



EFFECTIVENESS OF INTRAPARTUM TRANSCERVICAL AMNIOINFUSION IN CASE OF MECONIUM STAINED AMNIOTIC FLUID REDUCING FETAL DISTRESS

Gynaecology

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ABSTRACT

Introduction: Amniotic fluid serves several functions, providing a medium for fetal growth and development, also it contains important nutrients, hormones and antibodies. 20-30% of meconium stained liquor leads to meconium aspiration in which 4-5% of meconium stained liquor leads to meconium aspiration syndrome which accounts to 4-10% of neonatal death.

Material And Methods: Study done at Pannadhay Zanana Hospital, RNT Medical College, Udaipur between October 2018 to 2019 on women at term with vertex presentation having meconium stained liquor. 100 women with MSAF were randomly selected to receive amnioinfusion and 100 were categorized into control group.

Results: In Study group, 63 women (63%) delivered vaginally compared to 32 women (32%) in Control group ($p < 0.001$). In study group, maximum risk factor was of postdatism (29%), (18%) had cord around neck. In control (32%) had postdatism, (25%) had cord around neck. There were 49% of latent labour and 51% cases of active labour in study group. 56% cases of latent labour and 44% cases of active labour in control group. Mean hospital stay of women in Study group was 3.18 ± 1.79 days. While in control group, it was 5.17 ± 2.06 days, the difference was statistically highly significant ($p < 0.001$).

Conclusion: This study concludes that meconium stained liquor is associated with more complications like increased operative interference, meconium aspiration syndrome, birth asphyxia, low Apgar score, more NICU and hospital stay and increased perinatal mortality.

KEYWORDS

Meconium; Birth Asphyxia; Amnioinfusion

INTRODUCTION

Amniotic fluid serves several functions, providing a medium for fetal growth and development, also it contains important nutrients, hormones and antibodies. It protects the baby from injury, the fluid cushions the baby from outside pressures acting as a shock absorber. Baby floats inside the amniotic sac which gives freedom to baby for movements and also provide muscles and bone the opportunity to develop properly. Fluid in the uterus prevents the umbilical cord from compression. This cord transports fluid and oxygen from the placenta to growing foetus. Amniotic fluid also maintain intrauterine temperature. Meconium is the first intestinal secretion from the fetus. It contains GIT secretions, bile juice, cellular debris, amniotic fluid swallowed vernix caseosa, lanugo, blood. Meconium found in 12-22% of all deliveries and is up to 20% in term pregnancy and up to 50% in post dated pregnancy. 20-30% of meconium stained liquor leads to meconium aspiration in which 4-5% of meconium stained liquor leads to meconium aspiration syndrome which accounts to 4-10% of neonatal death.¹

The risk factors for meconium stained amniotic fluid are both maternal and fetal. The maternal factors are hypertension, Gestational Diabetes mellitus, maternal chronic respiratory or cardiovascular diseases, post term pregnancy, preeclampsia, eclampsia. The fetal factors include oligohydramnios, intrauterine growth restriction, poor biophysical profile.²

However, if aspirated by the fetus before or during birth, meconium can obstruct the airways, interfere with gas transfer and cause respiratory difficulties. Severe pulmonary dysfunction occurs in about one-half of the infants diagnosed with meconium aspiration syndrome³. Advances in the postnatal management of meconium aspiration syndrome such as low tidal volume ventilation, surfactant replacement and inhaled nitric oxide therapy may be important factors in this decline.⁴

The meconium staining of the amniotic fluid was classified as grade I, II and III by visual examination after spontaneous or artificial rupture of membranes.

Grade I: Meconium stain liquor is translucent, light yellow green in colour.

Grade II: Meconium stain liquor is opalescent with deep green and light yellow in colour.

Grade III: Meconium stain liquor is opaque and deep green in colour.

