MECONIUM STAINING OF AMNIOTIC FLUID IN LOW RISK PARTURIENTS

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SUMMARY

Meconium stained amniotic fluid has been considered to be a high risk factor, associated with a poor perinatal outcome. Some authors feel that meconium passage in utero is a sign of fetal distress, while others feel that it is a physiological event. Therefore a prospective study was undertaken to determine whether thick meconium stained liquor detected during labor in low risk parturients is associated with fetal distress. Fifty low risk parturients with thick meconium detected during labor, 50 with thin meconium and 50 with clear liquor were included in the study. Outcomes studied were fetal heart rate abnormalities, interventions for fetal distress and neonafal outcome assessed by morbidity, mortality, apgar scores and duration of nursery stay. Analysis of results showed that significantly more women with thick meconium stained liquor in labor were found to have fetal distress as diagnosed by fetal heart rate abnormalities and had some instrumental or operative intervention to cut short labor. However there was no significant difference in neonatal morbidity, apgar scores and nursery stay. We therefore suggest continuous electronic monitoring of all low risk gravidae with thick meconium stained amniotic fluid in labor. If fetal distress is diagnosed, early operative intervention will help to reduce the risk of meconium aspiration.

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INTRODUCTION

Meconium detected in the amniotic fluid has been considered by some to be a high risk factor (Hobel, 1971, Meis et al, 1982)

and to be associated with a poor perinatal outcome (Meis et al 1982, Starks 1980).

Passage of meconium in utero has been ascribed by various authors to differing mechanisms. On the one hand are those who postulate that a hypoxic insult to the fetus results in either fetal gut vasoconstriction and hyperperistalsis or vagal stimulation and is therefore a sign of fetal distress (Starks 1980). At the other end of the spectrum are authors like Fenton & Steer (1982) and Katz & Bawes (1992) who feel that meconium passage is a normal physiological event in a term fetus and is not a sign of fetal distress in the absence of fetal heart rate abnormalities. Whatever the cause of meconium passage, any asphyxial event in a fetus with meconium stained amniotic fluid might result in gasping in utero, aspiration of meconium and its complications.

Possible etiology of meconium aspiration (Miller et al 1975) Spontaneous + Reflex Hypoxic bowel stimulation

MECONIUM PASSAGE

No asphyxia	Asphyxia
Normal Breathing movements	Gasping in labor
(Glottis closed)	(Glottis open)
No aspiration	Aspiration

Since all fetuses with meconium passage in labor do not have an adverse outcome, it is important to distinguish those who are destined to develop fetal distress promptly, and intervene accordingly to prevent meconium aspiration syndrome.

As found by some authors, a large proportion of women with meconium stained amniotic fluid have some other high risk factor simultaneously i.e. preeclampsia, diabetes or postmaturity (Starks 1980, Miller et al, 1975, Miller & Read, 1981). This study is an effort to ascetain whether meconium staining of liquor per se, with no other high risk factors, predisposes to fetal distress in labor.

PATIENTS STUDIED AND METHODS

The study was conducted in Christian Medical College, Vellore from June to November 1992. Three groups of patients were chosen. Group A consisted to 50 women in labor with no antenatal risk factors and thick (Grade II or III) meconium stained liquor at spontaneous or artificial rupture of membranes. Group B consisted of 50 women with thin (Grade I) meconium stained amniotic fluid and Group C consisted of 50 age and parity matched controls with clear liquor. Grading of meconium staining of liquor was as suggested by O' Driscoll & Meagher (1986). Steer et al (1989) reported that the prevalence of abnormal fetal heart rates was nearly 50% in the meconium stained liquor group. It was assumed that the abnormal fetal heart rate patterns in the control group would be 25% less. Keeping alpha and beta errors as 5% and 20% respectively the sample size needed in each arm was calculated to be 50. Thick meconium stained amniotic fluid was considered an indication for external or internal continuous fetal heart rate monitoring. A few patients were not monitored either because of imminent delivery or unavailability of monitors. Patient with clear or Grade I meconium stained liquor were not monitored continuously unless an abnormal fetal heart rate was detected by intermittent auscultation.

Fetal distress was diagnosed in the presence of fetal heart rate abnormalities requiring intervention and if labor had to be cut short either by instrumentation or by caesarean section. Scalp pH analysis was not performed due to lack of its availability in this hospital. Fetal heart rate abnormalities included poor variability, tachycardia, bradycardia, variable, late or prolonged decelerations or combinations therof. Neonatal 1 and 5 minutes apgar scores, morbidity, mortality and duration of nursery stay were noted and all these criteria were submitted to a statistical analysis using chi square test.

