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Original Research Article

Role of Transcervical Amnioinfusion in Meconium Stained Amniotic Fluid- A Case Control Study

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Abstract: The passage of meconium in utero is associated with significant perinatal mortality and morbidity, especially with meconium aspiration syndrome. Different precautions during antenatal period, Intrapartum period and postnatal period have been suggested to prevent the deleterious effects of meconium aspiration. Aim of the study-The present study has been undertaken to evaluate the effect of amnioinfusion on fetal morbidity and mortality by observing the incidence of APGAR at 1 min, APGAR at 5 min, Neonatal intensive care unit admission, Meconium aspiration syndrome. 2. To evaluate the operative interference in thick meconium stained liquor complicated labour. The study was prospectively carried over a period of 6 months (June to November 2016) in our institution and with prior informed consent from 150 women out of 2846 deliveries fulfilling the inclusion criteria were studied. The study group – Amnioinfusion Cases 75 number were initially infused of 500ml of normal saline at the rate of 10- 15ml/min over a duration of 1 hr, initially and then after continued at a rate of 3-5ml/min until delivery, with continuous electronic fetal heart rate monitoring. A sterile pad is kept at vagina to note pad wetting. These were compared with 75 cases without amnioinfusion during delivery. Various parameters such as type of deliveries, neonatal outcome, meconium aspiration syndrome and NICU administration of the newborns were compared between cases and controls and the data was statistically analyzed. The present study supports the theory that intrapartum amnio infusion in labouring thick meconium stained liquor is a simple, safe and effective technique to decrease the perinatal morbidity and mortality.
Keywords: Meconium, perinatal mortality, amnioinfusion, delivery, neonatal care

INTRODUCTION

Meconium in Greek language means substance resembling poppy juice. Meconium is the first intestinal discharge from newborns, a viscous, dark-green substance composed of intestinal epithelial cells, lanugo, mucus, and intestinal secretions (eg, bile. Water is the major liquid constituent, comprising 85-95% of meconium; the remaining 5-15% of ingredients consists of solid constituents, primarily intestinal secretions, mucosal cells, and solid elements of swallowed amniotic fluid, such as proteins and lipids [1].

Meconium is sterile and does not contain bacteria, which is the primary factor that differentiates it from stool. Intrauterine distress can cause passage of meconium into the amniotic fluid. Factors that promote the passage in utero include placental insufficiency, maternal hypertension, preeclampsia, oligohydramnios, infection, acidosis, and maternal drug abuse, especially use of tobacco and cocaine [1].

The passage of meconium in utero is associated with significant perinatal mortality and morbidity, especially with meconium aspiration syndrome. It is subject of concern for both obstetrician and paediatrician. Its incidence is found to be 12 – 16% 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 and 4 – 5 % of meconium stained liquor leads to meconium aspiration syndrome which accounts to 4 – 10% of neonatal deaths [1].

Many measures have been suggested to prevent the deleterious effects of meconium aspiration as follows [2]

Antenatal period

- Identify the high risk cases and do close monitoring of fetal heart rate.
- Terminate pregnancy by end of 41 weeks if it is past dates.

Intrapartum period

- **Early ARM** to be done in high risk cases.
- **Amnioinfusion**., i.e. clinical application of transcervical saline which was introduced by Miyazaki and co-workers for relief of variable deceleration and to dilute or washout thick meconium prophylactically.

Postnatal period

- In non-vigorous infants don't try for spontaneous respiration, first clear upper airway under direct laryngoscopic vision then intubation

AIMS AND OBJECTIVES

To evaluate the effect of amnioinfusion on fetal morbidity and mortality by observing the incidence of

- APGAR at 1 min.
- APGAR at 5 min.
- Neonatal intensive care unit admission
- Meconium aspiration syndrome.

To evaluate the operative interference in thick meconium stained liquor complicated labour.

METHOD

This is a hospital based longitudinal study, with prospectively collected data over a period of 6 months (June to November 2016) in the department of Obstetrics and Gynecology in our institution. All the patients were informed about the study and those willing to participate only were considered as subjects.

Inclusion criteria

- Women in labour with thick meconium on spontaneous rupture of membranes or after ARM
- Singleton pregnancy
- Vertex presentation
- Gestational age more than 37 weeks
- In active phase of labour[cervical dilatation(3 to 8 cm)

Exclusion criteria

- Intrapartum sepsis
- Placenta previa
- Fetal anomaly
- Cervical dilatation > 8cm
- Cord prolapse.
- Uterine scar
- Placental abruption
- Indication for immediate delivery
- Maternal cardiac or pulmonary diseases

Study groups

150 women out of 2846 deliveries fulfilling the inclusion criteria were taken as subjects and divided into two study groups A -cases (75) and B- controls (75).

Study group A- cases (75) - with trancervical amnioinfusion

Study group B-controls (75) – without trancervical amnioinfusion

Arnamentarium

- Transfusion set
- Normal saline
- Intrauterine pressure catheter
- Betadine lotion
- Sterile gloves and towels
- Sterile pads

Procedure

The findings of general, systemic and abdominal and vaginal examination are noted from both the study groups. IV ceftriaxone 1gm antibiotic prophylaxis was given, placental location done with ultrasound examination to prevent direct injury.

