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Will An Amnioinfusion Reduce Fetal Distress in Cases of Thick Meconium Amniotic Fluid

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Authors Contribution:
MSA – Conceived Idea, Designed Study, Data Analysis
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HI- Data Collection, Literature Review, -, Final Proof Reading

Abstract
Objective: To find out if Amnioinfusion can reduce fetal distress in cases of thick meconium amniotic fluid.
Study Design: Randomized Control Trail.
Location and Duration: Department of Pediatrics Medicine Nishtar Hospital Multan from January 2017 to February 2018.
Material and methods: A total of 138 patients were included the study. Patients were divided into two equal groups, cases and controls. Group 1 received amnioinfusion while group II being the control group received standard care. Age, parity, cervical dilatation, interval between detection of meconium and delivery, percentage of neonates developing meconium aspiration syndrome, neonates getting admission in neonatal intensive care units and neonatal death were the variables measured and analyzed. Mean and standard deviation was calculated for continuous variables while frequency and percentage was calculated for categorical variables. Chi square test was applied and p value of less than or equal to 0.05 was considered as significant.
Results: APGAR score was more than 7 in 68.1% of the cases and 44.9% of the controls at 1 minute after birth. The difference was statistically significant (p=0.006). APGAR score was more than 7 at five minutes after birth in 92.8% of the cases and 76.8%of the controls (p=0.009). The incidence of meconium aspiration syndrome, NICU admissions and perinatal deaths was 13%, 17.4% and 4.3% in the group receiving amnioinfusion and 23.2%, 29% and 10.1% in the controls.
Conclusion: The results of the study clearly show that amnioinfusion is certainly very effective in reducing the incidence of fetal distress along with overall better outcomes as compared to the standard care of the meconium stained amniotic fluid.
Keywords: Amnioinfusion, fetal distress, thick meconium, amniotic fluid

Introduction

Obstetricians see passage of meconium during labor as a nightmare as it is often associated with significant number of neonatal morbidities and mortality [1]. About 8 to 16% deliveries are complicated by the passage of meconium in utero. Fetal hypoxic stress is the main cause of the passage of meconium which is caused by the neuronal stimulation resulting in stimulation of mature GI tract [2]. Meconium aspiration syndrome, skin erythema and neonatal sepsis are the possible complication resulting from meconium stained amniotic fluid [3]. The mechanism of association of these complications with meconium stained amniotic fluid is not fully understood. Incidence of meconium aspiration syndrome is reported to be around 10% in neonates [4]. Despite being an uncommon complication, meconium aspiration syndrome is one of the major causes of neonatal mortality and morbidity [5]. Meconium aspiration syndrome can develop before the start of the labor, during the process of labor or after delivering the baby. Methods to prevent this syndrome from developing are usually combined obstetric and pediatric approach and different methods have been purposed for this [6]. One of the methods to prevent this syndrome is transcervical amnioinfusion in which the basic principle of dilution of meconium and cushioning of umbilical cord is used to prevent umbilical cord compression [7].

Transcervical amnioinfusion involves use of a DeLee catheter for suctioning of mouth, nasopharynx and hypopharynx, at the time of the birth of the head [8]. Pediatrician immediately suctions the oropharynx with the help of a bulb and uses a laryngoscope to inspect the vocal cords. If meconium is found at the level of cord, direct suctioning of trachea is performed. This process was based upon the assumption according to which meconium aspiration occurs predominantly during delivery process. This procedure is a prophylactic measure to prevent the meconium aspiration syndrome.

This study is aimed to find whether transcervical amnioinfusion can reduce the occurrence of meconium aspiration syndrome and if it is effective in providing better neonatal outcomes. Not many studies have been done regarding the efficacy of this procedure. Rationale of our study is to assess the efficacy of this procedure during labor complicated by meconium.

