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Research Article

A study of meconium stained amniotic fluid, its significance and early maternal and neonatal outcome

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ABSTRACT

Background: Fetal well-being has traditionally been evaluated on the basis of fetal activity fetal heart and presence of meconium in liquor amnii in vertex presentation. The significance of meconium claimed to vary between its entirely being physiological to a sign of fetal distress. Passage of meconium is considered physiological exhibiting sign of fetal maturity on one hand & a sign of fetal distress and response to hypoxic insult on the other hand.
Methods: The present study is a case-control study of meconium stained amniotic fluid, its significance and early maternal and neonatal outcome and was carried out in the department of Obstetrics & Gynecology, Dhiraj General Hospital, Pipariya during April 2011 to March 2012.
Results: The incidence of passage of meconium was relatively higher in patients with pregnancy induced hypertension (20%) and pregnancy beyond 40 weeks (14.66%). Amongst the cases 28.66% patients had an abnormal fetal heart pattern and 12% had a variable fetal heart pattern whereas in controls the values were 8% and 3.33% respectively. The total number of patients with meconium aspiration was 18% whereas those with meconium aspiration syndrome were 6%.
Conclusions: Meconium passage still remains an enigma to the obstetrician. However, as shown in the study, thick meconium or thin are indicative of fetal distress. If modern management is based on the understanding of underlying pathophysiology of meconium passage than the harmful effect of meconium can certainly be lessened.

Keywords: Meconium, Fetal distress, Amniotic fluid

INTRODUCTION

Fetal well-being has traditionally been evaluated on the basis of fetal activity fetal heart and presence of meconium in liquor amnii in vertex presentation.

The significance of meconium claimed to vary between its entirely being physiological to a sign of fetal distress. Passage of meconium is considered physiological exhibiting sign of fetal maturity on one hand & a sign of fetal distress and response to hypoxic insult on the other hand. Clear amniotic fluid on the other hand is considered reassuring. Amniotomy in labour is also commonly performed to detect meconium where fetal heart rate is unsatisfactory. If meconium stained amniotic fluid (MSAF) is found, then continuous fetal heart rate monitoring (Cardiotocography CTG) is required for fetal well being.[3-5]

In recent years there is a dramatic fall in the rates of stillbirths and neonatal deaths due to improvement in antenatal and intra natal care in cases of passage of meconium.

Walker stated that when meconium is passed, the oxygen saturation in umbilical vein is at or below 30%.[2] It has been proposed by Eastman that anoxia weakens the action of rectal sphincters leading to passage of meconium.

Meconium Aspiration Syndrome (MAS) is a common problem encountered during delivery. The presence of meconium stained amniotic fluid (MSAF) is a serious sign of fetal compromise, which is associated with an increase in perinatal morbidity. MSAF was noted in approximately 12% of all deliveries. Meconium aspiration syndrome (MAS) was noted in 5% of these infants and more than 4% of MAS infants died accounting for 2% of all perinatal deaths.[1] Fortunately, only 5% of neonates born through MSAF develop MAS.[2]

MAS is more frequently seen in post term pregnancy or in growth restricted fetuses. An increased incidence of meconium passage into the amniotic cavity is also noted in the presence of feto-maternal stress factors such as hypoxia and infection, independent of fetal maturation.[6] Factors such as placental insufficiency, maternal hypertension, pre-eclampsia, oligohydramnios or maternal drug abuse (tobacco or cocaine) also result in, in-utero passage of meconium.[7]

The present study will help in modification of obstetric decisions (like early induction of labour after 37 weeks gestation, caesarean or instrumental deliveries) in the light of the results, and also generalizing the modified procedures in various organizations or elsewhere.

METHODS

Aims of the study

1. To observe the obstetric outcome in clinical cases of meconium stained amniotic fluid.
2. To observe the effect of thin and thick meconium, early and late meconium on obstetric and neonatal outcome
3. To know the association of maternal and fetal factors and passage of meconium and to assess the importance of the same as predictor of neonatal outcome.

Protocol and study period

After clearance from departmental committee and ethics committee the work was started. Time Scale: 1 ½ year.

The present study is a case-control study of meconium stained amniotic fluid, its significance and early maternal and neonatal outcome was carried out in the department of Obstetrics & Gynecology, Dhiraj General Hospital, Pipariya during April 2011 to March 2012.

During the specified study period, 150 cases of meconium stained amniotic fluid were enrolled in the study at random keeping following selection criteria:

1. Full Term Live Pregnancy
2. Singleton Pregnancy
3. Vertex Presentation
4. Meconium staining of amniotic fluid is detected after rupture of membranes.

