

Retrospective Study of Meconium Stained Liquor and Its Fetal Outcome

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Abstract: Aims and Objectives: To determine the fetal outcome and mode of delivery in patient with meconium stained liquor during labour. **Materials and Methods:** This retrospective study was conducted from December 2018 to May 2019 on patients admitted to labour room, KGH. Out of 3548 deliveries, patients who met the inclusion criteria were enrolled in our study. The data was collected in a predesigned proforma. **Results:** Incidence of meconium stained amniotic fluid (MSAF) was 8.82%(313), Out of which 46.9%(147) required SNCU admission. 25.85%(38) developed meconium aspiration syndrome (MAS) among who got admitted, in which 8.84%(13) had neonatal mortality. There was significant association between grades of meconium and MAS, babies with thick meconium were prone to develop MAS. Postdated pregnancy, preeclampsia were significant factors associated with MSAF. **Conclusion:** MSAF alone is not associated with an adverse outcome. 53%(166) babies remained asymptomatic. There is increased chance of operative delivery in presence of meconium especially when associated with abnormal CTG. Increasing grades of MSL and abnormal CTG are associated with poor outcome.

Keywords: Meconium stained amniotic fluid, preeclampsia, meconium aspiration syndrome.

Introduction

Meconium staining of amniotic fluid is suggestive of fetal distress. Meconium is thought to be passed from the fetal gastro-intestinal tract as a response to hypoxia, mesenteric vasoconstriction induced gut hyper peristalsis falling umbilicus venous saturation, vagal stimulation & normal physiological function of a mature fetus [1,2]. Conflicting outcomes have been reported in the labours, complicated by meconium staining of amniotic fluid, varying with degree of meconium staining [3,4,5].

Fetal distress as a result of fetal hypoxia presents as alteration in fetal heart rate especially bradycardia or abnormal CTG and decreased fetal scalp blood pH [6]. MSAF is associated with increased obstetric intervention and so associated with higher rate of caesarian delivery and increased need for neonatal resuscitation [7]. Both maternal and fetal factors are associated with risk of MSAF.

The maternal factors are hypertension, gestational diabetes mellitus, maternal chronic cardiovascular diseases, post term pregnancy, pre eclampsia, eclampsia. Risk factors on fetal side are Oligohydramnios, IUGR [8]. Aspiration of meconium by the fetus remains relatively common cause of perinatal morbidity and mortality because it is difficult to prevent [9]. The fetus passes meconium into amniotic fluid in 10% of all pregnancies, in 1.25% of these the meconium is aspirated into lungs of fetus/neonate [9]. This can result in respiratory distress, meconium aspiration syndrome.

Meconium stained liquor is a clinical diagnosis. Meconium aspiration syndrome can cause/contribute to neonatal death and in addition up to 1/3rd of all cases in which aspiration occurs, develop long term respiratory compromise [10-12].

However various methods have been tried to detect the presence of meconium in liquor and to prevent meconium aspiration syndrome. These methods include amnioscopy during early labour and oropharyngeal suction and endotracheal intubation after birth. The perinatal morbidity and mortality associated with meconium aspiration syndrome can be brought down if the high risks are identified in the antenatal period and careful decisions are made about the timing and mode of delivery and vigilant monitoring of the labour. This study was carried out to determine fetal outcome and mode of delivery in pregnant women with meconium stained liquor.

Aims and Objectives

To determine the fetal outcome and mode of delivery in patients with meconium stained liquor during labour.

Inclusion and Exclusion Criteria

The inclusion criteria are gestational age >37 weeks, cephalic presentation, singleton pregnancy in patients with meconium stained liquor (grade 1, 2, 3) after spontaneous or artificial rupture of membranes during labour. The exclusion criteria are gestational age <37 weeks, previous caesarean section, multiple pregnancy, non-cephalic presentations like breech, transverse lie and compound presentation.

Materials and Methods

This retrospective study was conducted from December 2018 to May 2019. This study was done on patients admitted to labour room, in the department of obstetrics and gynaecology at KGH. Pregnant women with singleton pregnancy, cephalic presentation with >37 weeks of gestational age were studied. Out of 3548 deliveries 313 patients had meconium stained liquor. All the patients in the study undergone a standardized form of labour management. The patients who fulfilled the inclusion criteria were enrolled in the study. All the data was collected in a predesigned proforma which included patients detailed history, gestational age, per abdominal examination, per vaginal examination, basic investigations including intrapartum CTG. The patients were carefully monitored. Investigations including intrapartum CTG. The patients were carefully monitored for the progress of labour by plotting the parameters on partogram. Fetal heart rate was strictly monitored by continuous electronic fetal monitoring. The meconium staining of amniotic fluid was classified as grade I, II, III by visual examination after spontaneous or artificial rupture of membranes. Grade I meconium stained liquor is translucent light yellow green in colour, grade II MSL is opalescent with deep green and light yellow in colour. Grade III is opaque and deep green in colour.

Deliveries is expedited when fetal heart rate abnormalities were detected by safest mode of delivery either by instrumental vaginal delivery or caesarean section. All patients underwent full trial of labour and caesarian section was done only if trial of labour was unsuccessful or if there were obstetric indications including fetal distress. The APGAR score of neonates at 5 minutes, birth weight, SNCU admission neonates with meconium aspiration syndrome and neonatal mortality were recorded.

