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Meconium Stained Amniotic Fluid, its Significance and Obstetric Outcome

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Abstract

MSAF is more common in primi gravidas as compared to multi gravidas. Postdatism, PIH, Eclampsia, IUGR, Oligohydromnios, PROM are main associating factors with occurrence of MSAF. ANC has limited role in preventing MSAF. Incident of abnormal fetal heart rate is 4 times and of variable heart rate is 5 times higher in MSAF group from control group. Most of the cases with abnormal heart rate pattern exhibit thick meconium and show significant association of fetal distress with character of meconium. Aggressive active management is required depending upon the character of meconium, heart rate pattern, stage of labour, expected time taken in delivery facility of neonatal care in place of delivery. Amnioinfusion is simple, safe and inexpensive procedure with almost nil complications though it does not decrease rate of cesarean section to statistically significant extent.

Key words: Fetal distress, meconium, meconium aspiration syndrome, amnioinfusion

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Introduction

Foetal well-being has traditionally been evaluated on the basis of foetal activity, foetal heart rate 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 considered physiological exhibiting sign of foetal maturity on one hand & a sign of fetal distress a response to hypoxic insult on the other hand.

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 [1]. 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.

In cases of meconium stained amniotic fluid (MASF) women should be carefully monitored during pregnancy. During labour fetal heart rate should be monitored. If meconium is thick with abnormal fetal heart rate and women are in first stage of labour, obstetricians prefer to perform lower section caesarion section (LSCS), and amnion-fusion is given during the intervening period [2-4]. This technique effectively treats repetitive variable fetal heart rate decelerations while relieving umbilical cords compression in labour. The passage of meconium in the absence of any changes in the foetal heart rate is clearly not a sign of foetal distress

Aims of this study were; 1. to observe the effect of thin and thick meconium, early and late meconium on obstetric outcome, 2. to know the association of maternal and factors and passage of meconium and to assess the importance of the same as predictor of obstetric outcome.

Material and Methods

A prospective study was conducted over period of 1 year from July 2008 to June 2009. Cases of meconium stained amniotic fluid during labour were taken at random basis having following selection criteria; Full Term Live Pregnancy, Singleton Pregnancy, Vertex Presentation, MSAF after rupture of membrane. Selection criteria for control cases are; Full Term Live Pregnancy, Singleton Pregnancy, Vertex Presentation, Clear Liquor Amni.

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

Amnioinfusion was performed through transcervical approach for women in labor because it does not require ultrasound guidance and the catheter can be used for repeated fluid instillation. After rupture of the fetal membranes, an intrauterine pressure catheter is inserted and attached to intravenous extension tubing [5]. Lactated Ringers solution without dextrose into the amniotic cavity was infused [6] as bolus (50 to 1000 mL) infusion followed by a constant infusion.

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 (7th day).

2. 1 month after the discharge.

3. 3 months after discharge

The meconium staining of the amniotic fluid was divided in thin and thick meconium by visual examination after spontaneous or artificial rupture of membranes.Thin meconium stained liquor is translucent, light yellow green in colour, Thick meconium is opaque and deep green in color.

The fetal heart rate was strictly monitored by continuous electronic fetal monitoring.

Results

Table 1 shows gravidity wise distribution of cases were 168 cases (62%) were primi gravida. 54 cases (19.9%) were second gravida, 33 cases (12.2%) were third gravida, 16 cases (5.9%) had gravidity >4. Total duration of labour in primi gravida is more so there is increased risk of foetal intrauterine hypoxia with resultant passage of meconium (Reed C. B.-1918). Moreover conditions like PIH, Eclampsia, Abnormal uterine contraction are more common in primi gravidas.

Table 1. Parity

	No. of Cases	**%**
G1	168	62.0
G2	54	19.9
G3	33	12.2
≥ G	16	5.9
Total	**271**	**100.0**

Table 2 shows that the exact reason of passage of meconium in the liquor is poorly understood. It could reflect the state of compensated fetal distress as it is suggested by few babies who are actually acidotic during labour [7]. Acute or chronic fetal hypoxia can result in the passage of meconium in utero [8]. Toxaemia in serious forms and even more hypertension because of placental lesion which they induce give rise to reduction in the surface of feto-maternal field of exchange.