Selection criteria for control cases:

1. Full term live pregnancy
2. Singleton pregnancy
3. Vertex presentation
4. Clear liquor amnii

Primigravida case- Primigravida control

Multigravida case- gravidity of control may be plus or minus 1

All the information regarding cases and controls were noted in systemic way in the proforma

The follow-up observation for cases and control were made as under

1. At the time of discharge of mother and baby (7^{th} day).
2. 1 month after the discharge.
3. 3 months after discharge

Chi-square test was used for statistical analysis of the data.

RESULTS

Table 1: Analysis according to high risk conditions.

		Case	%	Control	%
Anaemia	Moderate	41	65.08	63	67.02
	Severe	19	31.66	31	32.98
	Total	60	42.00	94	62.67
PIH	Mild	21	70.00	13	76.47
	Severe	9	30.00	4	23.53
	Total	30	20.00	17	11.33

Eclampsia	3	2	2	1.33
Pregnancy >40 weeks	22	14.66	11	7.33
Prom	6	4	4	2.66
Oligohydramnios	9	6	6	4
IUGR	7	4.66	5	3.33
PREV CS	10	6.66	9	6
Abruptio placenta	3	2	2	1.33

In this study it was noted that the incidence of passage of meconium was relatively higher in patients with pregnancy induced hypertension (20%) and pregnancy beyond 40 weeks (14.66%).

Table 2: Distribution of cases according to fetal heart rate pattern.

Fetal heart pattern	Case	%	Control	%
Normal baseline FHR	89	59.33	133	88.66
Outside normal baseline FHR	43	28.66	12	8
Variable FHR	18	12	5	3.33
(Chi-square value = 33.541, p-value < 0.0001 and d.f. = 2)				

In this table, it was noted that amongst the cases 28.66% patients had an abnormal fetal heart pattern and 12% had a variable fetal heart pattern whereas in controls the values were 8% and 3.33% respectively. This is highly significant suggesting that patients with meconium stained liquor definitely have an abnormal fetal heart rate pattern.

Table 3: Character of meconium in relation with fetal heart rate pattern.

Thin		Thick	
Alone	With abnormal FHR pattern	Alone	With abnormal FHR pattern
72(48%)	9(6%)	17(11.33%)	52(34.66%)

Here it was observed that 34.66% patients with thick meconium had an abnormal FHR pattern whereas only 6% of patients with thin meconium had an abnormal FHR pattern.

Table 4: Analysis according to mode of delivery.

Mode of delivery	MSAF		Control	
	No	%	No	%
Find	47	31.33	86	57.33
LSCS	84	56	52	34.66
Vacuum	5	3.33	3	2.00
Forceps	14	9.33	9	6.00
Total	150	100.0	150	100.0
(Chi-square value = 20.552, p-value = 0.0001 and d.f. = 3)				

Table 5: Incidence of meconium aspiration.

Total no. of MSAF	Total no. of meconium aspiration	Percentage (%)
150	27	18

Table 6: Incidence of Meconium Aspiration Syndrome (MAS).

Total no. of MSAF	Total no. of MAS	Percentage (%)
150	27	18

In this study the total number of patients with meconium aspiration was 18% whereas those with meconium aspiration syndrome was 6 %

Table 7: Distribution of cases according to morbidity and mortality.

Neonatal morbidity	Case	Percentage (%), n=150	Control	Percentage (%), n=150
O_2 supplementation	27	18.00	16	10.67
Endotracheal intubation	13	8.67	15	10.00
Ventilator support	6	4.00	4	2.67
Antibiotics	16	10.67	21	14.00
Neonatal death	17	11.33	10	6.67
Inotropes	6	4.00	2	1.33
Screen positive	10	6.67	3	2.00
Culture positive	14	9.33	10	6.67

DISCUSSION

Most of the centers in our country lack facilities for electronic fetal heart rate monitoring and fetal scalp blood studies. Under such circumstances only clinical evaluation of cases with meconium stained amniotic fluid in necessary. It is therefore necessary to re-examine the importance of clinical methods and apply them to judge the fetal hypoxia and prevent its long-term sequel.

Till such time that better strategies for management of meconium stained neonates are outlined by further studies, the best course would be careful intrapartum fetal heart rate monitoring and other measures to prevent fetal asphyxia.

Immediate airway management, need for suction and intubation should be guided by the state of the newborn, rather than the presence of meconium. Although the direct and indirect effects remain uncertain, meconium stained amniotic fluid is consistently identified as a predictor of maternal and perinatal complications.[1]

Meconium passage still remains an enigma to the obstetrician. However, as shown in the study, thick meconium or thin are indicative of fetal distress. If modern management is based on the understanding of underlying pathophysiology of meconium passage then the harmful effect of meconium can certainly be lessened.

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