

OBSTETRIC OUTCOME OF MECONIUM STAINED LIQUOR IN LABOUR

SYNOPSIS

Over a five month period from May to Sept '82, 3712 consecutive cases admitted to the University unit labour ward at Kandang Kerbau Hospital, Singapore were studied for the presence of meconium at the onset of labour and its obstetric outcome. 319 had meconium stained liquor giving an incidence of 8.6%. The fetal and neonatal outcome was compared with that of a control group of 380 patients with clear liquor but complicated by risk factors such as Intrauterine growth retardation, hypertensive disease of pregnancy, diabetes etc. Monitoring plan included continuous fetal heart rate monitoring, scalp pH determinations when necessary and optimal care at delivery.

Abnormalities of the fetal heart rate tracing were more common in the meconium stained groups compared to clear liquor group. Thick meconium stained liquor was associated with a higher emergency caesarean section rate, low Apgar score at 1 minute and more admissions of the newborn to the special care baby unit. The incidence of abdominal delivery and neonatal morbidity were similar in high risk labours with clear liquor and those with light or moderate meconium stained liquor. Out of 306 monitored cases presenting with meconium stained liquor, low Apgar score at 5 minutes was recorded in 6 cases and none had meconium aspiration.

It is concluded that all patients with meconium stained liquor, particularly with thick meconium, should be continuously monitored in labour. With good monitoring facilities and management of these patients intrapartum asphyxia and meconium aspiration can be avoided.

INTRODUCTION

The significance of meconium stained amniotic fluid as a sign of fetal distress remains controversial as the knowledge of underlying mechanisms is still incomplete. Several different hypotheses have been provided through the years. Classical concept of passage of meconium as a response of the fetus to hypoxia, acute or chronic, associated with poor fetal outcome is debatable. Saling (1) postulated that a mature infant exposed to hypoxia has the capacity of peripheral vasoconstriction including the fetal gut while supplying the vital organs with oxygenated blood. This mesenteric vasoconstriction causes hyperperistalsis and anal sphincter relaxation resulting in the passage of meconium. A decline of umbilical venous oxygen saturation below 30% has been observed with the passage of meconium (2). Hon (3) suggested that the vagal stimulation secondary to cord compression caused passage of meconium. Fenton and Steer (4) regarded the process as a normal physiological function in a mature fetus in the absence of fetal heart rate abnormalities.

Conflicting results have been reported regarding fetal outcome when the amniotic fluid is meconium stained. Some investigators (5-7) have reported an increased incidence of fetal distress and neonatal morbidity; others (8) only when other signs of asphyxia (ominous fetal heart rate decelerations and fetal acidosis) are present. Abramovici et al (9) found only three cases of slight fetal acidosis out of 80 and Saling (1) only three out of 176 cases of meconium stained amniotic fluid. Conflicting reports of fetal and neonatal compromise with the degree of meconium staining has also been published (6,9).

With modern equipment for fetal monitoring in labour including continuous fetal heart rate monitoring and facilities for scalp pH measurements the degree of fetal compromise can be assessed. In this prospective study the impact of modern management of labour in cases of meconium have been evaluated. Parameters such as fetal heart rate abnormalities, mode of delivery and short-term fetal outcome have been studied in relation to different degrees of meconium staining and to a control population.

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PATIENTS AND METHODS

For a five month period from May 1982 to September 1982, 3712 consecutive cases admitted to the University unit labour ward at Kandang Kerbau Hospital, Singapore were prospectively studied for amniotic fluid abnormalities in early labour. 319 cases who had various degrees of meconium staining and 380 cases with clear liquor but other high risk factors like pre-eclampsia, diabetes, intrauterine growth retardation, reduced fetal movements and prolonged pregnancy were selected for the study. All were singleton pregnancies with cephalic presentation.

