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Research Article

Study of Maternal and Fetal Outcome in Parturients with Meconium Stained Amniotic Fluid at Term Gestation – Role of Intrapartum Amnio Infusion

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Abstract: Passage of meconium in utero is a dangerous sign for fetal outcome which influence the decision as well as the mode of delivery.Amnio infusion to dilute this meconium and prevent decelerations and hasten the progress of labour is a procedure which can be tried for improving maternal and fetal outcome. The aim of this study is to study the maternal and fetal outcome in parturients with MSAF and compare it with patients with clear amniotic fluid and to know the role of amnio infusion in improving the maternal and fetal outcome in patients with MSAF. This descriptive case control study was carried out in the department of Obstetrics and Gynaecology, Mamata general hospital, khammam, Andhra Pradesh, India from January 2011 to December 2012. A total of 50 women with meconium stained amniotic fluid(MSAF) were studied to identify maternal and fetal outcome and was compared with 50 women with clear amniotic fluid. Normal delivery was significantly higher (58%) in clear liquor group as compared to MSAF group (22%). Cesarean section was more common in MSAF group (66%) where as it was (38%) in the clear liquor group (p=0.005). Low Apgar scores of < 5 at one minute was seen in 48% of MSAF and only 6% in clear liquor group (p<0.2). But at 5 minutes low Apgar score persisted in same 48% of MSAF babies whereas it was seen in 12% of clear liquor group. Among the babies born with MSAF 34% were referred to higher center compared to 6% in clear liquor group . Four babies with thick MSAF and one baby with clear liquor had neonatal death (p=0.005). Amnio infusion was done in 25 patients with MSAF.20/25 of them had normal vaginal delivery with out undue prolongation of labour and all the babies were alive with good apgar at birth .It was failed procedure in 5 patients since the decelerations persisted(3/5 pts.) and labour did not progress(2/5 pts.) inspite of amnio infusion and were taken up for LSCS. There were no complications noted associated with the procedure. Mode of delivery and fetal outcome were adversely affected by the presence of thick meconium stained liquor as compared to clear liquor. Additional monitoring facilities e.g. cardiotocography (CTG) if available would reduce fetal distress and allow timely intervention in such cases. Amnio infusion can be an alternative option in countries like India to improve maternal and fetal outcome.
Keywords: Meconium stained amniotic fluid, Perinatal outcome, Amnio infusion

INTRODUCTION:

In the Obstetric practice, the aim is to have safe delivery and healthy mother and baby. Meconium is a green, viscous liquid that first appears in fetal ileum from 10 weeks gestation [1]. Meconium stained amniotic fluid rarely occurs before 34 weeks of gestation [2]. After 34 weeks, incidence of meconium passage increases with gestational age and reaches approximately 30% at 40 weeks and 50% at 42 weeks [3,4]. The increased incidence of meconium stained amniotic fluid with advanced gestational age probably reflects the maturation of peristalsis in the fetal intestine, intestinal para- sympathetic innervations and myelination [5]. When the fetus suffers from hypoxia or asphyxia, increased para - sympathetic stimulation by vagus leads to passage of meconium. Intrauterine asphyxia also produces a gasping response by which meconium enters the trachea and once it has been aspirated into lungs it causes mechanical obstruction to airways, chemical pneumonitis and atelectasis [6]. Approximately 10-20% of live births demonstrate meconium in the amniotic fluid, yet few infants are adversely affected. Therefore the current risks associated with meconium remains uncertain and controversial. There are different opinions about the mode of delivery. Some experts explain that even if meconium is present in amniotic fluid, clinician may allow patients to labour in the presence of reassuring

fetal heart rate and some prefer for immediate operative delivery.

