

# Significance of Meconium Stained Amniotic Fluid in Relation To Fetal Outcome

KANWAL NOSHEEN

*Department of Obstetrics and Gynaecology, Unit-II, Sir Ganga Ram Hospital, Lahore*

*Correspondence: Kanwal Nosheen Assistant Professor Gynaecology, Email:- kavleenzz@gmail.com*

## ABSTRACT

**Introduction:** The presence of meconium stained amniotic fluid is a matter of great concern for both Obstetricians and Neonatologists due to increased perinatal morbidity and mortality associated with meconium staining and aspiration. The normal amniotic fluid is clear and staining of amniotic fluid is of prognostic value in the process of labour. Meconium staining has to be dealt with great caution with continuous fetomaternal monitoring and timely intervention, but still with all measures we are not sure of a healthy outcome.

**Objectives:** Determine the correlation of meconium stained liquor with fetal outcome.

**Study Design:** Cross-sectional descriptive study.

**Setting:** The study was carried in the Department of Obstetrics and Gynaecology, Unit-I, Services Hospital, Lahore.

**Duration of Study with Dates:** Study was conducted over a period of six months from 24-08-2006 to 23-02-2007.

**Subjects and Methods:** The study was conducted on 150 cases of pregnant women in labour, with meconium staining of the amniotic fluid.

**Results:** Mean age was found to be  $25.14 \pm 3.91$  years. Considering Apgar score at 1 minute, 82 infants (54.7%) had score between 0-4 and in 68 infants (45.3%) it was 5-6. Apgar score was 6-7 at 5 minutes in 95 infants (63.3%) and in 53 (35.4%) it was 8-9. It was 0-5 in 2 cases (1.3%). Considering the need for resuscitation, 111 infants (74%) required resuscitation and in 39 (26%) it was not needed. 86 infants (57.6%) were stable and 64 infants (42.7%) required admission to neonatal unit. 60 infants (95.2%) had 1-5 days stay in NNU and in 3 cases (4.8%) the stay was for 6-10 days.

**Conclusion:** There is a relation between the presence of meconium stained amniotic fluid and the Apgar score, both determining the neonatal morbidity interms of need for neonatal resuscitation, active oropharyngeal suction, need of NNU admission for artificial ventilation or extracorporeal oxygen. So in labouring patients careful monitoring should be done regarding : fetal heart rate, its patterns and colour of liquor ( if meconium \_stained, then grade of meconium ), so as to intervene timely and hence avoiding the neonatal morbidity.

**Key Words:** Meconium Stained Amniotic Fluid, IUGR, Apgar score.

## INTRODUCTION

Liquor is a liquid within the amnion that surrounds the fetus and protects it from mechanical injury.

Meconium is a thick, greenish-black substance that forms in the intestine of an unborn child (fetus). As the fetus swallows and digests the amniotic fluid within the womb, it produces meconium. Meconium consists of epithelial cells, mucus, bile and lanugo. Meconium in amniotic fluid, may be a sign that the newborn experienced stress before birth. If meconium gets into lungs it cause irritation and inflammation<sup>1</sup>.

The normal amniotic fluid is clear and staining of amniotic fluid is of prognostic value in the process of labour. Meconium staining of amniotic

fluid occurs in approximately 9-20% of births. It has been studied that the mean APGAR scores were significantly lower in neonates, if meconium was present<sup>2</sup>. Prolonged labour is also more common in such cases and associated with a particularly poor outcome.

Most of the pregnancies end in normal labour, with a healthy outcome. But this is not the case in all labours. There are various reasons for the complicated labours and one of them is the meconium stained liquor, that really is an alarming situation. Meconium staining has to be dealt in with great caution, continuous fetomaternal monitoring and timely intervention, and still with all measures we are not sure of a healthy outcome. Caesarean

sections are performed twice as frequently because there are increased chances of failure to progress or fetal distress, that is the indication in more than half the cases<sup>3</sup>.

Meconium aspiration may occur antepartum or intrapartum or at the infant's first breath<sup>4</sup>. The prognosis in neonates with meconium aspiration syndrome appears to be related to antepartum hypoxic damage to the lungs. If the baby sucks in meconium during or before delivery, it can get into the lungs and cause a very severe lung disease, that's why babies airways are usually suctioned at birth either by the obstetrician or paediatrician<sup>5</sup>, if meconium is noted in the amniotic fluid some of it might have gone into the lungs, resulting in breathing problems. Many of these babies will also develop persistent pulmonary hypertension of the newborn causing the baby to have low oxygen levels. Artificial ventilation is used to treat these infants but if this does not help, extracorporeal oxygen may be required<sup>6</sup>.