All but 13 patients had continuous electronic fetal heart rate monitoring in labour. These 13 cases were not monitored due to insufficient equipment and will be discussed later. If the fetal heart rate tracing was suspicious or abnormal, fetal scalp blood sampling for determination of fetal pH was performed and the cases managed appropriately. If instrumental vaginal or abdominal delivery was performed the indication was noted. Apgar scores of the neonates at 1 and 5 minutes, the number of cases intubated, the number of cases admitted to the special care baby unit (SCBU) and their birthweight were recorded. At delivery the oral and then nasal passages were cleaned and sucked prior to delivery of the shoulders. This procedure was particularly carefully done in cases of meconium stained liquor. Meconium staining of the liquor amnii was classified as light, moderate and thick. Liquor which was opaque and deep green in colour, was considered to be thickly meconium stained (TMS). Light meconium stained liquor (LMS) was translucent and light yellow green in colour. Moderate meconium stained liquor (MMS) opalescent with the colour in between that of light and thick meconium stained liquor.

All fetal heart rate tracings were classified as normal, suspicious or abnormal according to the description of Beard et al (10).

The data obtained were recorded on a computerised coding sheet and the information analysed by a TRS model 80 type II computer.

RESULTS

During the study period 319 patients (8.6%) had meconium stained liquor early in labour with cephalic presentation (singleton pregnancies). 120 (3.2%) had light meconium stained liquor, 129 (3.5%) had moderate meconium stained liquor and 57 (1.5%) had thick meconium stained liquor. 306 of the patients were electronically monitored in labour.

Thirteen patients (five with TMS, eight with MMS) were not monitored and thus excluded from the rest of the analysis. Of the five patients with thick meconium, 3 were admitted in advanced labour and delivered of babies in good condition soon after. The fourth patient was in early labour with a fetal heart rate of 80/min. The infant, delivered by emergency caesarean section, had an Apgar score of 9 at 1 min. The fifth admitted at 1 cm dilatation with intact membranes delivered within an hour after a precipitate labour. The baby, born in a caul of thick meconium, succumbed to meconium aspiration and its sequelae within 24 hours of delivery. The eight cases with moderate meconium stained liquor were admitted in advanced labour and delivered promptly of babies in good, condition.

FETAL HEART RATE PATTERNS (Table 1)

TABLE 1
FETAL HEART RATE PATTERNS IN DIFFERENT
DEGREES OF MECONIUM STAINED LIQUOR

Liquor description	Clear n = 380	LMS n = 120	MMS n = 129	TMS n = 57
Pattern of CTG %				
Normal	75.5	64.1	65.1	59.6
Suspicious	14.2	26.6	25.5	26.3
Abnormal	10.2	9.1	9.3	14.0

Suspicious fetal heart rate pattern were less frequent (14.2%) in the clear liquor group compared with the meconium stained groups which, regardless of the degree of staining, had a frequency of about 25%. Abnormal tracing were found in the same frequency in clear liquor group and LMS and MMS groups (about 10%). In the TMS group the frequency was slightly higher (14.0) but this difference was not significant.

APGAR SCORES AT 1 AND 5 MINUTES (Table 2)

TABLE 2
Apgar score at 1 and 5 minutes according to the degree
of meconium staining

Description of liquor	Clear n = 380	LMS n = 120	MMS n = 129	TMS n = 57
Apgar score				
% < 7 at 1 min	5.0	9.2	7.8	12.3*
% < 7 at 5 mins	1.1	3.3	0.8	1.8

*p<0.01

Babies born with thick meconium stained liquor were in significantly poorer condition as reflected by more babies with a one minute Apgar score of < 7 (p<0.01). Light and moderate meconium did not appear to adversely affect neonatal morbidity when compared with those born with clear liquor. In total, only 10 newborns were depressed at 5 minutes and similarly distributed in the 4 groups. In the TMS group only one newborn out of 57 had a low score at 5 minutes.

INTUBATION

In the clear liquor group 3 out of 380 (0.8%) were intubated compared to one out of 57 (1.8%) in the TMS group, 2 out of 129 (1.6%) in the MMS group and 4 out of 120 (3.3%) in the LMS group. The sample size is too small for statistical analysis.