Fenton and Steer suggested that passage of meconium was not significant if the fetal heart rate was greater than 110 beats per minute [7]. So, when facilities like cardiotocography (CTG), fetal blood sampling is not available, it is difficult to decide whether vaginal delivery or cesarean section should be done. Even when cesarean section is done, meconium aspiration syndrome can still occur and considerable morbidity may result both to newborns and mother. In most of the hospitals in India, facilities like fetal blood sampling are not available. Amnioinfusion can be an alternative option for treating intrapartum problems known to be associated with fetal compromise in patients with thick meconium stained amniotic fluid. The procedure is considered effective and easy to perform, with the benefits out weighing the risks. Amnioinfusion is a relatively new technique with several applications. In various obstetric situations where lack of amniotic fluid is perceived to be the problem, the infusion of fluid into the amniotic cavity is a simple and logical treatment approach. Artificially increasing amniotic fluid volume protects the umbilical cord from compression, and thus reduce the severity of variable decelerations. Diluting thick meconium fluid reduces the risk of meconium aspiration syndrome. Amnio infusion allows spontaneous vaginal delivery and avoid unnecessary operative intervention. This inexpensive technique appears to pose little risk and warrants consideration in properly selected patients. Amnioinfusion was first described in 1976 [8]. Using a rhesus monkey model, the authors reported that variable decelerations occurred when amniotic fluid was removed from the uterine cavity and resolved when it was replaced. Although this experiment established that variable decelerations related to oligohydramnios and cord compression could be corrected by amnio infusion, the technique did not achieve clinical application until 1983, when a novel approach to the relief of variable or prolonged decelerations was described [9]. It is for this reason our study was undertaken to know the role of amnio infusion in improving the maternal and fetal outcome in patients with MSAF in countries like India.

AIMS AND OBJECTIVES:

To study the maternal and fetal outcome in parturients with MSAF and compare it with patients with clear amniotic fluid, and to know the role of amnio infusion in improving the maternal and fetal outcome in patients with MSAF.

MATERIALS AND METHODS

This descriptive case control study was conducted at Mamata general hospital, khammam, Andhra Pradesh, India from January 2011 to December 2012 for a period of 2 years.This study comprised of 50 women admitted in labour and having meconium stained fluid and comparative group comprised of 50 women in labour with clear amniotic fluid. Consistency of meconium was divided into thick and thin. Thick meconium group was characterized by thick greenish meconium with particulate matter in amniotic fluid and thin group was characterized by light greenish staining of amniotic fluid. Detailed history of all patients was taken using a structured questionnaire and thorough examination was done for all. Transcervical Amnioinfusion Protocol was used for indicated cases. Patients with amnionitis, hydramnios, hypertonic uterus,multiple gestation,known uterine and fetal anamoly, severe fetal distress, non vertex presentation, antepartum haemorrhage were excluded from the study.

The procedure is straight forward and uses equipment found in most hospital labor and delivery suites, which includes the following: a double lumen intrauterine pressure catheter, normal saline solution at room temperature, a fetal monitor and intravenous tubing. Although not required, continuous close monitoring using a fetal scalp electrode is recommended if available. To date, no benefit has been demonstrated for the use of infusion pumps or solution warmers.10 The procedure adapted for amnioinfusion was informed and written consent obtained, a vaginal examination is performed to rule out cord prolapse, establish dilatation and confirm presentation. The fetal scalp electrode is placed, followed by an intrauterine pressure catheter to document resting tone (< 15 mm Hg). The normal saline is linked to the intravenous tubing. The tubing is primed as it would be for intravenous use. The tubing is then inserted into the infusion port on the three-way stop cock of the intrauterine pressure catheter. Recommendations for infusion protocols vary with institution.

The protocol followed by us was an initial bolus of 250 ml infused over 20 to 30 minutes. The rate is then adjusted according to the severity of decelerations, but usually at a rate of 10 to 20 ml per minute up to 600 ml, or till the resolution of the variable decelerations. An additional 250 ml beyond the volume at which decelerations resolve is administered, then the infusion is terminated, unless the decelerations resume. The infusion is said to be failed if infusion of 800 to 1,000 ml of saline does not result in termination of decelerations. In patients with thick meconium fluid, an infusion of 250 to 500 ml over 30 minutes, followed by a constant infusion at 60 to 180 ml per hour was given. The fetal heart rate and resting tone were assessed continuously during the intervention. Some fluid will leak from the uterine cavity throughout this process in most cases. Information on the mode of delivery and fetal outcome was recorded in a proforma. Fetal outcome was measured by Apgar score at 1 and 5 minutes, perinatal complications, babies referred to NICU for ongoing care and neonatal deaths. All babies were followed up for a period of 7 days following delivery. Comparisons were made between meconium

stained group and clear amniotic fluid group to find out if any difference existed between the two groups in relation to mode of delivery and fetal outcomes. Data analysis was done by using appropriate statistical method.

