



Maternal and perinatal outcome in patients with intrapartum fever

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Abstract

Aim: To estimate the incidence of maternal fever during labour and to analyze the maternal and perinatal outcome of women with intrapartum fever.

Materials and Methods: A prospective cohort study of women at 37 gestational weeks and above who presented in active labour with temperature ≥ 38 °c was conducted. A group of similar patients who did not develop maternal fever were the controls.

Results: During the period of six months there were total 6620 deliveries in our hospital, of which 212 patients developed intrapartum fever constituting 3.2 % of all hospital deliveries. The causes of intrapartum fever were due to intraamniotic infection which occurred in 26% of cases, while 20% had respiratory infection, 20 % had urinary infection and in 34%, no source of infection could be identified. There was no maternal mortality in the present study but hospital stay was significantly increased in the febrile group. In the febrile group, 30% had vaginal delivery compared to 67% in the non febrile group. Instrumental deliveries, Caesarean sections, fetal tachycardia, Meconium stained liquor, low Apgar score and NICU admissions were increased in the febrile group.

Conclusion: Irrespective of the etiology, maternal intrapartum fever carries risk for both the mother and to the newborn. Rapid resolution of fever is essential to reduce maternal and fetal adverse outcomes.

Keywords: Intrapartum fever, intraamniotic infection, NICU Admissions.

Introduction

Maternal intrapartum fever is a distress not only to the mother and fetus but also for the obstetrician and neonatologist. Maternal fever during labor has been reported in 1.6-14.6 % of deliveries⁽¹⁻³⁾. Fever may be due to infectious or noninfectious etiologies. Infectious causes include intrauterine infection or extra uterine causes like respiratory or urinary infection. Non-infectious etiologies include epidural analgesia, use of prostaglandins during labor induction, dehydration, increased ambient temperature and the activation of pro-inflammatory cascade during parturition^(2,4). It contributes to maternal and neonatal morbidity and mortality.

The objective of this study was to estimate the incidence of maternal fever during labour. Maternal and perinatal outcome of women with intrapartum fever were assessed with regards to severity and duration of fever. Ante partum and intrapartum factors related to the development of intrapartum fever were also assessed.

Materials and Methods

This is a prospective cohort study conducted for a period of 6 months at Government Medical College, Trivandrum which is a tertiary referral centre in the capital city of Kerala. Every patient with fever of ≥ 38 °c at ≥ 37 weeks who entered active phase of labour [induced or spontaneous] was identified. A systematic sampling was done

and every alternate case of maternal fever fulfilling the inclusion criteria was taken as the study group. A sample size of 75 was fixed. A group of similar patients who did not develop maternal fever (temperature less than 38 °C) with comparable age, parity and duration of labour was selected from consecutive labour room admissions as controls. According to the hospital protocol, all cases of maternal fever were given intravenous antibiotics and intravenous ampicillin given to all women after rupture of membranes- spontaneous or artificial rupture of membranes.

Exclusion criteria

Patients with

1. Any ante partum or intrapartum complications like preeclampsia, diabetes mellitus, intrauterine growth restriction, preterm labor.
2. Multiple pregnancies
3. Abnormal presentation
4. Anemia
5. Heart disease

Detailed histories of the patients were collected.

Details collected were

1. Maternal demographic features like age.
2. Ante partum factors like parity, maternal co morbidities,
3. Intrapartum factors like induction of labour, method of induction, Time of rupture of membranes, augmentation of labor with oxytocin or artificial rupture of membranes, number of vaginal exams, length of membrane rupture, mode of delivery.
4. History of onset of fever and associated symptoms like cough, dyspnoea, dysuria, foul smelling discharge per vaginum
5. Any contact with febrile illness or exanthematous fever
6. Detailed general and obstetric examination of the patient
 - 1) Maternal sublingual temperature noted 4th hourly during labor
 - 2) Maternal pulse rate
 - 3) Uterine tenderness