Results and Observations

Table 1. Grades of meconium stained liquor deliveries

| Total Number of Deliveries | Meconium Stained Liquor Deliveries (n=313) (8.82%) | | |
|-----------------------------------|---|--------------------|--------------------|
| | Grade 1 MSL | Grade 2 MSL | Grade 3 MSL |
| 3548 | 92 (29.39%) | 126 (40.25%) | 95 (30.35%) |

Table 2. Potential risk factors of meconium stained liquor

| | |
|----------------------|-------------|
| Post-dated | 94 (30.03%) |
| Preeclampsia | 29 (9.26%) |
| Oligohydramnios | 16 (5.11%) |
| Anemia | 15 (4.79%) |
| Rh immunization | 13 (4.15%) |
| IUGR | 10 (3.13%) |
| GDM | 8 (2.5%) |
| Imminent eclampsia | 5 (1.59%) |
| Elderly primigravida | 4 (1.25%) |
| Antepartum eclampsia | 2 (0.6%) |

Table 3. Fetal outcome according to grades of meconium stained liquor and Apgar Score

| Grades of MSL | APGAR <7 | APGAR >7 | Total |
|---------------|--------------------|---------------------|------------|
| 1 | 14 | 78 | 92 |
| 2 | 28 | 98 | 126 |
| 3 | 38 | 57 | 95 |
| Total | 80 (25.55%) | 233 (74.44%) | 313 |

Table 4. Mode of delivery and grades of meconium stained liquor

| Grades of MSL | Normal delivery | Instrumental delivery | LSCS | Total |
|---------------|---------------------|-----------------------|---------------------|------------|
| 1 | 70 | 4 | 18 | 92 |
| 2 | 30 | 8 | 88 | 126 |
| 3 | 27 | 10 | 58 | 95 |
| Total | 127 (40.57%) | 22 (7.02%) | 164 (52.39%) | 313 |

Table 5. Neonatal outcome according to grades of meconium stained liquor

| Grade of MSAF | n = 313 | | n = 147 | | |
|---------------|---------------------------|--------------------|-------------------|--------------------|--------------------|
| | Asymptomatic routine care | SNCU Admission | Discharged | MAS | Neonatal Mortality |
| 1 | 78 | 14 | 8 | 4 | 2 |
| 2 | 76 | 50 | 34 | 12 | 4 |
| 3 | 12 | 83 | 54 | 22 | 7 |
| Total | 166 (53%) | 147 (46.9%) | 96 (65.3%) | 38 (25.85%) | 13 (8.84%) |

Discussion

Fetal distress during labour can be assessed by fetal heart and by checking the presence of meconium in amniotic fluid [13-15]. Passage of meconium could be a physiological event reflecting maturity of fetus. It may on the other hand may reflect fetal hypoxia or increased vagal activity from cord compression [16].

The detection of MSL during labour often causes apprehension and anxiety for the patient as well as the health provider as it is often considered as fetal distress [17]. Generally thick meconium is associated with poor perinatal outcomes [18, 19].

The exact reason of passage of meconium in the liquor is poorly understood. Acute or chronic fetal hypoxia can result in passage of meconium in utero [20, 21]. Also the incidence of meconium passage during labour increases with gestational age 30% at 40 weeks, 50% at 42 weeks [22]. The MSAF and its associations 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 [23].

Presence of meconium below vocal cord is known as meconium aspiration and occurs in 20 to 30 % of all infants with MSAF [24]. Caesarean section is done in MSAF with abnormal CTG for better perinatal outcome [25]. The low APGAR scores may be because of direct vasoconstrictor effect of meconium on umbilical vein that results in vasospasm in leading to impaired placental blood flow [26]. Infants with APGAR score <7 at 5 minutes are 3 times more likely to have neurological abnormality [27].

Presence of meconium in absence of fetal heart rate abnormalities is not suggestive of fetal compromise and does not require any intervention. The increased rate of emergency caesarean section, instrumental vaginal delivery for fetal distress, meconium aspiration syndrome in neuro developmental abnormalities are possible problems with MSAF [28, 29]. After initial hypoxic but initiating the passage of meconium subsequent prolonged hypoxia or abnormal uterine activity may cause severe asphyxia [30]. Such prolonged hypoxia can be avoided by careful fetal monitoring, active management of labour and optimal care after birth. This would help avoid unnecessary caesarean sections in all cases of meconium stained liquor in absence of definitive indication. Clinical diagnosis of perinatal asphyxia is based on several criteria to main ones being evidence of cardio respiratory neurological depression which are defined by APGAR score <7 at 5 minutes after birth [31-39].

In our study, total number of deliveries were 3548 among which there were 313(8.82%) patients with meconium stained amniotic fluid. Grade I MSL equal to 92(29.39%), grade II MSL 126(40.25%), grade III MSL 95(30.35%). In our study out of 313 MSL deliveries the potential antepartum risk factors for MSAF were postdated pregnancy (30.03%), oligohydramnios (5.11%), pre eclampsia (9.26%), antepartum eclampsia (0.6%), imminent eclampsia (1.59%), anemia (4.79%), elderly primigravida (1.25%), GDM (2.5%), Rh immunisation (4.15%), IUGR (3.13%).

In our study there were 80(25.5%) babies with APGAR <7 among which 14(17.5%) babies were in grade I MSL. 28(35%) babies were in grade II MSL and 38(47.5%) in grade III MSL.

In our study, 46.9%(147) required SNCU admission, of which 25.85%(38) developed MAS. There is 8.84%(13) neonatal mortality seen among who required admission.

Overall neonatal mortality is 4.15%(13) out of 313 meconium stained liquor babies.

Conclusion

Meconium stained liquor alone is not associated with an adverse neonatal outcome. 53% of babies remained asymptomatic in spite of MSL and required only routine care. Increasing grade of MSL is associated with increased adverse outcome. Association of MSL with abnormal CTG is associated with poor outcome.

Conflicts of interest

There are no conflicts of interest.

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