ADMISSION TO SPECIAL CARE BABY UNIT

The incidence of admission to SCBU was

TABLE 3
ADMISSION TO SCBU

Description of Liquor	Clear n = 380	LMS n = 120	MMS n = 129	TMS n = 57
Admission to SCBU (%)				
2500 gms	2.9%	2.5%	0.0	0.0
2500 gms	4.7%	4.2%	4.7%	7.0%

*P<0.01

significantly increased for the thick meconium stained group when compared to the clear liquor group (p 0.01). Table 3 shows the admission rate to SCBU of the babies below and above 2500 grams. The clear liquor, LMS and MMS groups showed a similar incidence of admission to SCBU when admissions due to low birth weight were excluded.

OPERATIVE DELIVERY

The caesarean section rate for patients with thick meconium stained liquor was 35.1% compared to 17.6% in the clear liquor group which was statistically significant with a p value of 0.001. The caesarean section rates were 18.3% and 18.6% for light and moderate meconium stained liquor groups, respectively and were not significantly different compared to the clear liquor group. Operative vaginal delivery in the four groups were not significantly different. Though the operative vaginal and abdominal delivery were high, the percentage contributed by fetal distress to this number was found to be a small proportion.

TABLE 4
OPERATIVE VAGINAL DELIVERY AND LSCS IN DIFFERENT DEGREES OF MECONIUM STAINING

Description of Liquor	Clear n = 380	LMS n = 120	TMS n = 129	TMS n = 57
Mode of delivery, (%)				
Operative vaginal delivery				
Total	26.8	24.2	26.7	28.1
For fetal distress	5.5	4.2	4.7	8.8
L.S.C.S.				
Total	17.6	18.3	18.6	35.1*
For fetal distress	3.7	4.2	4.7	10.5*

*P<0.001

DISCUSSION

There were no neonatal deaths in the monitored group with thick meconium. Of three deaths in the

light and moderate meconium stained liquor groups two were due to lethal congenital malformations and the third due to septicaemia. The deaths in the clear liquor high risk group were due to prematurity and hyaline membrane disease; all three had birth weights less than 1400 gms.

Our results show a significantly increased incidence of suspicious fetal heart rate tracings in meconium stained groups compared with clear liquor group but abnormal tracings were found in similar frequencies in clear, LMS and MMS categories but slightly higher in TMS group. Neonatal compromise as suggested by 1 minute Apgar score and admission to special care baby unit was significantly higher in the TMS group compared to clear, LMS and MMS category. The incidence of caesarean section, specifically for fetal distress, was significantly higher in the TMS group than the other groups. The perinatal outcome and operative delivery rate were similar and was not significantly different in the LMS, MMS and clear liquor high risk labour groups. Hence, we conclude that meconium stained liquor may be a warning sign of fetal compromise in utero, particularly for thick meconium, while light and moderate meconium staining demonstrate equivalent fetal compromise to that of a high risk labour with clear liquor.

These findings are in accordance with other studies (5, 6) showing an impaired perinatal outcome in the presence of thick meconium stained liquor whilst showing very little compromise with light meconium stained liquor.

Miller (8) found that the presence of meconium in the absence of fetal heart rate changes was not a sign of distress and did not warrant intervention. Our patients were managed by continuous intrapartum fetal heart rate monitoring and there was no case which succumbed to hypoxia or meconium aspiration and its sequelae. In total, only 6 newborns to 306 mothers with meconium in early labour had low Apgar score at 5 minutes. The results presented indicate that the management of these patients with continuous fetal heart rate monitoring, fetal scalp blood sampling when indicated, and optimal care in cleansing the oral and nasal passages at delivery prevent severe cases of asphyxia and meconium aspiration.

It has been suggested that the passage of meconium could reflect a state of compensated fetal distress explaining why so few infants are acidotic in labour (1, 9). Following the initial bout of hypoxia (initiating the passage of meconium) repetitive bouts of hypoxia due to prolonged labour or abnormal uterine activity (induced or spontaneous) may lead to severe fetal asphyxia (7). Such events of fetal and neonatal asphyxia can be avoided by careful monitoring and active management of labour in addition to prompt and adequate care of the neonate at delivery. It is evident from this and other studies (8) that it is possible to fulfill this task instead of resorting to caesarean section in meconium stained liquor without a definite indication.

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