RESULTS

There was no statistically significant difference between the three groups in terms of maternal age, parity and gestational age (Table I). Similar numbers of patients in each group were in early labor or in active phase.

Thirty six patients in Group A, 7 in Group B and 4 in Group C were monitored continuously in labor with the electronic fetal heart monitor.

Table I
DISTRIBUTION OF AGE, PARITY AND GESTATIONAL AGE

Group	No. of patients	Mean age	Mean Gest. age	Parity 0	Parity >1
A	50	23.65	39.50	24	26
B	50	24.22	39.74	19	31
C	50	23.70	39.92	23	27

Table II
ABNORMAL FETAL HEART RATE PATTERNS AND INTERVENTION FOR FETAL DISTRESS

Group	Abnormal FHR pattern in labor	Intervention for fetal distress
A (n=50)	27	23
B (n=50)	2	3
C (n=50)	$p < 0.001$	$P < 0.001$

Fetal distress, diagnosed clinically or by fetal heart rate abnormalities on the electronic monitor trace was significantly more common in Group A viz 27 as compared to 2 and 4 in Groups B and C ($P < 0.001$). Intervention to cut short labor in the form of forceps, vacuum extraction or caesarean section with an indication of fetal distress was significantly more common in Group A viz 23 as compared to 3 and 2 in Groups B and C ($P < 0.001$) (Table II). Caesarean section for fetal distress was performed in 14 patients in Group A and none in Groups B and C.

Six infants in Group A had low 1 minute Apgar scores of less than or equal to 6 as opposed to 1 in group B and 1 in Group C, a possible cause being vigorous suctioning and intubation to remove the meconium. However there was no significant difference in the 5 minute apgar scores (Table III).

There were 2 perinatal deaths, one each from Groups A and C, a result which was not satistically significant. None of the infants in Groups B and C required nursery stay longer than 24 hours while three in Group A did. Neonatal morbidity was clinically, though not statistically, different in the 3 groups. In Group A one infant expired due to meconium aspiration syndrome, 4 received antibiotics for presumed sepsis or respitatory distress. As a contrast, only 2 infants each in Groups B and C required antibiotics for presumed sepsis.

Table III
ONE AND FIVE MINUTE APGAR SCORE

Group	1 minute		5 minute	
	Apgar < 6	> 6	Apgar < 6	> 6
A	6	44	1	49
B	1	49	0	50
C	1	49	1	49
	p = 0.01		p = 0.3	

DISCUSSION

The significance of the presence of meconium in amniotic fluid is debated. Some authors (Hobel, 1971; Starks, 1980; Dooley et al, 1985) have found that meconium, especially with fetal heart abnormalities was associated with increased perinatal mortality and morbidity. On the other hand Yeomans et al (1989) and Abramovici et al (1974) have found no correlation between presence of meconium and perinatal outcome.

According to Meis et al (1982), in labors

complicated by of meconium, fetal heart rate accelerations even in the presence of decelerations is a good prognostic sign. In their absence, frequency of resuscitation and low apgar scores were higher. Other authors have found low cord pH values and 1 and 5 minute apgar scores in those patients with meconium stained liquor as compared to those with clear liquor. Most of these complications were noted in studies in which the sample of patients included those with varying antenatal risk factors such as preeclampsia, gestational diabetes and post term pregnancies (Starks, 1980; Miller et al, 1975; Miller & Read, 1981).

It is ambiguous whether a poor perinatal outcome is due to aspiration of meconium at birth or intrauterine aspiration (Katz & Bames 1992). But a combination of meconium in amniotic fluid and fetal heart rate abnormality indicates a fetus at risk for meconium aspiration. A rational protocol to follow is electronic fetal monitoring for all fetuses when thick meconium is found in labor even if the parturient has no other antenatal risk factors. There is no need to electronically monitor those gravidas with Grade I liquor as the fetal outcome is similar to those with clear liquor. Early intervention is advised in the presence of fetal heart rate abnormalities such as poor variability, tachycardia, bradycardia or decelerations and immediate laryngoscopy and endotracheal suctioning of the neonate should be performed (Carson et al 1976).

In this study, on a low risk group of parturients, those in whom there was thick meconium stained liquor had a significantly greater number of interventions to cut short labor for fetal distress as compared to those in whom the liquor was clear or thinly meconium stained. Patients at term with no antenatal risk factor and thick meconium detected in labor should be regarded as a high risk group. Fetal distress once diagnosed, labor should be cut short with a view to preventing intrauterine aspiration of meconium which in turn will minimize the incidence of meconium aspiration syndrome.

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