RESULTS:

During the study period of two years, there were a total of 1800 deliveries in mamata general hospital. Of these, 485 had meconium stained amniotic fluid an incidence of 27%.

Fetal Heart Rate Abnormality:

Only 3(6%) of clear amniotic fluid had FHR abnormality. Among MSAF,17(34%) had FHR abnormality. This was seen in 2/22 in thin MSAF group whereas 15/28 of thick MSAF group.

Mode Of Delivery:

Normal delivery was significantly higher (58%) in clear liquor group as compared to MSAF group (22%). Cesarean section was more common in MSAF group (66%) where as it was (38%) in the clear liquor group (p=0.005). MSAF group were more likely to have instrumental and operative delivery (78%) than controls (42%).

Apgar Score:

24(48%) of MSAF and 3(6%) of clear liquor born babies had low Apgar score of < 5 at one minute. At 5 minute, the same 24(48%) of MSAF born babies had low Apgar score and it was 6(12%) in clear liquor group.The difference was found significant both at 1 minute (p<0.2) and at 5 minutes (TABLE-1).

Referral To Higher Center:

Among the babies born with MSAF 17/50(34%) were referred to higher center for NICU admission compared to only 3/50(6%) in clear liquor born babies.

Perinatal Complications:

Respiratory Distress Syndrome(9) ,Meconium Aspiration Syndrome(2),Hypoxic Ischemic Encephalopathy (10) and sepsis(4) were seen in 25 cases of MSAF and the other 25 babies did not have any problem, where as in control group none of the babies had meconium aspiration syndrome,3 babies had hypoxic ischaemic encephalopathy ,1 baby had respiratory distress syndrome and only 1 had sepsis.All the other 45 babies did not have any problem. (TABLE-2)

Infant Mortality:

The known deaths among the MSAF were 4, a mortality rate of 8%. 5 babies in moribund condition were discharged after discussion with family members. If assumed these babies died, then mortality in MSAF reached 9. One baby died in the control group (2%). The incidence of death (know and assumed) seen in the MSAF group babies was statistically significant (p=0.005) (TABLE-3)

Amnio Infusion

This was done in 25 patients with MSAF.20/25 of them had normal vaginal delivery with out undue prolongation of labour and all the babies were alive with good apgar at birth .It was failed procedure in 5 patients since the decelerations persisted(3/5 pts.) and labour did not progress(2/5 pts.) inspite of amnio infusion and were taken up for LSCS. There were no complications associated with the procedure.

Table-1: Apgar Score Between Msaf (N=50) And Clear Liquor (N=50)Groups

APGAR SCORE (1 MINUTE)	MSAF		CLEARLIQUOR	
	NUMBER	%	NUMBER	%
<5/=5	24	48%	03	06%
>5	26	52%	47	94%
Total	50	100%	50	100%
Apgar Score (5 Minutes)				
<7/=7	24	48%	06	12%
>7	26	52%	44	88%
Total	50	100%	100	100%

Table-2: Perinatal Complications In Cases Of MSAF(N=50) And Clear Liquor(N=50)

PERINATAL COMPLICATION	CLEAR AF		MSAF		P-VALUE
	NUMBER	%	NUMBER	%	
Normal Baby	45	90%	25	50%	
Meconium Aspiration Syndrome	00	00%	02	04%	0.15
Respiratory Distress Syndrome	01	02%	09	18%	0.001
Hypoxic Ischaemic Encephalopathy	03	06%	10	20%	0.064
Sepsis	01	02%	04	08%	0.168
Total	50	100%	50	100%	

Table-3: Infant Mortality Rate In Clear Fluid And MSAF

MORTALITY	CLEAR FLUID	MSAF	THIN MECONIUM	THICK MECONIUM
Death	01	04	00	04
Discharged (Assumed Death)	00	05	00	05
Total Deaths	01	09	00	09

DISCUSSION:

