Research Article

Randomised clinical trial of amnioinfusion and caesarean section in cases of thick meconium stained amniotic fluid, fetal and neonatal outcome

Rajashree Bhosale[1*], Sanjaykumar Patil[2], Yamini Patil[3], Nitin Kshirsagar[4]

[1]Senior Resident, [2]Associate Professor, [3]Associate Professor, [4]Professor and HOD, Department of Obstetrics and Gynaecology, Krishna Institute of Medical Sciences, Karad, Maharashtra, INDIA.
Email: rajshri.bhosale@gmail.com

Abstract

Aims and Objectives: To compare the fetal, neonatal outcome in amnioinfusion group with control group in thick meconium stained liquor at full term. To evaluate proportion of meconium aspiration syndrome in cases and control. To evaluate whether caesarean section improves perinatal outcome in thick meconium stained liquor in early first stage of labour**. Material and Method:** By all aseptic precautions a Nasogastric suction catheter size 8 was introduced through the transcervical route in cases of thick meconium stained liquor at full term and normal saline was used for amnioinfusion. 63 women receving amnioinfusion were considered as study group and 63 women not receiving amnioinfusion were included in control group. Study Period-May 2012-May 2014.Inclusion criteria: Full term pregnancy, Primigravida/multigravida, Singleton pregnancy, Vertex presentation, Cervical dilatation of 3 – 5 cm, Engaged head, Rupture of membranes, Women in active stage of labour. Exclusion criteria: Intrauterine deaths, Major fetal anomalies, Malpresentations, Chorioamnionitis, Cardiovascular disease in mother, Previous caesarean delivery, Placenta previa or abruptio placenta, Multiple pregnancy. **Conclusion:** Meconium staining of liquor is a commonly observed phenomenon. The presence of thick meconium is associated with increased incidence of perinatal morbidity and mortality. The use of simple technique such as amnioinfusion results in reduction of caesarean section and perinatal morbidity. Amnioinfusion not only reduces the burden on already limited resources in developing countries but also has cost benefit. I found in my study that amnioinfusion decreased the incidence of caesarean section. It decreased the incidence of neonatal complications like meconium aspiration syndrome, meconium below the vocal cords, neonatal intensive care unit admission, cases with Apgar < 7, thus decreases the burden on already overloaded NICU facilities. Caesarian section in amnioinfusion group showed better outcome of babies as compared to the control Group where the patients were directly posted for Caesarian section without doing amnioinfusion. Amnioinfusion is a simple, safe and cost effective procedure improving maternal, foetal and neonatal outcome.

Keywords: Amnioinfusion, Thick meconium stained liquor, caeserian section, foetus, neonate.

[*]**Address for Correspondence:**
Dr. Rajashree Bhosale, Senior Resident, Department of Obstetrics and Gynaecology, Krishna Institute of Medical Sciences, Karad, Maharashtra, INDIA.
Email: rajshri.bhosale@gmail.com

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INTRODUCTION

Incidence of meconium passage in amniotic fluid can be as high as 18 %. Katz VL[1]. Meconium staining of amniotic fluid is considered as a harbinger of fetal compromise because of its direct correlation with fetal distress and increased liklihood of inhalation of meconium with deleterious effect on neonatal lung. Meconium is a noxious material having damaging effects on the amniotic cavity, umbilical cord and vessels. Delayed exposure leads to meconium aspiration syndrome. Thick and tenacious meconium can lead to

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complications like: Lung collapse, Alveolar rupture, Interstitial emphysema, Pneumothorax, Pneumomediastinum. AMNIOINFUSION causes dilution of amniotic fluid reducing the complications.

OBSERVATIONS AND RESULTS

Table 1: Age wise distribution

Age group	Cases		Control		p Value
	No.	%	No	%	
<20	10	16	11	18	
21-25	36	57	28	44	0.5596
26-30	17	27	20	32	
31-35			4	6	

The age wise difference in cases and control was not significant.

Table 2: Parity wise distribution

Gravida	Cases		Control		p Value
	No	%	No	%	
Primi	38	61	45	71	0.1786
Gravida 2	21	33	12	19	
Gravida 3	4	6	6	10	

Majority of the patients in both the groups were primigravidas. Parity wise difference in cases and control was not significant

Table 3: Period of Gestation

Period (weeks)	Cases		Control	
	No	%	No	%
37 – 40	48	78%	32	50%
40 – 41	9	14 %	19	30%
41 – 42	6	10 %	12	20%

The p value was 0.0125.