MAS (Meconium Aspiration Syndrome) is one of the most common cause of neonatal respiratory distress hence the presence of meconium in amniotic fluid is a subject to concern treatment strategies are: Deep suctioning of hypopharynx and nares during delivery and Immediate tracheal suctioning after birth.

Despite airway cleaning, meconium aspiration syndrome is not always prevented, the causative factor being "in utero aspiration". Meconium aspiration remains the most significant cause of morbidity and mortality during neonatal period. 10 to 30% of meconium stained babies develop varying degree of respiratory difficulties. It causes acute airway obstruction, chemical pneumonitis, surfactant dysfunction or inactivation, and pulmonary hypertension. If severe, hypoxemia may lead to neonatal death or long term neurological sequelae in survivors. High frequency of meconium stained amniotic fluid in laboring women at term, so meconium aspiration relatively common. Amnioinfusion reduced risk of meconium aspiration. It is a simple, inexpensive and feasible technique to improve fetal outcome.

AIMS & OBJECTIVES

- 1) To study the effectiveness of amnioinfusion.
- 2) To know the neonatal outcome in patients with meconium stained liquor.
- 3) To study the incidence of meconium aspiration syndrome in term pregnancy.
- 4) To study the incidence of intrapartum operative interventions in women with meconium stained liquor.

MATERIAL & METHODS

This hospital based interventional randomized control study was carried out in Pannadhay Zanana hospital, RNT Medical College, Udaipur during the period October 2018 – 2019.

Inclusion Criteria:

- 1) Live singleton pregnancy;
- 2) Term labour (> 37 completed week) with latent and active phase;
- 3) Vertex presentation;
- 4) Normal fetal heart rate with regular rhythm;
- 5) Having meconium stained liquor on spontaneous rupture of membrane or after doing artificial rupture of membranes.

Exclusion Criteria:

- 1) Multiple gestation;
- 2) Malpresentations;
- 3) Fetal congenital anomalies;
- 4) Polyhydramnios;
- 5) Prelabour rupture of membranes;
- 6)

Chorioamnionitis; 7) Antepartum hemorrhage; 8) Previous caesarean section.

After a detailed history including complications during pregnancy, general physical examination, obstetric examination were performed. Patients categorized in two groups, first one with amnioinfusion (study group) and other one with no amnioinfusion (control group) with 100 patients in each group.

Amnioinfusion:

Patient was asked to lie in dorsal position and sterilized catheter was introduced transcervically under aseptic precaution so that its tip lies just above the baby's head. 500 ml normal saline infused over 20 minutes then 500 ml more will be infused at the rate of 30-45 drops per minute. Both groups were managed in labour ward as per routine policy. The labour was monitored by using routine partograph. Patient was kept in left lateral position. Number of uterine contractions in 10 minutes and tone and duration of each contraction were noted. Augmentation for inadequate uterine contraction was done with use of oxytocin, if there was a delay in the progress of labor and no fetal bradycardia recorded. Presence of any antepartum complications like uterine hypertonus, incoordinate uterine activity or uterine rupture were noted and managed accordingly. If fetal distress was diagnosed than patients were taken for caesarean section. Time and mode of delivery, duration between detection of MSAF and delivery of fetus was noted. Baby handed over to paediatrician. endotracheal suction was done directly through an endotracheal tube, if required. Babies with meconium were observed and 1 minute and 5 minute Apgar score were recorded. If babies had any respiratory distress then they were immediately shifted to NICU. Neonate and maternal well-being was monitored till the date of discharge from hospital.

