ORIGINAL ARTICLE
pISSN 0976 3325 | eISSN 2229 6816
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www.njcmindia.org

INTRAPARTUM AMNIOINFUSION IN MECONIUM STAINED AMNIOTIC FLUID- A RANDOMIZED CONTROL STUDY IN A TERTIARY CARE HOSPITAL

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Financial Support: None declared
Conflict of interest: None declared

How to cite this article:
Vachhani AD, Shah JM, Goel GS, Mehta MN, Desai AI, Dalal MT. Intrapartum Amnioinfusion in Meconium Stained Amniotic Fluid- A Randomized Control Study In a Tertiary Care Hospital. Ntl J of Community Med 2015; 6(3):442-444.

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Date of Submission: 12-06-15
Date of Acceptance: 29-08-15
Date of Publication: 30-09-15

ABSTRACT

Objective: The study was undertaken to evaluate maternal and Perinatal outcomes following transcervical intrapartum amnioinfusion in women with meconium stained amniotic fluid.

Methods: A randomized control study was conducted on 200 women with moderate to thick meconium stained amniotic fluid during labor. Group A (study group) of 100 cases received amnioinfusion. Group B (control group) of 100 cases received standard obstetric care. Fetal heart rate monitoring was done using cardiotocography.

Results: 66% of women were in the age group of 21-25 years. Average cervical dilatation at detection of meconium and detection of meconium to delivery interval was similar in both groups. In the study group, 68% women had normal vaginal delivery as compared to 49% in the control group ($p<0.01$). Operative delivery was required in 32% and 51% cases in groups A and B respectively. Meconium aspiration syndrome was developed in 5% cases in group A and 15% cases in group B ($p=0.02$, Odds ratio 0.29 (0.1-0.85)). There were no differences in Apgar scores, NICU admissions and Perinatal mortality between two groups. No any maternal complications were noted due to amnioinfusion.

Conclusion: Intrapartum amnioinfusion in meconium stained amniotic fluid is simple, safe and inexpensive intervention to reduce the rates of meconium aspiration syndrome and its complications.

Key words: Amnioinfusion, Meconium, Aspiration, randomized control study

INTRODUCTION

Passage of meconium during labor is a nightmare for the Obstetricians as it is associated with significant neonatal morbidity and mortality. It results from neural stimulation of a mature GI tract and usually results from fetal hypoxic stress. Meconium stained amniotic fluid is relatively common problem occurring in 5 to 24.6% of all deliveries[1]. Effects of the meconium stained amniotic fluids include meconium aspiration syndrome (MAS), neonatal sepsis and skin erythema. About 10% of neonates develop meconium aspiration syndrome. Transcervical amnioinfusion has been proposed as a mean for reducing the complications[2]. The basis of this procedure is dilution of meconium and cushioning of the umbilical cord to prevent compression. The objective of this study was to observe the effects of amnioinfusion on Perinatal outcome.

METHOD

This randomized controlled study was carried out between Jun 2011 to December 2012 in the department of Obstetrics and Gynecology, SMIMER, Surat. Approval of hospital Ethics' committee was obtained prior to conducting the study. Inclusion criteria were: cervical dilatation 3 to 7 cm, gestational age of 37 weeks or more, presence of moderate to thick meconium and single live fetus with cephalic presentation. Exclusion criteria were: scarred uterus, Chorioamnionitis, antepartum hemorrhage, congenital malformation of fetus and indication for immediate delivery such as severe fetal bradycardia or cord prolapse

Women matching the above criteria, allocated to either group A or group B by sequentially numbered opaque envelope. The study was conducted on 200 women. Women in group A received an amnioinfusion (study group, n=100) and women in group B received the standard care forming the control group (n=100). The written informed consent was taken from each of the participants voluntarily.

Method of amnioinfusion: The perineum was painted with povidone-iodine solution and draping was done. A sterile K-90 catheter was inserted through the cervix into the uterine cavity just above the fetal head. 500 ml of normal saline was infused through the catheter over 30 min. Additional fluid was given at the rate of 180-200 ml/hour.

Women in both groups were managed in left lateral position and received IV fluids and O_2 inhalation. Fetal heart sounds were continuously monitored by cardiotocography. The progress of labor was monitored by partograph. Augmentation with oxytocin was done when required. The decision regarding LSCS was taken if fetal heart rate decelerations or slow progress of labor develop. The neonatologist was called at the time of delivery. The details regarding mode of delivery, Apgar score, Perinatal and maternal complications were noted. Results were analyzed with chi-square test and relative risk with odds ratio (95% confidence interval) using EPI-Info analytical software.