Material and Method:

This is a randomized control trail carried out in department of Obstetrics and Gynecology Nishtar Medical College from January 2017 to February 2018. Ethical approval for the study was obtained from the hospital ethics committee. Sample was calculated from the reference study carried out by Ashvin D Vachhani et al. Sample was collected using the non probability consecutive sampling technique. A total of 138 patients were included the study. Patients were divided into two equal groups depending upon the treatment being received. Inclusion criteria were set as women presenting with cervical dilatation of 3 to 7 cm, presence of thick meconium, cephalic presentation of the fetus and thirty seven weeks of gestation or more. Patients with scarred uterus, antepartum hemorrhage, chorioamnionitis and fetal congenital malformation were excluded from the study. Moreover patients with the indication of immediate delivery (severe fetal bradycardia or cord prolapse) were also excluded from the current study. Group 1 received amnioinfusion while group II being the control group received standard care. An informed consent was taken from the mothers before including them into the study.

For amnioinfusion povidone was used to paint the perineum and draping was performed. Just above the fetal head, a sterile catheter (K-90 catheter) was introduced into the uterine cavity through cervix. Normal saline (500 ml) was infused for 30 minutes via the catheter. Further infusion was carried out at the rate of 180 to 200 ml\hr. IV fluids and oxygen inhalation was given to all the women. All women were dealt with in left lateral position. Cardiotocography was used to monitor the fetal heart rate on continuous basis. Whenever there was need to augment the labor, oxytocin was administered. The decision to perform lower segment cesarean section was based upon the evidence of decelerations in fetal heart rate and slowly progressing labor. A neonatologist with five years of experience was present at the time of the delivery to carry out the procedure of amnioinfusion and management of the neonates. Following parameters like, Apgar score, mode of delivery, perinatal complications and maternal complications were recorded. Age, parity, cervical dilatation, interval between detection of meconium and delivery, percentage of neonates developing meconium aspiration syndrome, neonates getting admission in neonatal intensive care units and neonatal death were the variables measured and analyzed. All the data thus collected was subjected to statistical analysis using computer software SPSS version 23. Mean and standard deviation was calculated for continuous variables while frequency and percentage was calculated for categorical variables. Chi square test was applied to check the significance of outcome variables between the two groups and p value of less than or equal to 0.05 was considered as significant.

Results

One hundred and thirty eight patients were divided into two equal groups. Both groups were comparable in terms of age groups ($p>0.005$). More than 68% patients were between 21 and 30 years of age. The number of Primiparae and multiparae women was similar in both the groups. Observed cervical dilatation at the time of detection of meconium in the amniotic fluid was also similar in both groups. Mean cervical dilatation at the time of detection of meconium in the amniotic fluid was 5.15±1.73 cm in the test group and 5.04±1.77 cm in the controls ($p>0.005$). (Table-I) Time interval between detection of meconium and the time of delivery was also comparable in both the groups. Mean time interval was 3.00±1.79 hours in the test group and 3.22±1.86 hours in the controls ($p>0.005$). (Table-II)

The incidence of operational delivery was significantly more (60.9%) in the controls as compared to in the cases (39.1%). On the other hand, the incidence of vaginal delivery was higher in the cases than in the controls ($p=0.041$). (Table-III) APGAR score was more than 7 in 68.1% of the cases and 44.9% of the controls at 1 minute after birth. The difference was statistically significant ($p=0.006$). APGAR score was more than 7 at five minutes after birth in 92.8% of the cases and 76.8%of the controls ($p=0.009$). The incidence of meconium aspiration syndrome, NICU admissions and perinatal deaths was 13%, 17.4% and 4.3% in the group receiving amnioinfusion and 23.2%, 29% and 10.1% in the controls. (Table-IV)

Table-I
Profile of the patients under study

Profile		Group 1 (n=69)	Group 2 (n=69)
Age in years	<20	17.4%	21.7%
	21-25	49.3%	31.9%
	26-30	24.6%	30.4%
	31-35	8.7%	15.9%
Parity	Primipara	66.7%	60.9%
	Multipara	33.3%	39.1%
Cervical Dilatation at detection of meconium stained amniotic fluid	3-4 cm	44.9%	47.8%
	5-6 cm	27.5%	27.5%
	>6cm	27.5%	24.6%
	Mean ± S.D	5.15±1.73 cm	5.04±1.77 cm

