stained AF	75	4	5.33	14	18.66
Control group	100	0	0	2	2

Incidence of early neonatal death were higher in study group (18.66%) as compared to control group (2%) and incidence of still birth was 5.33% in study group while in control it was 3%.

Table 9: COMPARISON OF ABG PARAMETERS AT DAY 1 IN STUDY GROUP

	Mean Arterial pH	Mean Pco2	Mean standard HCO3
Thin meconium	7.27 ± .10	43 ± 1.2	18.3 ± 1.5
Thick meconium	7.13 ± .18	46 ± .9	16 ± 1.1
p value	0.001	.001	.004

Table (10) METABOLIC COMPLICATIONS IN MECONIUM STAINED CASE GROUP AND CONTROL GROUP

		Symtomatic Hypoglycemia		Symptomatic Hypocalcemia	
		No.	%	No.	%
Study group	Thin meconium(n=51)	4	7.84	14	27.4
	Thick meconium(n=24)	3	12.5	7	29.16
Control group(n=100)		5	5	3	3

This table (10) shows that incidence of metabolic seizures were higher in study group as compared to control group. It also shows that incidence of hypocalcemic seizures were higher than hypoglcemic seizures in study group.

DISCUSSION:

MSAF has been implicated as a major factor influencing fetal well being. Presence of meconium in AF was considered to be of great concern to mid wives and Obstetricians of old age. Passage of meconium was once thought to be a sure sign of fetal death in utero (Schultz 1925) but later was realized to be a sign of fetal hypoxia not actually fetal death (James Walker 1959). Even modern Obstetricians are fully aware that meconium in AF during labour calls for close vigilance of fetal well being during labour.

INCIDENCE OF MSAF STUDIED BY DIFFERENT AUTHORS:

Authors	Incidence
Goud &Krishna (1989)(11)	9.8%
Arun (1991)(12)	14%
Hari Bhaskar (1997)(13)	11.2%
Nirmala et al(14)	7.89%
Rev Sauda et al(15)	11.9%
Present study (2012 – 2013)	4.9%

Total numbers of deliveries during study period were 1520, of which 75 were meconium stained non vigorous newborns which constituted 4.9% of total deliveries during the period

In study group 3.3% had thin meconium whereas 1.5% had thick meconium. This lower incidence in present study is because only non vigorous newborns born through MSAF were taken into consideration whereas in other studies all newborns born through MSAF were taken.

Incidence of Birth Asphyxia in different studies:

Authors	Incidence of birth asphyxia	
	Study group	Control group
Desmond(16)	21.8%	-
Miller(17)	46%	15.8%
Meis(18)	33.1%	12.8%
Priyadarshini V et al(19)	14.28%	-
Present study	26.66%	0%

Majority of the authors have concluded that incidence of birth asphyxia was higher in MSAF newborns

Incidence of severe birth asphyxia was reported to be 15.68% and moderate birth asphyxia was 49.02% in thin meconium stained group whereas in thick meconium severe birth asphyxia was 29.16% and moderate birth asphyxia was 50% reported by APGAR score at 1 minute

Incidence of severe birth asphyxia was reported to be 5.88% and moderate birth asphyxia was 19.6% in thin meconium stained group whereas in thick meconium severe birth asphyxia was 12.5% and moderate birth asphyxia was 20.83% reported by APGAR score at 5 minute

Meconium Aspiration Syndrome Studies:

Studies	MAS
Priyadarshini V et al(19)	40%
Khazardoost et al(20)	21.1%
Espinheira MC et al(21)	5%
Present study	24%

Incidence of Meconium Aspiration Syndrome:

Studies	Incidence of MAS	
	Thin meconium	Thick meconium
Narli N et al(22)	15.1%	38.5%
Present study	21.56%	29.16%

Thick Meconium cases had higher incidence (29.16%) of Meconium Aspiration Syndrome

Ventilatory Support Studies:

Studies	Incidence
Priyadarshini V. et al(20)	48.57%
Espinheira MC et al(21)	43.1%
Present study	17.33%

Studies	Comparison of need of ventilator	
	Thin meconium	Thick meconium
Priyadarshini V et al(20)	14.2%	34.28%
Present study	15.68%	20.83%

Ventilatory support was significantly higher in case MSAF group as compared to control and in comparison of thin versus thick MSAF cases, the need for ventilatory support was higher in thick meconium stained cases.

NICU Admission Studies:

Studies	Duration of Hospitalization (mean NICU) (days)	
	Thin meconium	Thick meconium
Narli N et al(22)	8.4	11.2
Priyadarshini V et al(20)	5.6	8.4
Present study	9.2	14.1

Duration of mean NICU days was higher in thick meconium stained group than thin meconium stained group and the mean duration was higher than other study groups probably because it was a study of only non vigorous newborns.

Neonatal Morbidity Studies:

Studies	Percent distribution
Arun et al(12)	6.85%
Debdas(23)	10%
Present study	18.66%

Neonatal Mortality Studies:

Studies	Mortality
Arun(12)	3.7%
Debdas(23)	6%
Usha 2004(24)	6%
Present study	18.66%

In conclusion, obstetric management should be affected by meconium in the amniotic fluid in various gestational ages at delivery. Therefore, management re-quires awareness of this potential risk, appropriate in-trapartum care and a combined obstetric-neonatal ap-proach in cases with MSAF

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