

## Original Article

### Analysis of effectiveness of an intravenous infusion of acetaminophen during the active phase of labour

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#### ABSTRACT

**Background:** Labour is generally considered to be a painful experience and analgesia is regularly required. Stretch of the cervix during dilatation, ischaemia of the muscle wall of the uterus with buildup of lactate and stretch of the vagina and perineum in the second stage are the probable causes of labour pain. Hence; the present study was undertaken for assessing the efficacy of an intravenous infusion of acetaminophen during the active phase of labour. **Materials & methods:** A total of 50 pregnant females were enrolled. All the subjects were broadly divided into two study groups, with 50 patients in each group, as follows: Group 1: Patients received IV Acetaminophen, Group B: Patients receiving matched placebo. Secondary outcome measures included duration of labour, and VAS. **Results:** 13 subjects of the group 1 and 15 subjects of the group 2 belonged to the age group of 21 to 30 years. No-significant results were obtained while comparing the age-wise distribution of subjects of both the study groups. Mean duration of first stage labour among the subjects of the group 1 and group 2 was 349.5 minutes and 613.8 minutes respectively. Significant results were obtained while comparing the mean duration of first stage of labour among group 1 and group 2. Mean VAS after 30 minutes among subjects of group 1 and group 2 was 7.11 and 6.13 respectively. Significant results were obtained while comparing mean VAS after 30 minutes among subjects of the group 1 and group 2. **Conclusion:** Intravenous acetaminophen is an efficacious non-opioid drug for relieving labour pain and decreasing duration of labour without any significant adverse effects.

**Key words:** Acetaminophen, Labour

Received: 24 June, 2021

Accepted: 26 July, 2021

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**This article may be cited as:** Nehra S, Verma N. Analysis of effectiveness of an intravenous infusion of acetaminophen during the active phase of labour. J Adv Med Dent Scie Res 2021;9(8):132-134.

#### INTRODUCTION

Labour is generally considered to be a painful experience and analgesia is regularly required. Stretch of the cervix during dilatation, ischaemia of the muscle wall of the uterus with buildup of lactate and stretch of the vagina and perineum in the second stage are the probable causes of labour pain. Labour pain which results in marked increase in minute ventilation and oxygen consumption during contractions, can cause severe respiratory alkalosis and a left shift of the maternal oxyhemoglobin dissociation curve, thus diminishing oxygen transfer to the fetus. Compensatory hypoventilation between contractions may cause transient maternal hypoxemia, and potentially, foetal hypoxaemia. These periods of hypoventilation may be exacerbated by analgesic

techniques that result in respiratory depression (e.g., systemic opioid analgesia).<sup>1-3</sup>

Acetaminophen is also known as paracetamol, is commonly used for its analgesic and antipyretic effects. Acetaminophen is thought to exert its analgesic activity by inhibiting the synthesis of prostaglandins in the Central Nervous System (CNS) (central acting) and peripherally blocking pain impulse generation. Paracetamol has a favourable safety profile without any risk of congenital anomalies.<sup>4-6</sup> Hence; the present study was undertaken for assessing the efficacy of an intravenous infusion of acetaminophen during the active phase of labour.

## MATERIALS & METHODS

The present study was undertaken for assessing the efficacy of an intravenous infusion of acetaminophen during the active phase of labour. A total of 50 pregnant females were enrolled. All the subjects were broadly divided into two study groups, with 50 patients in each group, as follows: Group 1: Patients received IV Acetaminophen, Group B: Patients receiving matched placebo. Secondary outcome measures included duration of labour, and VAS. All the results were recorded and analysed by SPSS software. Chi-square test, Mann Whitney U test and student t test were used for evaluation of level of significance. P- value of less than 0.05 was taken as significant.

## RESULTS

13 subjects of the group 1 and 15 subjects of the group 2 belonged to the age group of 21 to 30 years. No-significant results were obtained while comparing the age-wise distribution of subjects of both the study groups. Mean duration of first stage labour among the subjects of the group 1 and group 2 was 349.5 minutes and 613.8 minutes respectively. Significant results were obtained while comparing the mean duration of first stage of labour among group 1 and group 2. Mean VAS after 30 minutes among subjects of group 1 and group 2 was 7.11 and 6.13 respectively. Significant results were obtained while comparing mean VAS after 30 minutes among subjects of the group 1 and group 2.

