

Role of Amnioinfusion among the Women in Labour with Meconium Stained Liquor

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Abstract:

Objectives: Meconium stained liquor is commonly associated with increased neonatal morbidity and mortality. Objective of this study is to assess the effects of amnioinfusion in labour with meconium stained amniotic fluid.

Materials and methods: This is prospective Case-Control study. The study was carried out in the Department of Obstetrics and Gynaecology of NRS Medical College and Chittaranjan Seva Sadan, Kolkata. Labouring term and post term pregnant mothers with singleton vertex presentation with ruptured membrane associated with meconium stained liquor were included in this study. Usually two to three bottles of normal saline was infused through the catheter. Progress of labour was monitored by Partograph. Apgar Score at 1 minutes and 5 minutes were recorded.

Results and Analysis: All the mothers under the study were given amnioinfusion in active labour with meconium stained liquor and mean delivery time (in hours) from onset of the procedure upto delivery by any route was 5 ± 0.13 . The rate of caesarean section was less in case group compared to control group which is statistically significant. Amnioinfusion also improved the Apgar Score at 1 minute and 5 minutes ($P=0.038$).

Conclusions: Amnioinfusion in labour with meconium stained liquor decrease the rate of caesarean section and improves the neonatal outcome. It is a cheap, easy and effective procedure without serious side effects.

Key-words: Amnioinfusion, intrauterine, meconium stained liquor

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I. Introduction

Amnioinfusion is a procedure of intrauterine intervention in a patient either with intact or ruptured membranes^{6,8}. It was first recommended by Miyazaki and Taylor in 1983. The procedure may be applied in women with meconium stained liquor in labour with ruptured membranes. In such a patient, sole purpose of amnioinfusion is to wash out the meconium which is toxic to neonatal lung if aspirated¹⁰ from the uterine cavity and to increase the amniotic volume to minimize the hazards of oligohydramnios. The amnioinfusion in cases with intact membranes is indicated in oligohydramnios⁸ to increase the intraamniotic volume, to prevent fetal hazards like pulmonary hypoplasia, compression deformities of the fetus^{5, 6}.

Our objective is to assess the effects of amnioinfusion in labour with meconium stained amniotic fluid. Meconium stained liquor is commonly seen (7-22% of live births) and it is associated with increased neonatal morbidity and mortality especially due to increased chance of meconium aspiration syndrome. Amnioinfusion in molthers in labour with meconium stained amniotic fluid can dilute the concentrations of meconium and reduce thwe fetal cord comp[ression to decrease the incidence of meconium aspiration that may occur in utero. The intrapartum imnioinfusion has been advocated to decrease the rate of caesarean section, improve Apgar scores, improves neonatal outcome as proved by many studies. It is technically simple, cheap procedure without requiring any complicated skill. The present study was designed to test the hypothesis that amnioinfusion can reduce the incidence of caesarean section and improve neonatal outcome.

II. Materials And Methods

The prospective case-control study was carried out in the Dept. of Obstetrics and Gynaecology, NRS Medical College, Kolkata (January, 2002- January 2004) and Chittranjan Seva Sadan , Kolkata(July 2017- July,2018). Laboring term and post term pregnant mothers with singleton vertex presenting fetus with ruptured membranes associated with meconium stained liquor were included in our study. Any obstetrical or medical complicating factors such as diabetes, pre-eclampsia, malpresentations etc. other than presence of meconium stained liquor were excluded.

For the mother selected under study after history taking, maternal and fetal monitoring, a soft long sterile simple rubber catheter was inserted transcervically into the uterine cavity above the head of fetus, the presenting part³. During per vaginal examination, with the guidance of internal fingers, the rubber catheter was introduced above the presenting part gently and aseptically. Initially 500 ml of normal saline at room temperature was infused through the catheter at a slower rate. The procedure was continued till clear fluid coming out from the uterine cavity as the meconium was washed out gradually. Usually two to three bottles of normal saline solution were required for this purpose. The mother was observed throughout the course of labour for any fresh occurrence of meconium in labour. In our study, there was no need of amnioinfusion for the second course. The control groups were not given any amnioinfusion, only routine care was given. According to sample size calculator and based on previous studies, sample size was estimated as total no. of mothers under study should be 250(125 cases of amnioinfusion group A and 125 cases of control group B).