The subjects in study group A- cases, following steps were followed.

- Parts are prepared and vagina is cleaned, betadine lotion applied then after that, draping with sterile towels done.
- Intrauterine pressure catheter of sufficient length is introduced transcervically between the head and ruptured membranes in utero

aseptically above presenting point and other end of tube is connected to normal saline bottle at room temperature with help of transfusion set.

- Initially amnioinfusion of 500ml of normal saline was infused at rate of 10- 15ml/min over duration of 1 hr, and then it is continued at a rate of 3-5ml/min until delivery, with continuous electronic fetal heart rate monitoring.
- A sterile pad is kept at vagina to note pad wetting
- Partogram was maintained. Patients were carefully watched for progress of labour and they were strictly monitored for fetal heart rate by continuous electronic fetal heart rate monitoring.
- Amnioinfusion was stopped before shifting the patient to operation theatre for emergency caesarean section or in 2nd stage of labour.
- After delivery, infants were closely monitored, with immediate measures for upper airway clearing and intubation.
- Apart from amnioinfusion both study groups cases and controls were given both obstetrical and perinatal care equally
- Data of various parameters in the study population such as distribution by parity**,** Mode of delivery, Neonatal outcome, Meconium aspiration syndrome, and NICU admission was collected.

RESULTS

Table 1 showed no significant difference in the parity between study groups A and B. Table 2 showed significant difference in the modes of delivery between study groups A and B. table 3 and 4 showed significant difference in the neonatal outcome between study groups A and B. table 5 showed 14% less incidence of meconium aspiration syndrome in study group A then B. Table 6 showed NICU admission is 30% less in study group A than B.

Table-1: **Distribution of study population by parity**

parity	**Study**	**Control**
primi	40	42
multi	35	33

Table-2: **Mode of delivery**

Mode of delivery	**Study group**	**Control group**
Spontaneous vaginal	25(33%)	10(13%)
Assisted vaginal	35(47%)	27(36%)
EMLSCS	15(20%)	38(50%)
Statistical significance	$X^2 =$ **17.42; p<0.05. significant**	

Table-3: **Neonatal outcome data APGAR at 1 minute**

APGAR at 1min	**Study**	**Control**	χ^2
0-6	4	36	20.29
7-10	71	39	**P<0.001 significant**
APGAR at 1min		**Study**	**Control**
Case control -Bankura		20%	50%
Poznan		18%	24%
Present study		6%	48%

Table-4: Neonatal outcome data APGAR at 5 min

APGAR at 5 min	**Study**	**Control**	χ^2
0-6	2	12	7.87
7-10	73	63	**P<0.05 significant**
APGAR at 5 min		**Study**	**Control**
Case control –bankura		2%	4%
Case control -Dehradun		4%	4%
Poznan		1%	6%
Present study		2%	16%

Table-5: Meconium aspiration syndrome

MAS	**Study**	**Control**	χ^2
Present	2	12	3.95
Absent	73	63	p< 0.05 significant
MAS		**Study**	**Control**
Case control –Bankura		4%	20%
Case control – Dehradun		6%	10%
Present study		2%	16%

Table-6: NICU admission

NICU admission	**Study**	**Control**
Case control – Bankura	6%	28%
King George's medical college Lucknow	5%	21%
Present study	15%	46%

Table-7: Perinatal mortality

Perinatal mortality	**Study**	**Control**	**p- value**
Present	1	10	<0.001
absent	74	65	Significant
Perinatal mortality		**Study**	**Control**
Case control – bankura		Nil	2%
King George's medical, Lucknow		1%	8.4%
Present study		1%	14%

DISCUSSION

Our study results in distribution of study population by parity are similar to singh *et al*. [3] (Table1). In our study even though the assisted vaginal deliveries are high in study group A ,there are more than 20% spontaneous vaginal deliveries in study group A compared with study group B and with 30% less incidence of EMLSCS in study group A population (Table 2). The rate of caesarean section correlates with case control studies done at bankura and deharadun and also study at poznan university women health [4].

Our study results showed that by amnioinfusion 14% of neonates showed better APGAR at 5min in study group A when compared with study group B. By amnioinfusion 40% of neonates showed better APGAR at 5min in study group A when compared with study group B (table 3 and 4). Our study correlates with the studies of Bankura, Dehradun and Ponzan [4,5].

Meconium aspiration syndrome, a life threatening complication of meconium stained liquor's incidence is 14% less in study group A when compared with study group B (Table5). Our study correlates with the studies of Bankura, Dehradun and Poznan [4,5].

NICU admission which shows the perinatal morbidity is also 30 % less in study group A than B. (Table 6).There was only one neonatal death in study group whereas control group has 10 neonatal deaths. Our study results correlates with King George's Medical college study done at Lucknow [6]**, b**ut differs with Bandura study [4].

CONCLUSION

The present study supports the theory that intrapartum amnioinfusion in labouring thick meconium stained liquor is a simple, safe and effective technique to decrease the perinatal morbidity and mortality by lowering incidence of meconium aspiration syndrome, NICU admissions, with better APGAR scores at 1 and 5 min along with decrease in caesarean section rate in amnioinfusion group

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