RESULTS AND DISCUSSION

Table No. 1: Distribution Of Patients According To Mode Of Delivery

Mode of Delivery	CASE		CONTROL		Total	
	No.	%	No.	%	No.	%
SPND	63	63.00%	32	32.00%	95	47.5%
LSCS	20	20.00%	60	60.00%	80	40%
Assisted Del.	17	17.00%	8	8.00%	25	12.5%

p<0.001 (Highly Significant)

In the above table in Study group, 63 women (63%) delivered vaginally compared to 32 women (32%) in Control group. The p-value was <0.001 which was highly significant. In Study group, 17 women (17%) had assisted vaginal delivery (ventouse/ outlet forceps) compared to 8 women (8%) in Control group. The p-value was >0.05 which was not significant. In Study group, 20 women (20%) were taken for caesarean section compared to 60 women (60%) in Control group. The p-value was highly significant (<0.001). This difference is due to increase in number of caesarean section due to fetal distress (irregular fetal heart pattern) in Control group. Our findings are in accordance to the studies⁵⁻⁷

Table No. 2: Distribution Of Patients According To Indication Of Caesarean Section

Indication of Caesarean Section	CASE		CONTROL		Total		Pvalue
	No.	%	No.	%	No.	%	
Arrest in second stage	0	0%	1	100%	1	0.50%	>0.05
Cord prolapse	0	0%	1	100%	1	0.50%	>0.05
CPD	1	25%	3	75%	4	2%	>0.05
DTA	3	38%	5	63%	8	4%	>0.05
Fetal distress	15	25%	44	73%	60	30%	<0.001
Obstructed	1	33%	2	67%	3	1.50%	>0.05
Oligo	0	0%	3	100%	3	1.50%	>0.05
Vaginal warts	0	0%	1	100%	1	0.50%	>0.05

In the above table, out of 60 caesarean sections; in Study group 15 (25%) were due to fetal distress, compared to 44 (73%) in Control group. The p-value was <0.001 which was significant. In Study group, 1 woman (33%) had caesarean section due to obstructed labour compared to 2 (67%) in Control group. The p-value was >0.05 which was not significant. In study group, 3 woman (38%) had caesarean section due to DTA compared to 5 (63%) in control group. The p-value was >0.05 which was not significant.

In the study by Shilpa et al (2014)⁸ similar findings were shown. In their

study group, out of 7 cesarean sections; 3 (42.86%) were due to fetal distress compared to 16 out of 23 cesarean sections (69.57%) in Control group. The p-value was <0.05 which was significant. In Study group, 3 women (42.86%) had caesarean section due to arrested labour compared to 4 (17.39%) in Control group. The p-value was >0.05 which was not significant. In study group, 1 woman (14.28%) had caesarean section due to protracted labour compared to 3 (13.04%) in control group. The p-value was >0.05 which was not significant.

A possible explanation for the lower incidence of caesarean section in the amnioinfusion group is that by increasing amniotic fluid volume around the fetus, amnioinfusion reduces the risk of fetal distress caused by umbilical cord compression induced vagal stimulation. It probably decreases further meconium passage, as well as, removes the stimulus for deep fetal breathing and gasping.

Table No. 3: Status Of Babies At Birth

Status	CASE		CONTROL		Total	
	No.	%	No.	%	No.	%
Vigorous	86	86%	58	64%	146	73%
NonVigorous	14	14%	42	36%	54	27%

p<0.001 (Highly Significant)

A total of 58 (64%) babies of control group and 86 (86%) babies of study group were vigorous at birth, 42 babies (36%) of control group and 14 (14%) babies from study group were non vigorous. Babies of study groups were significantly more vigorous (p<0.001).

Asnani M et al (2016)⁹ had similar findings. A total of 18 (45%) babies of control group and 27 (67.5%) babies of study group were vigorous at birth, 22 babies (55%) of control group and 13 (32.5%) babies from study group were non vigorous. Babies of study groups were significantly more vigorous.

