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Original Research Paper

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PERINATAL OUTCOME FOLLOWING INTRAPARTUM AMNIOINFUSION IN PATIENTS WITH MECONIUM STAINED LIQUOR

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ABSTRACT

AIM To evaluate the effectiveness of Amnioinfusion in cases with Meconium Stained Liquor in composite primary outcome measures. **MATERIALS AND METHODS** The present study is a hospital based randomized controlled study conducted at Gauhati Medical College and Hospital in the department of Obstetrics & Gynaecology from 1st July 2020 till 30th June 2021. The study includes cases admitted in hospital after 37 weeks of pregnancy in labor who exhibit meconium stained liquor after spontaneous or artificial rupture of membranes. Total 200 patients were selected, 100 were given amnioinfusion (study group); 100 patients without amnioinfusion were offered routine obstetric care (control group). Both groups were well matched for age, parity, period of gestation and cervical dilatation. **RESULTS** Meconium aspiration syndrome was markedly reduced by saline Amnioinfusion. It occurred in 6% of cases in the amnioinfusion group and 22% of cases in the non-infusion group. There was increase incidence of vaginal delivery and decreases the incidence of caesarean section following inrapartum amnioinfusion. NICU admissions were 34% in control group compared to 19% in amnioinfusion group. Perinatal mortality and Hypoxic ischaemic encephalopathy in the infusion group was 4% as compared to 10% in the control group. The duration of nursery stay in both groups were similar. Neonatal outcome was significantly better in the amnioinfusion group. **CONCLUSION** A significant increase in the neonatal morbidity and mortality occurs when meconium is detected in the amniotic fluid. Amnioinfusion significantly decreases incidence of caesarean section, meconium below vocal cord, meconium aspiration syndrome with no increase in complications. Neonatal outcome was significantly better in the amnioinfusion group.

KEYWORDS : Amnioinfusion, Meconium Aspiration Syndrome, Meconium Stained Amniotic Fluid.

INTRODUCTION

The presence of meconium in the amniotic fluid is relatively common. It remains a concern for both obstetrician and paediatrician because meconium passage is associated with increased perinatal morbidity and mortality and its association with meconium aspiration syndrome and its sequelae. The term meconium is derived from a greek word "mekonion" which means opium juice. Aristotle coined the term meconium and reported opium like effects in neonates born through Meconium Stained Amniotic Fluid.Three theories regarding fetal passage of meconium may explain the tenuous connection between its detection and neonatal mortality.First, fetuses may pass meconium in response to hypoxia, and meconium therefore signals fetal compromise (Walker, 1953).

Second, in utero passage of meconium may represent normal gastrointestinal tract maturation under neural control (Mathews, 1979). A final theory posits that meconium passage follows vagal stimulation from common but transient umbilical cord entrapment with resultant increased bowel peristalsis (Hon, 1961)[1].

Clinical Application of transcervical Amnioinfusion (AI) was first described by Miyazaki and coworkers (1983)[2] as an intrapartum procedure for relief of variable deceleration. Intrapartum AI was later proposed by Wenstrom and Parsons as a way of diluting meconium to decrease the incidence of MAS. Transcervical amnioinfusion is instillation of fluids through cervix during labor once membrane ruptures. It dilutes and washes away thick meconium and increases amniotic fluid index.

In patients with oligohydramnios, amnioinfusion reduces cord compression for which thick meconium is a marker and prevents meconium aspiration and therefore fetal gasping. Studies have shown conflicting reports regarding the role of amnioinfusion in meconium stained amniotic fluid, so this study was conducted to evaluate the role of transcervical amnioinfusion in intrapartum management of meconium stained amniotic fluid.

OBJECTIVES

- To compare the incidence of meconium aspiration syndrome in amnioinfusion and routine care group.
- To find out the perinatal outcome (perinatal morbidity and mortality) in both the groups.
- To study maternal outcome in both the study and control group

METHOD

This randomized controlled study was conducted at Gauhati Medical College and Hospital in the department of Obstetrics & Gynaecology from 1st July 2020 till 30th June 2021. 200 women at term gestation in labour with meconium stained amniotic fluid were randomized to receive either transcervical intrapartum amnioinfusion with saline (100) or routine obstetrical care (100).