All the mothers were monitored by fetal heart sound auscultation in every 15 minutes and 5 minutes during 1st stage and 2nd stage of labour respectively using stethoscope or fetal Dopplar. Progress of labour was monitored by Partograph in 1st stage. In some cases, labour was augmented by escalating doses of oxytocin infusion. Preparation of OT, anesthetist, baby resuscitation equipments all were made available round the clock.

III. Results And Analysis

Initially 295 mothers in labour were assessed for eligibility. But 33 mothers of them did not meet the inclusion criteria. Out of them 12 mothers opted out of the study. Finally, 250 patients were taken up for randomization into two groups of 125 each to receive amnioinfusion as per the procedure described before (group A) or no amnioinfusion, only as usual maternal and fetal monitoring (group B). There were no refusals after randomization. So, data from 250 patients were available for analysis; group A (n=125), group B (n=125).

Observations were tabulated in excel sheet, a grand chart created and analyzed. Continuous data were expressed as mean \pm Standard error of mean (SEM). Discrete categorical data were presented as number of patients [n (%)] and median value. Incidences of adverse events were expressed as percentage. Comparisons of continuous data with a normal distribution were performed using the independent Student's *t* test. Categorical data were analyzed with contingency tables using Pearson Chi-square test. Statistical test were considered significant when p value<0.05. All analysis were conducted using Graph Pad Instat statistical software.

Table 1: The demographic profiles and some parameters of these 250 labouring mothers are given in the table below

Parameters	Group A(n=125) (Mean \pm SEM)	Group B(n=125) (Mean \pm SEM)	P-Value
Age in years	24.12 \pm 0.49	24.07 \pm 0.46	0.934(NS)
Parity	0.66 \pm 0.06	0.74 \pm 0.07	0.428(NS)
Birth weight of baby in Kg	2.88 \pm 0.04	2.86 \pm 0.04	0.789(NS)

A value of p<0.05 are considered as significant. NS, nonsignificant. Table 1 shows the mean age in years, parity, gestational age (weeks), baby birth weight in Kg. The mean age was 24.12 \pm 0.49 years in group A and 24.07 \pm 0.46 years in group B. It was evident that there was no statistically significant difference between two groups (p=0.934). The mean parity was 0.66 \pm 0.06 in group A while group B had a mean parity of 0.74 \pm 0.07. Group A and group B were comparable as per distribution of parity (p=0.428). Group A had a mean gestational age in weeks of 38.65 \pm 0.12 while it was 38.61 \pm 0.12 in group B. There was no statistically significant difference in distribution of pregnant mothers according to gestational age. The mean birth weight of babies in Kg was 2.88 \pm 0.04 in group A while group B had 2.86 \pm 0.04. Thus it was clear from the above table that group A and group B were comparable (p=0.789).

The mean cervical dilatation of laboring mothers during starting of amnioinfusion was 6.72 \pm 0.11 cm and the mean delivery time (in hours) from onset of the procedure upto delivery by any route was 5 \pm 0.13.

Table 2: Comparison between two groups in respect to LSCS and Assisted Vaginal Delivery

Parameters	Group A	Group B	Two tailed P-Value	Relative Risk	95% Confidence Interval
LSCS	22(9%) n=125	43(17%) n=125	0.0037(S)	0.6079	0.4227-0.8744
Assisted vaginal delivery	16(9%) n= 103	21(20%) n=82	0.986(NS)	0.735	0.496-1.09

From table no. 2, it is evident that rate of caesarean section is more in group B statistically (p=0.003) which is significant. The test was done by Fisher's exact test using Yate's continuity correction. But in respect to assisted vaginal delivery in the form of ventouse or forceps, there was no significant statistical difference (p=0.986).