- 4) Colour and nature of amniotic fluid at the time of rupture of membranes

Lab investigations like maternal total leukocytes count and differential leukocyte count, urine microscopy, amniotic fluid gram stain, high vaginal swabs and C Reactive protein were done. The diagnosis of clinical chorioamnionitis was made if the mother had maternal fever accompanied by at least 2 of the following signs: fetal tachycardia >160 beats per minute, maternal tachycardia >100 beats per minute, maternal leukocytosis (maternal white blood cell (WBC) >15,000 cells/mm), uterine tenderness, or foul-smelling vaginal discharge^[10]. Both groups received similar obstetrical and neonatal care. Maternal and neonatal outcomes were assessed.

Statistical Analysis

The data collected in the structured Performa was entered into master sheet and statistical tables were constructed. The statistical constants like mean, standard deviation, percentage were computed to compare the different groups. For nominal level data, chi-square test was applied and for tables with low cell values Fisher's exact test was applied. For interval ratio level data, student's test was applied. For all tables' related to nominal level data, percentage was commuted. Mean and SD were used to describe interval ratio level data.

Results

During the period of six months there were total 6620 deliveries in our hospital, of which 212 patients developed intrapartum fever. Out of 212, 152 patients fulfilled the inclusion criteria and 75 cases were selected as the study group (every 2nd case). Control group was selected from the consecutive labour room admission with comparable age, parity and duration of labor.

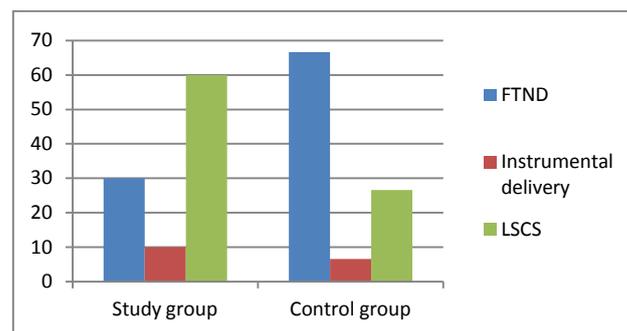
The causes of intrapartum fever were due to intraamniotic infection which occurred in 26% of cases, while 20% had respiratory infection, 20 % had urinary infection and 34% had no source of infection.

Patient demographic continuous variables for intrapartum fever

| | Cases (N=75) | controls (N=75) | t value | p value |
|---------------------------|-----------------|--------------------|---------|---------|
| Age (mean) | 23.7 | 23.6 | 0.26 | p>0.05 |
| Number of term deliveries | | | | |
| 0 | 39 | 39 | | |
| 1-3 | 36 | 36 | | p>0.05 |
| Prostaglandin induction | 50 | 48 | | |
| Oxytocin augmentation | 15 | 14 | | |
| Amniotomy | 10 | 13 | | |

Statistically the difference in age was not significant. Statistically the study and control group with regard to parity were identical. It was observed that 52% of the patients in the study group were primigravidas where as the total percentage of primigravidas delivered during the period were only 48 %. So the association between nulliparity and maternal intrapartum fever was highly significant. The number of patients in the study group and control group had similar modes of induction and oxytocin augmentation.

69.3 % of the women with fever delivered within 6 hours of onset of fever while 29.3% delivered within 6-12 hours. In the febrile group, 30% had vaginal delivery compared to 67% in the non febrile group. Instrumental deliveries and caesarean sections were increased in febrile women.