INCLUSION CRITERIA:-

(a) All pregnant patient with gestational age of 37 weeks or more, admitted in the hospital who exhibit meconium stained liquor after spontaneous or artificial rupture of membranes. (b) Singleton live pregnancy (c) Cephalic presentation (d) Cervical dilatation between 3 and 8 cm. (e) Moderate to thick meconium stained liquor.

EXCLUSION CRITERIA:-

(a) Fetal congenital anomaly (b) Indication for urgent delivery (Cord Prolapse, Fetal bradycardia) (c) Antepartum hemorrhage (d) Chorioamnionitis (e) Polyhydramnios (f) Maternal cardiovascular / respiratory disease (g) Previous uterine incision

RESULTS

The results were depicted in the form of tables or charts.

Table showing distribution of patients according to FHR Abnormalities

FHR Abnormality	Routine Care	Percentage	Amnioinfusion	Percentage	Significance
Present	40	40%	25	25%	P=0.02
Absent	60	60%	75	75%	

FHR abnormality was found in 40% patients of routine care group and in 25% patients of amnioinfusion group. Hence there were more cases of fetal distress in routine care group, the 'P' value = 0.02 which was statistically significant. Thus, amnioinfusion significantly decreases FHR abnormalities.

Table showing distribution of patients according to mode of delivery

Mode of Delivery	Routine Care	Percentage	Amnioinfusion	Percentage	Significance
SVD	30	30%	45	45%	P= 0.03
F/V	22	22%	24	24%	P= 0.2 (NS)
LSCS	48	48%	31	31%	P= 0.01

In the Amnioinfusion group, 45% patients had vaginal delivery as compared to only 30% of patients in the routine care group. The difference was statistically significant, p= 0.03 The incidence of Outlet Forceps or Ventouse delivery were 24 % in study group and 22% in control group, which was statistically not significant (P>0.05). The incidence of caesarean section was 31% in the study group and 48% in the control group respectively, which was statistically significant

Thus, amnioinfusion increases the incidence of vaginal delivery and decreases the incidence of caesarean section.

Table showing time interval between MSAF and delivery

Time Interval	Routine Care	Percentage	Amnioinfusion	Percentage	Significance
<1 Hour	24	24%	32	32%	P = 0.02
1-2 Hour	50	50%	57	57%	
2-3 Hours	26	26%	11	11%	

In the study group, a significant number of patients progessed and had vaginal delivery. 0verall, there was significantly (p= 0.02) less time interval between detection of meconium and delivery in the study group as compared to control group.

Table showing APGAR score at 1 minute

APGAR at 1min	Routine Care	Percentage	Amnioinfusion	Percentage	Significance
6 or less	44	44%	29	29%	P=0.03
7 and above	56	56%	71	71%	

There was significant improvement in APGAR score at 1 minute and 5 minutes (P = 0.03) in the AI group as compared to the routine care group.

Table showing APGAR score at 5 minute

APGAR at 5min	Routine Care	Percentage	Amnioinfusion	Percentage	Significance
6 or less	21	21%	10	10%	P= 0.03
7 and above	79	79%	90	90%	

There was significant improvement in APGAR score at 1 minute and 5 minutes (P = 0.03) in the AI group as compared to the routine care group.

Table showing Neonatal Characteristics

Neonatal Characteristics	Routine Care	Percentage	Amnioinfusion	Percentage	Significance
Meconium below vocal cord	42	42%	27	27%	P= 0.02
Meconium Aspiration Syndrome	22	22%	6	6%	P= 0.001
NICU Admission	34	34%	19	19%	P= 0.016
Perinatal Death	10	10%	4	4%	P= 0.1(NS)

Meconium below the vocal cords was evident in only 27% patients receiving Amnioinfusion, compared to 42% in the non-infusion group of patients (p=0.02). Meconium aspiration syndrome was markedly reduced by saline Amnioinfusion. It occurred in 6% of cases in the infusion group and 22%nof cases in the non-infusion group (p=0.001). NICU admissions were 34 % in control group compared to 19% in amnioinfusion group (P=0.016). Perinatal mortality and HIE in the infusion group was 4% as compared to 10% in the control group (statistically not significant).