Less amount of liquor may cause cord compression resulting in compromised utero placental circulation and subsequent fetal hypoxia and passage of meconium. Also the incidence of meconium passage during labour increases with gestational age 30% at 40 weeks, 50% at42 weeks [9]. after term pregnancy progressively less and less oxygen is supplied by placenta to the foetus through the umbilical vein, it seemed to be proven that placental insufficiency was the most important factor contributing to perinatal mortality.

The MSAF and its association are still very important determinants of perinatal morbidity and mortality and a successful management of such pregnancies is only possible after better understanding pathophysiology of meconium passage [10]. Presence of meconium below vocal cord is known as meconium aspiration and occurs in 20-30% of all infants with MSAF with around 12% mortality [11].

Table 2. High Risk Conditions

		Case	%	Control	%
Anaemia	Moderate	60	22.14	63	23.24
	Severe	39	14.39	45	16.61
	Total	99	36.53	108	39.85
PIH	Mild	47	17.34	22	8.11
	Severe	15	5.53	7	2.58
	Total	62	22.87	29	10.69
Eclampsia	Antepartum	6	2.2	2	0.7
	Intrapartum	0	0	0	0
	Total	6	2.2	2	0.7
Pregnancy >40 weeks		42	15.49	14	5.16
PROM		11	4.05	8	2.95
Oligohydromnio		17	6.27	10	3.69
IUGR		14	5.16	7	2.58
Previous 1 LSCS		18	6.6	12	4.42
Abruptio Placenta		7	2.5	4	1.47

Table 3 exhibits normal FHR in 179 cases (66.05%) v/s 249 (91.88%) controls. Above table shows outside normal range in 92 (33.94%) cases v/s 22 (8.11%) controls. 230 cases shows regular rhythm v/s 263 controls. Comparing with control group and neglecting associating factors incidence of abnormal rate is around four times higher in case group and incidence of variable heart rateis around five times higher in case group. Chi square test is applied. P value is found to be significant (P<0.001) supporting the above result.

Table 3. Distribution of Cases according to Fetal Heart Rate Pattern

Fetal Heart Rate Pattern	Case	%	Control	%
Normal Baseline FHR (110 - 160 b/m)	179	66.05	249	91.88
Outside Normal Baseline FHR (Tachycardia or Bradycardia)	92	33.94	22	8.11
Variable FHR Pattern	41	15.12	8	2.95
Chi square= 75.05, DF= 2, P=0.0000 (P<0.001)				

Table 4 shows that out of 271 MSAF cases 148 were asociated with thin meconium and 123 were with thick meconium. 90 and 7 deliveries occurred normally in respective groups showing significant difference. P value was found to be significant (P<0.001) after applying chi square test.

These figures show that passage of thick meconium needs urgent intervention depending upon the stage of labour. Mothers with thick meconium group should not be taken for normal vaginal delivery until it seems that time required in anticipated delivery is less then time required for preparation of LSCS.

Table 4. Mode of Delivery

Type of meconium	FTND	Operative and instrumental delivery	Total
Thin	90	58	148
Thick	7	116	123
Total	97	174	271
Chi square= 88.8, DF=1, P=0.00 (P<0.001)			

In the Table 5, 3-4 cm dilatation maximum number of cases delivered by cesarean section i.e. 17 (80.95%), as opposed to 30 (75%) cases who delivered by normal vaginal delivery at >6 cm dilatation meaning that amnioinfusion may help to prevent cesarean section at cervical dilatation >6 cm to some extent. Above table also shows that amnioinfusion seems to improve cervical dilatation and effacement and thus increased chance of vaginal delivery and also reduces the interval from detection of meconium to delivery [12,13].