55 (73.3 %) of the women in the study group had higher leukocyte count of more than 15000/ while none of the women in the control group had an elevated WBC count. Mean polymorphonuclear leucocyte count in the study group and control group were 66.2 and 52.6 and lymphocyte count was 32.3 and 42.7 respectively which was statistically significant. This indicates the natural increase in polymorphs in acute infectious diseases. 17 out of the 20 patients with clinical chorioamnionitis had pus cells or bacteria in the amniotic fluid.

| Factors | study | control | t value | p value |
|-------------|----------|----------|---------|---------|
| Neutrophils | 66.2±4.8 | 52.6±1.9 | 23.4 | p<.005 |
| Lymphocytes | 32.3±1.8 | 42.7±1.5 | 39.9 | p<.005 |

There was no maternal mortality in the present study but hospital stay was significantly increased in the febrile group. 60 % of the patients in febrile Neonatal outcomes

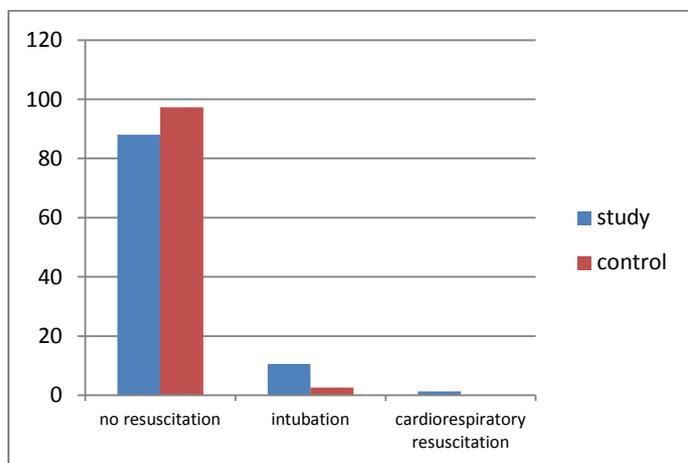
| Factors | study | control |
|----------------------|---------|---------|
| Apgar score at 5 min | | |
| ≤6 | 25(33) | 7(9%) |
| ≥7 | 50(67%) | 68(91%) |

group had to stay in the hospital for more than 5 days while 22.6% had a prolonged hospital stay of more than 5 days

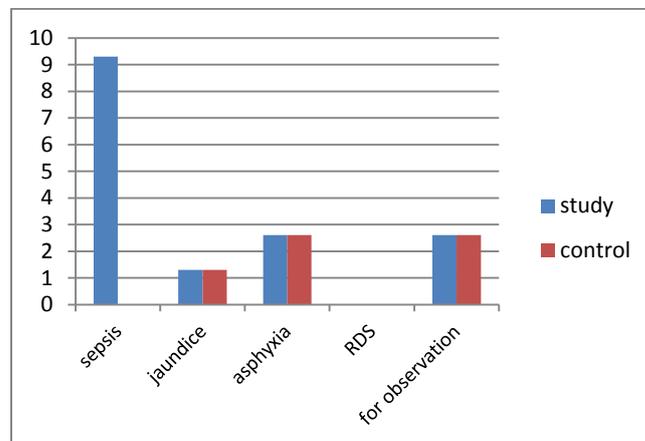
| Apgar score at 5 min | Fever delivery interval (Mean) | t value | p value |
|----------------------|-----------------------------------|---------|---------|
| ≤6 | 6.24±2 | 0.38 | p> 0.25 |
| ≥7 | 6.36±1.8 | | |

The mean fetal heart rate was 163.2 ±1.8 in the febrile group while the mean was 144.5±4.9 in the control; group which was highly significant.30.6% of the women in febrile group had moderate to thick Meconium stained amniotic fluid while only 8 % of the women in the afebrile category had Meconium stained liquor. Those babies with lower apgar of 6 or less were born to mothers with mean temperature of 101.3°F where as the 50 cases with Apgar score 7 or more had a mean temperature of 100.9°F. So the fetal outcome was significantly related to the height of fever. The duration of fever delivery interval did not affect the apgar scores. But the incidence of neonatal sepsis increased with prolonged fever delivery interval. RDT was found to be positive in 8 cases in whom fever delivery interval was more than 4 hours while only one baby was RDT positive in whom fever delivery interval was ≤ 4 hours.11.9% of babies born to mother with maternal fever needed resuscitation while only 2.6% in the afebrile group required resuscitation. This clearly shows the neonatal morbidity status in patients with maternal intrapartum fever. 13.3% of the babies in febrile group were admitted to neonatal ICU while 8.8%of the afebrile group had NICU admission.