Meconium is graded depending upon its concentration, i-e :

light green : grade I,

golden yellow : grade II,

greenish, with specks : grade III,

dark green, thick consistency / paste like : grade IV<sup>7</sup>.

Close monitoring of labour is important for early detection of failure to progress and fetal distress. The warning signs are the grade of meconium staining of amniotic fluid and the abnormal fetal heart rate patterns seen on external cardiotocography that shows the progress of labour. In this way we can timely decide the better mode of delivery<sup>8</sup>.

This study is aimed to show the usefulness of timely detection of the meconium staining of amniotic fluid, by visualizing the change in colour of amniotic fluid. Monitoring the fetal heart rate showing bradycardia using Pinnard fetoscope and electronic cardiotocographs showing decelerations is also important because this is an indirect indicator of meconium staining as fetal bradycardia means distress to the fetus.

## METHODOLOGY

This cross-sectional descriptive study based on purposive non-probability sampling, was carried in the Department of Obstetrics and Gynaecology, Unit-I, Services Hospital, Lahore over a period of six months from 24-08-2006 to 23-02-2007. The

study was conducted on 150 cases of pregnant women in labour with gestational age more than 36 weeks, with meconium staining of the amniotic fluid and meconium staining seen after delivery of baby. The exclusion criteria was breech presentation and women on special drugs resulting in meconium stained liquor e.g. steroids, marijuana.

One hundred and fifty pregnant women fulfilling the inclusion criteria were included in this study after taking informed consent. Meconium was diagnosed on digital examination, sterilized speculum examination, or vulval pad. Fetal heart rate and its pattern, bishop score and grade of meconium were assessed alongwith.

Then they were evaluated by taking detailed history including sociodemographic profile (age, parity etc). Fertility history (gravidity, previous pregnancies outcome and mode of deliveries and any complications, during present pregnancy) were noted on proforma. Level of meconium staining and fetal outcome interms of apgar score, need of resuscitation, admission to NNU were recorded.

All this information was collected through proforma attached herewith.

The collected data was entered into SPSS version 12.0 and analyzed.

The variables collected were classified and presented in various forms. The sociodemographic of variables were presented as descriptive statistics, giving means and standard deviations of numeric data like age. The symptoms and signs were presented as frequencies and proportions. The outcome of routine investigations were presented as positive or negative.

## RESULTS

A total of 150 women were included during the study period from 24-08-2006 to 23-02-2007 in the department of Obstetrics and Gynaecology, Unit-I, Services Hospital, Lahore.

Table-1 reveals that on first examination 30 patients (46.9%) had grade-II meconium, 27 patients (42.2%) had grade-I, meconium and in 7 patients (10.9%) there was grade-III meconium.

On first examination, 114 patients (76%) had reactive cardiotocography and in 36 patients (24%) the trace showed non-reactive pattern (Table-2).

On repeat examination, there was grade-II meconium in 112 patients (93.3%), grade-III meconium in 5 cases (4.2%) and 3 patients (2.5%) had grade-I meconium (Table-3).

## Significance of Meconium Stained Amniotic Fluid in Relation To Fetal Outcome

Table-4 depicts, 98 patients (81%) had Non-reactive cardiotocography and in 26 patients (19%) cardiotocography was reactive.

124 patients (82.7%) underwent caesarean section and 26 patients (17.3%) had normal vaginal delivery (Table-5).

**Table-1:** Distribution of cases by grade of meconium (first examination) n = 64

Grade meconium	Number	Percentage
I	27	42.2
II	30	46.9
III	07	10.9
Total	64	100.0

**Table-2:** Distribution of cases by initial CTG findings (first examination) n = 150

CTG findings	Number	Percentage
Reactive	114	76.0
Non-reactive	36	24.0
Total	150	100.0

**Table-3:** Distribution of cases by grade of meconium (second examination) n = 120

Grade meconium	Number	Percentage
I	03	02.5
II	112	93.3
III	05	04.2
Total	120	100.0

**Table-4:** Distribution of cases by repeat CTG findings (second examination) n = 121

CTG findings	Number	Percentage
Reactive	26	19.0
Non-reactive	98	81.0
Total	121	100.0

**Table-5:** Distribution of cases by mode of delivery n = 150

Mode of delivery	Number	Percentage
Normal vaginal delivery	026	17.3
Caesarean section	124	82.7
Total	150	100.0

Considering Apgar score at 1 minute, 82 infants (54.7%) had score between 0-4 and in 68 infants (45.3%) it was 5-6 (Table-6).