Table 5. Mode of Delivery and its Relation with Different Cervical Dilatation at which Amnioinfusion is Performed

Dilatation	Total	FTND	%	LSCS	%	Instrumental	%
3-4 cm	21	03	14.28	17	80.95	01	4.76
5-6 cm	52	26	50.00	15	28.84	11	21.15
> 6 cm	40	30	75.00	04	10.00	06	15.00

Conclusions

1. MSAF is more common in primi gravidas due to prolonged and difficult labour as compared to multi gravidas.
2. Also PIH, Eclampsia, Post datism which are some of the predisposing factors for passage of meconium are more commonly associated with primi gravidas.
3. Postdatism, PIH, Eclampsia, IUGR, Oligohydromnios, PROM are main associating factors with occurrence of MSAF.
4. Incident of abnormal fetal heart rate is 4 times and of variable heart rate is 5 times higher in MSAF group from control group.
5. Most of the cases with abnormal heart rate pattern exhibit thick meconium and show significant association of fetal distress with character of meconium.
6. Aggressive active management is required depending upon the character of meconium, heart rate pattern, stage of labour, expected time taken in delivery facility of neonatal care in place of delivery. Almost double number of LSCS are performed in MSAF group showing need of active intervention.
7. The increased rate of emergency Caesarean Section, Instrumental VaginalDelivery for fetal distress, meconium aspiration syndrome and neuro developmental handicaps are possible problems with MSAF [14].
8. Amnioinfusion is simple, safe and inexpensive procedure with almost nil complications though it does not decrease rate of cesarean section to statistically significant extent but it does decrease adverse effect of MSAF over baby by diluting amniotic fluid and also probably by reducing the time interval from detection of MSAF to delivery.

References

1. Naveen S, Kumar SV, Ritu S, Kushia P. Predictors of meconium stained amniotic fluid: a possible strategy to reduce neonatal morbidity and mortality. J Obstet Gynecol India. 2006;56(6):514-7.
2. Rathor AM1, Singh R, Ramji S, Tripathi R. Randomized trial of amnioinfusion during labor with meconium stained amniotic fluid. BJOG. 2002;109(1):17-20.
3. Das V, Shrivastava S, Preetikumar et al. Amnioinfusion during labor complicated by meconium. J Obstet Gynecol India. 2001;51:105-7.
4. Sahu IM. Intrapartum amnio-infusion for meconium stained amniotic fluid. J Obstet Gynecol India. 2003;53:345-7.
5. Abdel-Aleem H, Amin AF, Shokry M, Radwan RA. Therapeutic amnioinfusion for intrapartum fetal distress using a pediatric feeding tube. Int J Gynaecol Obstet. 2005;90(2):94-8.
6. Shields LE, Moore TR, Brace RA. Fetal electrolyte and acid-base responses to amnioinfusion: lactated Ringer's versus normal saline in the ovine fetus. J Soc Gynecol Investig. 1995;2(4):602-8.

7. Abramovici H, Brandes JM, Fuchs K, Timor-Tritsch I. Meconium during delivery a sign of compensated fetal distress. Am J Obstet Gynecol. 197415;118(2):251-5.

8. Stark AR, Jane SL. Meconium aspiration, Manual of Neonatal Care, 2003;5:402-3.

9. Steer PJ, Daniethian P. Foetal distress in labour. In: James DK, Steer PJ, Weiner CP, Gonaik B, eds, High risk pregnancy: management options. 3rd edition. Philadelpia: Elsevier Inc. 2006;1450-72.

10. Simsek A, Celen S, Islimye M, Danisman N, Buyukkagnici U. A long-standing incomprehensible matter of obstetrics: meconium-stained amniotic fluid, a new approach to reason. Arch Gynecol Obstet. 2008;278(6):559-63.

11. Khatun AH, Jahanara A, Haque E, Kamal M, Al Mamun MA, Khan MFH, Hoque M. Fetal outcome in deliveries with meconium stained liquor. Bangladesh J Child Health. 2009;33(2):41-45.

12. Patil Kamal P, Swamy MK, Samatha K. A one year cross sectional study of management practices of MSAF & perinatal outcome. J Obstet Gynecol India. 2006;56(2):128-30.

13. Wenstrom KD, Parsons MT. The prevention of meconium aspiration in labor using amnioinfusion. Obstet Gynecol. 1989;73(4):647-51.

14. Maymon E, Chaim W, Furman B, Ghezzi F, Shoham Vardi I, Mazor M. Meconium stained amniotic fluid in very low risk pregnancies at term gestation. Eur J Obstet Gynecol Reprod Biol. 1998;80(2):169-73.