Table No. 4: Distribution Of Cases According To Phase Of Labor At The Time Of Meconium

Phase	CASE		CONTROL		Total	
	No.	%	No.	%	No.	%
Latent	49	49%	56	56%	105	52.5%
Active	51	51%	44	44%	95	47.5%

p>0.05 (Not Significant)

There were 49 (49%) cases of latent labour and 51 (51%) cases of active labour in study group. 56 (56%) cases of latent labour and 44 (44%) cases of active labour in control group. Our findings were similar to the findings of Qadir et al (2016)¹⁰ who had 25 (50%) cases of latent labour in study group and 29 (58%) of active labour. Similarly other studies¹¹⁻¹² reported 17 & 30 cases respectively in latent phase of labour and 22 & 94 cases in active phase of labour in their study.

Table No. 5: Distribution According Neonatal Complications

Characteristics	CASE		CONTROL		Total		P value
	No.	%	No.	%	No.	%	
MAS	5	5%	7	7%	12	12%	>0.05
Asphyxia	3	3%	19	19%	22	22%	<0.001
Pneumonia	1	1%	7	8%	9	9%	<0.05
Septicemia	0	0%	4	4%	4	4%	<0.05
Alive	93	93%	100	100%	193	96.5%	<0.001
Still Birth	7	7%	0	0%	7	3.5%	

In study group, 3 neonates (3%) had asphyxia in study group and 19 (19%) in control group. The p-value was <0.001 which was highly significant. Similar findings were of Gupta P et al (2016)¹⁴, in their study 6 neonates (17.14%) had mild birth asphyxia 2 (5.71%) had moderate birth asphyxia {total 8(22.86%)} compared to 9(25.71%) with mild asphyxia and 4(11.42%) with moderate asphyxia {total 13(37.14%)} in Control group. The p-value was >0.05 which was not significant.

There were 100% live birth in study group as compared to 93% in control group. Similar findings were seen in the study by Gupta P et al¹⁴ (2016), they reported 2% mortality in study group. Dinobandhu et al (2013)¹⁵ reported 12% mortality in control group and none in study group.

Table No. 6: Duration Of Hospital Stay Of Mother

Hospital Stay	CASE		CONTROL		Total	
	No.	%	No.	%	No.	%
≤3 days	72	72%	30	30%	102	102%
4-6 days	24	24%	62	62%	86	86%
>6 days	4	4%	8	8%	12	12%

p<0.001 (Highly Significant)

In Study group, hospital stay of mothers less than 4 days was 72%, 24% had stay of 4-6 days and 4% had stay of >6 days. While in control group, hospital stay of mothers less than 4 days was 30%, 62% had stay of 4-6 days and 8% had stay of >6 days. The p-value was <0.001 which was highly significant.

In the study by Shilpa et al (2014)⁸ in Study group, 26 (74.29%) had hospital stay of ≤3 days, 7 women (20%) had stay of 4-6 days and only 2 women (5.71%) had stay of >6 days. While in Control group, 9 women (25.71%) had hospital stay of ≤3 days, 14 women (40%) had stay of 4-6 days and 12 women (34.29%) had stay of >6 days. The p-value was <0.01 which was significant.

CONCLUSION

The results of our small study support the theory that amnioinfusion does reduce the risk of fetal morbidity associated with meconium stained amniotic fluid. No serious adverse effects on either mother or fetus, related to amnioinfusion were observed.

Amnioinfusion should be only one of the number of interventions aimed at reducing the risk of MAS. Others include electronic fetal HR monitoring, operative delivery in selected cases and proper airway support in the newborn period. Also the relative benefits of the AI could depend on the pattern of use of these co-interventions.

This study concludes that meconium stained liquor is associated with more complications like increased operative interference, meconium aspiration syndrome, birth asphyxia, low Apgar score, more NICU and hospital stay and increased perinatal mortality. Amnioinfusion reduces the rate of cesarean section significantly while at the same time improve the neonatal outcome in terms of both Apgar Score, reduced need of resuscitative measures and reduced neonatal morbidity. It is safe, easy and inexpensive procedure useful in patients with meconium stained amniotic fluid. It decreases the need for operative intervention thus reducing the neonatal and maternal morbidity.

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