Majority of the patients in both the groups were between 37-40wks of gestation

Table 4: Dilution effect of liquor after amnioinfusion in the study group

Liquor	Cases	
	No	%
Clear	37	58%
Thin meconium	26	42%
Thick meconium	0	

This table showed that there was not a single case, which continued to have thick Meconium after amnioinfusion

Table 5: Mode of delivery in cases

Mode	Cases	
	No	%
Spontaneous ftvd	45	71%
Ventouse / forceps Ftvd	3	5%
Oxytocin ftvd	3	5%
Lscs	12	19%

The above table showed that 71% of patients had spontaneous FTVD, thus the need for LSCS was minimized with amnioinfusion

Table 6: Apgar score in cases and control

Apgar	1 min Cases	control	5 min Cases	control	10 min Cases	control
P value	0.0058		0.4028			
< 3		2				
4 – 7	55	61	2	4		
> 7	8		61	59	63	63

The difference in the Apgar score at the end of 1 min in cases and control was significant. The difference in the Apgar score at the end of 5min in cases and control was not significant

Table 7: Comparison of apgar score in cases undergoing lscs with control

Apgar score	1 min		5 min		10 min	
	Cases undergoing LSCS	Control	Cases undergoing LSCS	Control	Cases undergoing LSCS	Control
P value	<0.0001		<0.0001			
<3		2				
4 - 7	12	61		4		
>7			12	59	12	63

This table showed that the patients undergoing LSCS after amnioinfusion had better apgar score than patients directly undergoing LSCS without amnioinfusion.

Table 8: Resuscitation technique used during birth

Technique	Cases	Control
Bag and mask	3	10
Endotracheal suction	2	15
Endotracheal suction + o2	1	5
Endotracheal suction + intubation + o2		2

The p value was <0.0001

The table 8 showed that the need for intubation to remove meconium from trachea was significantly less in the cases than control.

Table 9: Presence of meconium

Site	Cases	Control
Below vocal cord	3	22
Staining of body	10	9

The p value was 0.0034

This table showed that the percentage of the patients with presence of meconium below the vocal cords was found to be low in cases i. e. with amnioinfusion.

Table 10: NICU admission

	Cases	Control
NICU	6	32
Mother side	57	31

P value was < 0.001

The need of admission to the NICU was more in the control group than cases with amnioinfusion.

Table 11: Meconium aspiration syndrome

	Mas	P value
Cases	3	0.0006
Control	17	

This table showed that the no. of babies with MAS were more in control group than cases.

Table 12: Treatment received in NICU

Treatment	Cases	Control
Antibiotic	3	10
I. V fluids	1	12
Anticonvulsant Therapy(ACT)		2
Antibiotic + i.v fluids	2	8

The p value was < 0.0001

This table showed that the babies in control group needed more treatment than cases**.**

Table 13: NICU stay

	5 days	6 – 12 days	>12 days
Cases	5	1	-
Control	11	9	2

The p value was 0.0041.

This table showed that the NICU stay was longer for control group than for cases.

DISCUSSION

This present, prospective case control study consisted comparison of 63 cases receiving amnioinfusion and 63 not receiving amnioinfusion and directly posted for LSCS, in thick meconium stained liquor. 1) Effect of Amnioinfusion: In present study amnioinfusion significantly improved the quality of liquor, i.e., liquor which was thick meconium stained had become clear in 58% cases, and in remaining cases, the color had considerably improved. Sadovskly *et al* (1989)[2] in their study had observed that the incidence of thick meconium was significantly low after amnioinfusion. By adding volume in the cavity, not only is the meconium diluted, but the cord compression may be decreased, relieving hypoxia and therefore decreasing fetal compromise, Hofmeyr [3].There is evidence that amnioinfusion reduces the consistency of meconium. Cialone[4,5,6].2) Mode of Delivery : In present study the LSCS rate was reduced by amnioinfusion. Similar observations were made by different studies like Asmita Muthal Rathore[7], Khosla *et al*[8]. The incidence of caeserian section was less in amnioinfusion group. Similar findings were reported by Lo and rooers [9], Moodley *et al*[10] and Macri *et al* [11]. This was probably due to increase in the volume of amniotic fluid thus avoiding cord compression.

Studies	LSCS % in amnioinfusion group
Macri *et al* (1992) [11]	2.3%
Rathore *et al* (2002) [7]	21%
Present study	19%
Bhatia Pushpa (2013) [12]	14%
Partha Mukhopadhyay (2006)	19.3%

3) Apgar score: In present study I found that the apgar scores at the end of 1 min and 5 minutes were better in study group, Wenstrom and Parson (1989)[13] had also observed that patients receiving amnioinfusion had better apgar score at the end of 1 min in cases than in control. Sahu *et al* (2003) [14] also found better apgar score at 5 minutes i.e. 15% in study group and 6.6% in control group. Amnioinfusion in cases of meconium –stained liquor significantly improved neonatal outcome and lowered Caesarian Section rate without increasing any maternal and fetal complications. Bansal Neeta[15] 4) Resuscitation Techniques: In present study I observed that the need of measures to resuscitate babies were more in control group as compared to study group. Sadovaky *et al* (1989)[2] also observed significant difference between the amnionfusion and control group babies for the need for resuscitation. 5) Meconium below the vocal cord: In present study, meconium below the vocal cord was found to be significantly less in the study group to 4.7 % as compared to control group 34.9%. Table below shows the results of different studies in this regard