Neonatal Resuscitation



Neonatal Admission



The incidence of neonatal sepsis was higher in febrile group. There was no neonatal mortality in the present study.

Discussion

In the present study, maternal fever was detected in 212 patients out of total 6620 deliveries constituting 3.2 % of all hospital deliveries. The rate of intrapartum fever has been reported to be 3 % with few studies suggesting a rate as high as 7 %⁽⁵⁾.

Even though intrapartum fever has always been associated to chorioamnionitis, it can occur due to noninfective conditions s like epidural analgesia, normal thermal physiological changes in women who are not on analgesics and delivery in a overheated room⁽⁴⁾. 26 % of febrile women had features of clinical chorioamnionitis while only 5.5 % cases of clinical chorioamnionitis were detected in a study done by Burgess⁽⁶⁾.

There were no cases of maternal sepsis or maternal death in this study but hospital stay was prolonged in 60 % of the patients with intrapartum fever when compared to 22.6 % in the control group. A study conducted at university of Tennessee medical centre also showed similar results⁽⁵⁾.

It was observed that there was a strong association between nulliparity and maternal intrapartum

fever. Total leukocyte count, polymorphonuclear leukocyte count and lymphocyte count were found to be elevated with statistical significance in the febrile group when compared to the controls⁽⁶⁾. Pus cells or bacteria in amniotic fluid gave a positive predictive value of 85% and negative predictive value of 91% for amniotic fluid gram stain for detection of intraamniotic infection.

The incidence of meconium stained liquor was found to be high in the febrile group. Maternal fever has a definite effect on fetal heart rate which is evident from different studies⁽⁷⁾. But, fetal tachycardia, even in presence of maternal fever is poorly correlated with intraamniotic infection^(8,9). These two factors must have led to an increased fetal monitoring and increased rate in caesarean section as seen in our study.

Predicting which febrile patients will require antibiotics is extremely challenging⁽⁶⁾. A retrospective study done on 45 patients diagnosed with clinical chorioamnionitis found that maternal tachycardia, leucocytosis and fetal tachycardia had low specificity and clinical features like uterine tenderness and foul smelling discharge had poor sensitivity⁽⁸⁾. Hence, Intravenous antibiotics are administered to all women with intrapartum fever in our institution. But this required increased monitoring of the newborns born to febrile women and increased use of antibiotics in these babies which is consistent with other studies⁽²⁾.

There was increased neonatal morbidity in the febrile group. The fetal outcome was significantly related to the height of fever. The duration of fever delivery interval did not affect the apgar scores. But the incidence of neonatal sepsis increased with prolonged fever delivery interval. NICU admission was also increased in the febrile group. There was no neonatal mortality in the present study. The overall incidence of neonatal sepsis was 1.05/1000 deliveries

While another study on febrile intrapartum fever who delivered after 36 weeks gave an overall rate of neonatal sepsis to be 0.82/ 1000 deliveries⁽⁵⁾

There was no maternal mortality in the present study but hospital stay was significantly increased

in the febrile group. 60 % of the patients in febrile group had to stay in the hospital for more than 5 days while 22.6% had a prolonged hospital stay of more than 5 days.

Conclusion

Irrespective of the etiology, maternal intrapartum fever carries risk for both the mother and to the newborn. It is associated with increased risk of instrumental deliveries, Caesarean sections, fetal tachycardia, Meconium stained liquor, low Apgar score and NICU admissions. Rapid resolution of fever is essential to reduce maternal and fetal adverse outcomes.

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