Table 3. Comparison between two groups in respect to Apgar score and adverse effects

Parameters	Group A	Group B	Two tailed P-Value	Relative Risk	95% Confidence Interval
Apgar score at 1 minutes	7.54±0.12(Mean ±SEM)	6.76±0.14(Mean ±SEM)	0.0001(S)	-	-
Apgar score at 5 minutes	8.90±0.08 (Mean±SEM)	8.63±0.09 (Mean±SEM)	0.038(S)	-	-
Presence of meconium below the level of vocal cord	7(3%)	19(8%)	0.021(S)	0.511	0.268-0.974
Meconium aspiration syndrome	2(1%)	5(2%)	0.44(NS)	0.5645	0.173-1.834
Neonatal death	2(1%)	6(2%)	0.28(NS)	0.491	0.147-1.64
Puerperal pyrexia	4(2%)	5(2%)	1.00(NS)	0.885	0.421-1.85

From table no. 3, it was seen that during the comparison between two groups in respect to Apgar scores at 1 minutes and 5 minutes, there was better score in amnioinfusion group A (unpaired two-tailed P-Value 0.001 and 0.038 respectively). By Fisher's exact test, it was seen that presence of meconium below the level of vocal cord of the neonates were significantly more in group B (P=0.021). Though the incidence of meconium aspiration syndrome was more in group B (5 vs 2), but it was not statistically significant (p=0.44). Neonatal deaths and puerperal pyrexia were more in group B (6 cases/ 5 cases) than group A (2 cases/ 4 cases) but these were not statistically significant (p value 0.28 and 1.00 respectively).

IV. Discussion

The cases (n=125) and the controls (n=125) in our study were compared in respect to baseline parameters such as age, parity, gestational age in weeks, birth weight of the babies and degree of meconium stained. From analysis of our study, most of the mothers both in study and control groups fall of between 18-25 years (68% in study group and 72% in control group). According to parity distribution, most patients were primigravida both in study group(78%) and control groups (70%). After pervaginal examination, it was seen that medium and thick meconium stained liquor was present in study group 72% and control group 77%. All the mothers under study were given amnioinfusion in active labour with meconium stained liquor when average cervical dilation was 6.72±0.11 cm and mean delivery time (in hours) from onset of the procedure upto delivery by any route was 5±0.13. The rate of caesarean section was less in group A compared to control group (p=0.003) which was statistically significant. Similar results were shown in the study by Asmita M Rathore et al, Paul R Cialone and MA Elserly^{3, 4, 10}. But in respect to assisted vaginal delivery in the form of ventouse or forceps, there was no significant statistical difference (p=0.986). The study by Neeta B et al had similar findings of non-significant differences between two groups in respect to instrumental delivery⁸. After delivery of the baby, Apgar scores at 1 minutes were compared between two groups. It was seen that there was better score in amnioinfusion group A (unpaired two-tailed P-Value 0.001 and 0.038 respectively). Similarly, Apgar score at 5 minutes, the score was lower in Group B (p=0.038). Amnioinfusion improved the Apgar score of baby at 1 minutes and 5 minutes. It was seen that presence of meconium below the level of vocal cord of the neonates were significantly more in group B (P=0.021) though the incidence of meconium aspiration syndrome was more in group B (5 vs 2). But it was not statistically significant (p=0.44). The randomized controlled study done by M A Elserly showed less meconium aspiration syndrome and presence of meconium below the level of vocal cords. (p= 0.018 and 0.001 respectively).¹⁰ The multicentre trial conducted in Zimbabwe and South Africa showed a statistical significant reduction in meconium aspiration syndrome in the amnioinfusion group.(3.1% vs 12.8%:RR 0.24: 95% CI 0.12-0.48)⁷. Neonatal deaths and puerperal pyrexia were more in group B (6 cases/ 5 cases) than group A (2 cases/ 4 cases) but these were not statistically significant (p value 0.28 and 1.00 respectively). Similar study by Neeta B supported the findings of maternal pyrexia (p=0.23).⁸

V. Conclusion

There is less caesarean section rate in amnioinfusion group compared to other group. Maternal infection in the form of puerperal pyrexia is also not increased. Presence of toxic meconium below the level of vocal cord is also diminished and Apgar score after birth is definitely improved in study group. Incidence of meconium aspiration syndrome is also less but it is not statistically significant. So, we recommend amnioinfusion in labour with meconium stained liquor as it is cheap easy effective procedure without serious side effects. But future randomized controlled trial with large sample size will be needed.

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