Studies	Amnioinfusion	Control	p Value
Wensteron and Parsons(1989) [13]	5.5%	36.3%	<0.01
Sadovsky *et al* (1989) [2]	0%	29%	<0.05
Rathore *et al*(2002) [7]	10%	24%	0.001
Sahu *et al* (2003) [14]	5%	22.6%	0.00004
Macri *et al* (1992) [11]	4.7%	38.8%	<0.01
Present study	4.7%	34.9%	0.0034 S

6) NICU admission: In present study: the total number of babies admitted in NICU were 9.5% in study group and 50.7% in control group. Sahu *et al* (2003) [14] found NICU admission in 5% in study group and 21.3% in control group. Rathore *et al* (2002)[7] found 3% in study group and 11% in control group. Asmita study found 3% in study group and 11% in control group.In present study the diagnosis of meconium aspiration syndrome was done on the basis of chest x-ray which showed that 4.7% of cases had Meconium aspiration syndrome and 26.9% of control

group had Meconium aspiration syndrome. This finding was similar to Patil Kamal P,Swamy MK Study[16] where thick meconium stained liquor had higher incidence of Meconium aspiration syndrome i.e. 19% compared to 2% in thin meconium stained group. Thus according to this study amnioinfusion plays an important role in reducing meconium aspiration syndrome. Similar observations were made by other workers like Narang A[17], Bhide SS[18], Gregory GA[19]. Pierce *et al*[20] also had similar findings. i.e. 2.5 % of Meconium aspiration syndrome in amnioinfusion group. Wenstrom and Parsons (1989)[13] found the incidence of MAS to be 6.8% in the control group and none in the study group. Rathore *et al* (2002)[7] found the incidence of 1% MAS in control group and none in study group. Sahu *et al* (2003)[14] found incidence of MAS 1% in study group and 17.3% in control group.7) Treatment Required :In present study more babies required parenteral antibiotics and anticonvulsive therapy in control group as compared to study group, these parameters were not studied by other studies. Amnioinfusion is thought to reduce the risk of MAS to 2.2% verses 6.2% according to Cochrane collaboration 2010[21], Issue 8. 8) Perinatal Morbidity and the NICU Stay :There were 5 babies from study group kept in NICU for 1-5 days in comparison with control group in which 11 babies were kept in NICU. One baby from the study group had to stay in NICU for 7 days. Whereas in control group 9 babies had to stay in NICU for 6-12 days and 2 babies needed stay longer than 12 days. In our study there were no perinatal deaths in both the groups. Hofmeyr *et al* [3] reported that the incidence of MAS was lower than expected and no perinatal deaths were found in their study.

SUMMARY

126 patients of meconium stained liquor were studied. Amnioinfusion in 63 cases having thick meconium stained liquor had significant dilution effect in 58 % of the patients. Incidence of meconium stained amniotic fluid was found to be higher in primigravidas, 61% in study group and 71% in control group. The rate of caesarean section in patients who received amnioinfusion was 19% and spontaneous FTVD was seen in 71% of the cases. Apgar score of >7 was seen in more number of babies from amnioinfusion group than from non infusion group. Similarly apgar score of <3 was seen in less number of babies from amnioinfusion group than in non infusion group. Apgar score was better in those patients undergoing LSCS after amnioinfusion than without amnioinfusion.

Resuscitative measures such as

Measures	Study group	Control group
Bag and mask	3	10
Endotrachial suction	2	15
Endotrachial suction and O2	1	5
Endotrachial suction and intubation and o2	none	2

Presence of meconium below the vocal cord was seen in 3 cases as compared to 22 in control. MAS was seen in 3 cases as compared to 17 in control group. NICU admission in 6 cases as compared to 32 in control group babies. The no. of babies receiving intravenous fluid therapy, antibiotic and anticonvulsant therapy were more in control as compared to study group. Longer NICU stay was seen in control group babies as compared to cases group. There were no maternal morbidity as consequence of amnioinfusion

CONCLUSION

Meconium staining of liquor is a commonly observed phenomenon. The presence of thick meconium is associated with increased incidence of perinatal morbidity and mortality. The use of simple technique such as amnioinfusion results in reduction of caesarean section and perinatal morbidity. Amnioinfusion not only reduces the burden on already limited resources in developing countries but also has cost benefit. I found in my study that amnioinfusion decreased the incidence of caesarean section. It decreased the incidence of neonatal complications like meconium aspiration syndrome, meconium below the vocal cords, neonatal intensive care unit admission, cases with Apgar < 7, thus decreases the burden on already overloaded NICU facilities. Caesarian section in amnioinfusion group showed better outcome of babies as compared to the control Group where the patients were directly posted for Caesarian section without doing amnioinfusion. Amnioinfusion is a simple, safe and cost effective procedure improving maternal, foetal and neonatal outcome.

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