The duration of nursery stay in both groups was similar. Neonatal outcome was significantly better in the infusion group.

DISCUSSION

In the present study fetal distress occurred in 25% in the study group and 40 % in control group (p=0.02). Study by Macri et al[3] showed that the rates of fetal distress, cesarean section were significantly reduced in amnioinfusion group. WuB et al[4] (1991) reported significant reduction rates in caesarean section for fetal distress. Peurtas et al[5] similarly reported reduction rates in caesarean section for fetal distress.

In the amnioinfusion group, 45% patients had spontaneous vaginal delivery as compared to only 30% of routine care group patients. The incidences of Outlet Forceps/ Ventouse delivery were almost same in study group and control group. The incidence of caesarean section was 31% in the amnioinfusion group and 48% in routine care group. Thus, there was significant decrease in incidence of caesarean section in the amnioinfusion group. In the amnioinfusion group, a large number of patients experienced faster progress in labour and delivered vaginally in a shorter period of time in compared to routine care group. Thus significantly less time interval (p= 0.02) between detection of meconium and delivery was noticed in the amnioinfusion group.

This coincides with the studies by Pierce et al[6] who showed lower incidence of caesarean section in the amnioinfusion group (19.7% vs 24.3%) and his instrumental delivery was 18%. CRAMP-2[7], meta-analysis study shows that cesarean section rates were similar in both groups. Wenstrom et al[8] also showed that patients receiving amnioinfusion had significantly lower incidence of operative delivery.

Number of cases with APGAR at 1 minute <6 were 29% in study group as compared to 44% in control group. Number of cases with APGAR at 5 minute <6 were 21% in control group as compared to 10% in study group. Thus, there was significant improvement in APGAR score at 1 minute and 5 minute in amnioinfusion group. The present study correlated with CRAMP I[9] study which showed improvement in 1 minute APGAR score and also with Cramp-2[7], meta analysis study which shows significant reduction in incidence of 5 minute APGAR score < 7.

Meconium below the vocal cords was evident in only 27% patients receiving amnioinfusion, compared to 42% in the non-infusion group of patients. Meconium aspiration syndrome was reduced markedly with saline amnioinfusion. It occurred in 6% of cases in the amnioinfusion group and 22% of cases in the non-infusion group (p=0.001). NICU admissions were 34% in control group compared to 19% in amnioinfusion group (P=0.001). Perinatal mortality and HIE in the amnioinfusion group was 4% as compared to 10 % in the control group.CRAMP-1[9] and CRAMP-2[7] meta-analysis study shows significant reduction in several measures of perinatal morbidity in amnioinfusion group: meconium aspiration

syndrome, NICU admission, Neonatal ventilation and hypoxic ischaemic encephalopathy, 5 minute APGAR score < 7, while cesarean section rates were similar in both groups. Eriksen et al[10] noted the rate of meconium below vocal cords (1 of 65 vs 8 of 59) was significantly lower in patients receiving amnioinfusion. In the present study 22% cases of MAS occurred in control group and 6% in amnioinfusion group. Macri et al[3] noted that the rate of fetal distress, caesarean section, meconium aspiration and meconium aspiration syndrome were significantly reduced in amnioinfusion group.

Sadavsky Y et al[11] noted the incidence of thick meconium was significantly lower in amnioinfusion group, meconium more than traces below vocal cords, need for positive pressure ventilation at birth and without increase in complications related to amnioinfusion.

CONCLUSION

The presence of thick meconium is associated with increased perinatal morbidity and mortality. Meconium aspiration syndrome is a significant cause of perinatal mortality which can be reduced by amnioinfusion. From the above study it can be concluded that in a resource poor country with limited facilities, amnioinfusion can be used as an effective measure to improve the fetomaternal outcome as well as to reduce the incidence of caesarean section rate, thereby reducing maternal morbidity and improving perinatal outcome.

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