**Table 1: Comparison of duration of first stage of labour among study group and the control group of the subjects**

Duration of first stage of labour (minutes)	Group 1	Group 2	Mann Whitney U test	P- value
Mean	349.5	613.8	246.8	0.000 (Significant)
SD	153.8	182.6		

**Table 2: Comparison of VAS after 30 minutes among subjects of the study group and the control group**

Duration of first injection	Group 1	Group 2	Mann Whitney U test	P- value
Mean	7.11	6.13	348.5	0.000 (Significant)
SD	0.84	0.82		

## DISCUSSION

Labor pain is among the most excruciating pain experienced by women. Labor pain affects maternal psychology and course of labor causing apprehension, anxiety, and stress. Pain during the first stage of labor originates predominantly due to cervical dilatation and uterine muscle wall ischemia leading to lactate accumulation. During the late first stage and second stage of labor, the vagina and perineum form additional sources of pain. The associated increase in sympathetic activity leads to increased oxygen consumption, respiratory alkalosis, and metabolic acidosis which could lead to decreased oxygen being transferred to the fetus. Thus, pain relief during labor is expected to reduce maternal stress and improve maternal and perinatal outcome. Obstetric analgesia and anesthesia have evolved from vague possibility to reality. The non-pharmacological techniques of analgesia include emotional support, relaxed birth environment, psycho-somatic preparation, yoga, acupuncture, and transcutaneous electrical nerve stimulation (TENS). Paracetamol, the mode of analgesic action of which has still not been fully elucidated but probably is a centrally acting drug which inhibits prostaglandin synthesis, has recently been made available as intravenous preparation. Various studies have proved intravenous paracetamol as effective analgesic agent which is safe, effective, inexpensive, and requires no special monitoring.<sup>7-9</sup> Hence; the present study was undertaken for assessing the efficacy of an intravenous infusion of acetaminophen during the active phase of labour.

In the present study, 13 subjects of the group 1 and 15 subjects of the group 2 belonged to the age group of 21 to 30 years. No-significant results were obtained while comparing the age-wise distribution of subjects of both the study groups. Mean duration of first stage labour among the subjects of the group 1 and group 2 was 349.5 minutes and 613.8 minutes respectively. Significant results were obtained while comparing the mean duration of first stage of labour among group 1 and group 2. Zutshi V et al evaluated the efficacy of an intravenous infusion of 1000 mg of acetaminophen as an intrapartum analgesic. The first 200 consecutive parturients fulfilling the inclusion criteria were recruited into the study. Women were then randomised to receive either intravenous 1000 mg (100ml) of acetaminophen (Group A, n=100) or 100 ml normal saline (Group B, n=100). Primary outcome assessed was effectiveness of acetaminophen to provide an adequate amount of analgesia, as measured by a change in Visual Analogue Scale (VAS) pain intensity score at various times after drug administration. Secondary outcomes measured were duration of labour, need for additional rescue analgesia and presence of adverse maternal or foetal effect. There was pain reduction at 1 and 2 hours in both groups ( $p < 0.001$ ). However, it was more significant in the acetaminophen group, especially at 1 hour. Duration of labour was shortened in both the groups, without any maternal and foetal adverse effects. Intravenous acetaminophen is an efficacious non-opioid drug for relieving labour pain without any significant maternal and foetal adverse effects.<sup>10</sup>

In the present study, Mean VAS after 30 minutes among subjects of group 1 and group 2 was 7.11 and 6.13 respectively. Significant results were obtained while comparing mean VAS after 30 minutes among subjects of the group 1 and group 2. Abdollahi MH et al compared analgesic efficacy of paracetamol with pethidine for labour pain in normal vaginal delivery. In this single-blinded, randomised control trial, 80 primigravid singleton women with full-term pregnancy candidate for normal vaginal delivery, were entered the trial and divided in to pethidine (A) and paracetamol (B) groups. At the time of admission, age and body mass index of mother and gestational age based on last day of period were recorded. In both groups, intravenous promethazine and hyoscine were administered to each patient at the first stage of delivery. From beginning of active phase of delivery, patients in group A received 50 mg intramuscular pethidine injection. At the same time patients in group B, received an intravenous solution infusion containing 1000 mg paracetamol and 300 cc of normal saline. After patients' selection, 19 individual omitted during study due to exclusion criteria and finally 30 patients in paracetamol group and 31 patients in pethidine group remained to enter the trial. There was no significant difference in age and BMI of mothers between both groups ( $P > 0.05$ ). Maternal age and labour duration in paracetamol group had no meaningful difference with maternal age and labour duration of patients in pethidine group ( $P > 0.05$ ). The average VAS pain score was significantly lower in paracetamol comparing to that of pethidine group (8.366 out of 10, 9.612 out of 10, respectively,  $P < 0.001$ ). It is concluded that intravenous paracetamol is more effective than intramuscular pethidine to relief labour pain in normal vaginal delivery.<sup>11</sup>

## CONCLUSION

Intravenous acetaminophen is an efficacious non-opioid drug for relieving labour pain and decreasing duration of labour without any significant adverse effects.

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