Apgar score was 6-7 at 5 minutes in 95 infants (63.3%) and in 53 (35.4%) it was 8-9. It was 0-5 in 2 cases (1.3%) (Table-7).

Considering the need for resuscitation, 111 infants (74%) required resuscitation and in 39 (26%) it was not needed (Table-8).

Table-9 shows 86 infants (57.6%) were stable and 64 infants (42.7%) required admission to neonatal unit.

**Table-6:** Apgar score at 1 minute n = 150

Apgar score	Number	Percentage
0-4	82	54.7
5-6	68	45.3
Total	150	100.0

**Table-7:** Apgar score at 5 minute n = 150

Apgar score	Number	Percentage
0-5	02	01.3
6-7	95	63.3
8-9	53	35.4
Total	150	100.0

**Table-8:** Distribution of cases by need for resuscitation n = 150

Need for resuscitation	Number	Percentage
Yes	111	74.0
No	39	26.0
Total	150	100.0

**Table-9:** Distribution of cases by admission to NNU n = 150

Admission to NNU	Number	Percentage
Yes	64	42.7
No	86	57.3
Total	150	100.0

## DISCUSSION

Cardiotocography is used in almost all tertiary care center for fetal surveillance in antepartum as well as intrapartum period. At most places, it is the only objective method for diagnosis of acute fetal hypoxia but it cannot precisely determine whether real hypoxia is present or not. Similarly grading of meconium on visual inspection is also not diagnostic and for precise diagnosis of hypoxia, fetal blood sampling is required.

This study will help to determine the relationship between meconium staining, abnormal Cardiotocography and fetal outcome.

In current study, 46.1% had grade-I meconium, 10.9% had grade-II meconium and 42.2% had grade-III meconium. 74% infants required immediate resuscitation. This is comparable to the study of Sanliyalp et al<sup>11</sup> in which the accuracy rate of visual diagnosis of meconium stained amniotic fluid was found as statistically significant 54.7%

with 19.4% thin, 53.1% moderate and 90.6% of thick meconium

In the study of Wong et al<sup>12</sup> 9.8% cases showed non-reassuring cardiotocography and in present study. In 24% cases there was non-reassuring cardiotocography and in repeat trace it was non-reactive in 81% which is similar to the study of Meydanli et al [5] in which there were non-reassuring fetal heart rate tracings.

According to the study of Tran et al<sup>13</sup> meconium staining (8.8% thin, 5.5% moderate, 4.6% thick). In present study, 42.2% had grade-I meconium, 46.9% had grade-II meconium and 10.9% had grade-III meconium.

The caesarean delivery rate was increased (82.7%) compared to normal vaginal delivery rate (17.3%) which is comparable to the study of Becker et al<sup>14</sup>, according to which caesarean section rate was 17.4% versus 9.6%, vaginal operative delivery rates were 13.9% versus 6.2%. In another study by Locatelli et al<sup>15</sup>. Caesarean deliveries were more in cases with meconium stained amniotic fluid.

Close monitoring of labour in the presence of meconium stained liquor (particularly thick meconium stained liquor) is important to detect failure to progress and fetal distress early so as to intervene in time. Mean Apgar scores were significantly lower and the proportion of neonates with poor Apgar score was higher if thick meconium was present according to the study by Saunders<sup>3</sup>.

In my study, 54.7% infants had Apgar score between 0-4 and 45.3% had Apgar scores of 5-6. Apgar score at 5 minute was 0-5 in 1.3%, 6-7 in 63.3% and 8-9 in 35.4% infants.

The study of Bhat and Rao<sup>16</sup> shows that nearly one third of infants with meconium aspiration syndrome required resuscitation. In the study by Ashfaq and Shah [4] 56% infants had meconium aspiration and required resuscitation. This is comparable to my study in which 74% infants required resuscitation.

In the study of Scott et al<sup>17</sup> 75% babies with meconium staining needed admission to neonatal nursery unit which is consistent with my study according to which 74% required active resuscitation and 42.7% infants were admitted to the nursery.

## CONCLUSION

There is a relationship between the presence of meconium stained amniotic fluid and the Apgar

score, both determining the morbidity. The presence of thick meconium in the amniotic fluid signaled greater morbidity in the form of increased need for intensive fetomaternal monitoring, need for instrumental vaginal delivery or emergency caesarean section, low Apgar score, need for neonatal resuscitation and need for stay in NNU.

However according to my study there was poor correlation between abnormal cardiotocography and neonatal outcome, so un-necessary caesarean sections for fetal distress can be avoided if fetal blood sampling is used instead of pathological trace alone.

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## Significance of Meconium Stained Amniotic Fluid in Relation To Fetal Outcome

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