Table-II
Interval between detection of meconium and delivery

Interval between detection of meconium and delivery	Group 1 (n=69)	Group 2 (n=69)
0-1 hour	20.3%	18.8%
1-3 hours	30.4%	24.6%
3-5 hours	36.2%	40.6%
>5 hours	13%	15.9%
Mean ± S.D	3.00±1.79 Hours	3.22±1.86 Hours

Table-III
Mode of Delivery

Mode of Delivery	Group 1 (n=69)	Group 2 (n=69)	p-value
Vaginal Delivery	56.5%	39.1%	0.041
Operational Delivery	43.5%	60.9%	

Table-IV
Perinatal Outcomes

Parameter		Group 1 (n=69)	Group 2 (n=69)
APGAR Score *	>7 at 1 minute	68.1%	44.9%
	<7 at 1 minute	31.9%	55.1%
	>7 at 1 minute	92.8%	76.8%
	<7 at 1 minute	7.2%	23.2%
Meconium Aspiration Syndrome		13%	23.2%
NICU Admission		17.4%	29%
Perinatal Death		4.3%	10.1%

P-value=0.006 at 1 minute and 0.009 at 5 minutes, statistically significant; NICU=neonatal intensive care unit

Discussion

Review of the previous literature shows that amnioinfusion has beneficial effect in terms of maternal and neonatal outcomes in settings of meconium stained amniotic fluid. But in a study the conclusion was made that amnioinfusion is only beneficial in settings where there are limited availability of surveillance activities. Moreover it was also suggested that it is difficult to understand whether these beneficial effects are due to relief of oligohydromios and dilution of meconium [9]. So in that particular study they rendered amnioinfusion as an ineffective method for the management of meconium stained amniotic fluid in order to reduce neonatal complications such as meconium aspiration leading to neonatal distress. Where in contrast to this study another study has proved that transcervical intrapartum amnioinfusion is efficient in patients with meconium stained amniotic fluid [10]. Same was the case in another study that assessed the efficacy of amnioinfusion in terms of the reduction in frequency of cesarean sections and concluded that this technique is significantly associated with reduction of requirement of cesarean infection [11]. Likewise another study was in consensus with the results of our study in showing that amnioinfusion is not only associated with lower number cesarean sections but is also associated with lowering the incidence of fetal distress. Other beneficial effects reported in that study included

decrease in the incidence of respiratory distress, meconium below vocal cord, neonatal intensive care unit admission and fewer one minute Apgar scores of less than seven [12].

In our study we concluded that amnioinfusion is significantly effective in meconium stained amniotic fluid but a study showed that in settings of standard surveillance and facilities this technique should not be used as their results were against the results of our current study. They suggested that in standard care settings amnioinfusion is not as effective as compared to the conventional methods of management of meconium stained amniotic fluid by preventing meconium aspiration syndrome, perinatal deaths and\or any other neonatal complications [13]. But results and conclusion of our study is backed up by the results and conclusion of a previous study in which efficacy of amnioinfusion was determined in a tertiary care hospital and results suggested that this technique is quite useful in this setting by reducing the rate of cesarean section, better neonatal outcomes in terms of reduced need of resuscitation, Apgar score and reduced neonatal morbidity [14]. Multiple studies favor the results of this study and thus it can be safely said that amnioinfusion is relatively safe and effective in management of complications of meconium stained amniotic fluid [15, 16 & 17].

Conclusion

The results of the study clearly show that amnioinfusion is certainly very effective in reducing the incidence of fetal distress along with overall better outcomes as compared to the standard care of the meconium stained amniotic fluid.

Conflict of interest

There was no conflict of interest.

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