RESULTS

Table 1 show that 66% of women were in the age group of 21-25 years. Average cervical dilatation at detection of meconium was 4.45 cm in group A and 4.37 cm in group B which was almost similar in both groups. As shown in table 2, detection of meconium to delivery interval was similar in both groups (3.25 hrs vs 3.57 hrs).

In the study group, 68% women had normal vaginal delivery as compared to 49% in the control group. The difference was statistically significant ($p<0.01$).

Table 1: Profile of study participants

Profile	Group A (n=100)	Group B (n=100)
Age in years		
<20	9%	11%
21-25	63%	69%
26-30	23%	18%
31-35	5%	2%
Parity		
Primiparous	45%	56%
Multiparous	55%	44%
Cervical dilatation at detection of MSAF		
3-4 cm	55%	56%
5-6 cm	36%	37%
>6 cm	9%	7%
Average	4.45 cm	4.37 cm

Table 2: Detection of meconium to delivery interval

Detection of meconium to delivery interval in hours	Group A (n=100)	Group B (n=100)
0-1 hr	15%	6%
1-3 hr	41%	47%
3-5 hr	36%	40%
> 5 hr	8%	7%
Average	3.25 hr	3.57 hr

Table 3: Mode of delivery

Mode of delivery	Group A (n=100)	Group B (n=100)
Vaginal delivery	68%	49%
Operative delivery (LSCS+Instrumental)	32%	51%

P<0.01, Odds ratio 2.21(1.24-3.92), Significant

Table 4: Perinatal outcome of the cases

Parameter	Group A (n=100)	Group B (n=100)
APGAR score		
> 7 at 1 min	86%	77%
< 7 at 1 min	14%	23%
> 7 at 5 min	95%	87%
< 7 at 5 min	5%	13%
Meconium aspiration syndrome	5%	15%
NICU admission	11%	21%
Perinatal deaths	1%	4%

Operative delivery was required in 32% and 51% cases in groups A and B respectively. Even

though Apgar score < 7 at one minute after birth was present in 14% and 23% cases in groups A and B respectively, this difference was not significant (p=0.1). Similarly Apgar score < 7 at five minutes after birth was present in 5% and 13% cases in groups A and B respectively, which was not significant (p=0.05). Meconium aspiration syndrome was developed in 5% cases in group A and 15% cases in group B, which was significant (p=0.02, Odds ratio 0.29 (0.1-0.85)). It suggests that amnioinfusion is effective in reducing the incidence of meconium aspiration syndrome. NICU admissions were required in more cases in group B (21% vs 11%). This difference was not significant (p=0.053). Difference in mortality in both the groups was not significant (p=0.17, odds ratio 0.24(0.02-2.2)). No any maternal complications were noted due to amnioinfusion.

DISCUSSION

Effects of the meconium stained amniotic fluids are: (i) aspiration of meconium stained amniotic fluid before, during and after birth leading to airway obstruction, surfactant dysfunction and chemical pneumonitis which ultimately lead to respiratory distress, gross ventilation-perfusion mismatch and persistent pulmonary hypertension of the newborn. (ii) Presence of meconium into the amniotic fluid reduces its antibacterial activity, increasing the risk of Perinatal infection. (iii) Meconium is irritating to the fetal skin leading to erythema toxicum. Complications of meconium aspiration are most serious.

Amnioinfusion was first described in 1976. Potential mechanisms through which amnioinfusion acts include mechanical cushioning of the umbilical cord to prevent cord compressions that lead to fetal acidemia, predisposition to MAS and dilution of meconium. Thin meconium is not associated with increased incidence of meconium aspiration syndrome. So diluting the thick meconium reduces the risk of meconium aspiration[3]. This was the reason for less number of cases required operative deliveries in the amnioinfusion group (32% vs 51%). Similar observations were made by other authors also[4,5,6,7]. Thakkar PA et al, Spong CY et al and Fraser WD et al did not find any difference in LSCS rate in the study and control groups [8, 9]. Our study shows that incidence of MAS reduced in the Amnioinfusion group (5% vs 15%). Similar Observations were also made in other studies [10, 11, 12, 13, 14, 15].

CONCLUSION

Intrapartum amnioinfusion in meconium stained amniotic fluid is simple, safe and inexpensive intervention to reduce the rates of meconium aspiration syndrome and its complications.

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