The frequency of the occurrence of meconium staining of amniotic fluid in different studies have shown a range of 10-22% [11,12]. In the studies done in India, the range of incidence varied from 7.4% to14.3% [13,14,15]. In the present study, the incidence was 27% which is higher than reported in most of the literature.In this study fetal heart rate abnormality was seen in 4% in MSAF group whereas 6% in clear AF group.David et al found that fetal heart rate abnormality and low apgar was seen more in MSAF group [15]. In spite of debate, there are still a number of unresolved controversies concerning management of the labour with meconium stained amniotic fluid. Nevertheless most obstetricians feel unsafe about the state of the fetus if meconium stained liquor is seen. This influences the mode of delivery. In setting where other facilities of intrapartum monitoring like cord blood sampling, CTG and non stress test are not available, instrumental as well as cesarean delivery are found to be increased when meconium is present. In the present study 22% of MSAF group had normal vaginal delivery as compared to 58% in clear liquor group. Similarly, cesarean delivery was 66% among MSAF group compared to 38% in clear liquor group. Instrumental delivery was greatly increased by the presence of thick meconium but cesarean delivery was slightly higher 16/22 (72%) in thin meconium as compared to thick meconium 6/28 (21%). This is because thick meconium tends to occur later in second stage, perhaps during the instrumental delivery. Finding of this study is comparable to the studies done by Sashikala et al who found 38.7% of MSAF group had normal delivery whereas 40.7% of MSAF group had cesarean delivery and 20.7% had instrumental delivery [6]. Clifford et al found cesarean section rate of 38% in MSAF group as compared to 26% in clear liquor group [16]. In the present study the association of MSAF with low Apgar was strong, 22.8% of thick MSAF babies had low Apgar score (<5) at one minute as compared with thin MSAF born babies. At 5 minute only 9% of thin meconium and 78.6% of thick meconium babies had low Apgar score (<7). One of the reasons for persistently low Apgar scores could be the very limited resuscitation facilities available. These finding are comparable with the study of Clifford JB et al in which 40.3% of babies among MSAF group were having low Apgar score at one minute as compared to 3.9% in clear liquor babies [16]. But this dropped to 1.6% in both MSAF and clear liquor babies at five minutes. In the study by Sashikala 61% of MSAF babies had asphyxia as graded by Apgar score at one minute [11,12]. Ziadeh found 30% of thick meconium babies had low Apgar score of less than 7 at one minute [14]. Among the babies born with MSAF 17/50(34%)were referred to higher center for NICU admission compared to only 3/50(6%) in clear liquor born babies.Among referred newborn 15/28(54%) were with thick meconium. Ziadeh and Scott both reported increased admission of babies with MSAF to special care unit [14,17]. Among the referred babies 18% were diagnosed as having transient tachypnoeic attack and 20% had hypoxic ischemic encephalopathy as compared to 2% and 6% in respectively in clear liquor. Similarly 4% of the babies developed MAS and 8% had septicemia in MSAF in compared to none and 2% respectively in the clear liquor group. In the study of Sasikala, 39.7% developed transient tachypnoea, 6.1% MAS and 3.8% septicemia.In this study no baby in either group were still born but 4(8%) babies with thick meconium and 1(2%) baby in clear group died in the hospital. Five babies from the thick meconium group had an unknown outcome. Similarly Gupta et al found that 4.9% of MSAF babies had neonatal death as compared to 2.8% in clear liquor babies [18]. Meconium aspiration syndrome accounts for 2 percent of all perinatal deaths[19]. Any mechanism by which thick meconium can be converted to thin meconium in the already potentially compromised fetus is postulated to have a positive affect on neonatal outcome specifically, a decreased incidence of meconium aspiration syndrome [20,21]. Few acute events have been attributed to amnioinfusion. Isolated cases of umbilical cord prolapse have been reported, but they were well within the quoted occurrence rate of prolapse in pregnancies with vertex presentation where amnioinfusion was not used [22]. Other reported infrequent complications of amnioinfusion include uterine scar disruption and iatrogenic polyhydramnios and elevated intra-uterine pressure during the procedure which leads to fetal bradycardia [23]. In the present study amnio infusion was done in 25 patients with MSAF ,we did not have any grave prognosis for both mother and fetus.

CONCLUSION:

Both mode of delivery and fetal outcome were affected by the presence of thick meconium stained liquor as compared to clear. So presence of thick meconium should be monitored closely and additional monitoring facilities such as CTG if available could guide obstetrician to decide the mode of delivery and any other necessary intervention on time. Thick MSAF in presence of low Apgar score is directly responsible for high neonatal morbidity and mortality. So,amnio

infusion can be an alternative option in countries like India to improve maternal and fetal outcome.

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