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Original Research

Assessment of the effectiveness of an intravenous infusion of 1000 mg of acetaminophen during the active phase of labour

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ABSTRACT:
Background: Labour is the active process of delivering a foetus and is characterised by regular, painful uterine contractions which increase in frequency and intensity. Acetaminophen is also known as paracetamol, is commonly used for its analgesic and antipyretic effects. Hence, the present study was undertaken for assessing the effectiveness of an intravenous infusion of 1000 mg of acetaminophen during the active phase of labour. **Materials & methods:** A total of 50 pregnant females were enrolled in the present study. All the patients were broadly divided into two study groups, with 25 patients in each group, as follows: Group A: Patients received IV Acetaminophen, Group B: Patients reviving matched placebo. The course of events was studied and decrease in intensity of pain if any during labour was accessed by visual analog score. The VAS consists of a 10-mm horizontal line anchored at one end with the words "no pain" and at the other end with the words "worst pain imaginable." All the results were compiled and recorded on Microsoft excel sheet and were analyzed by SPSS software. **Results:** Mean duration of first infusion among the patients of Group A and group B was 256.2 minutes and 426.5 minutes respectively. Significant results were obtained while comparing the mean duration of first injection. Mean VAS after 30 minutes and 60 minutes was significantly higher for patients of group A in comparison to patients of group B. **Conclusion:** Intravenous infusion of acetaminophen during labour shortened the effective duration of labour and assists in relieving labour pain.
Key words: Intravenous, Acetaminophen

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INTRODUCTION

Labour is the active process of delivering a foetus and is characterised by regular, painful uterine contractions which increase in frequency and intensity. The pain of labour has two components: visceral and somatic, and its anatomy is well documented. The cervix has a central role in both the first and second stage of labour. Visceral labour pain occurs during the early first stage and the second stage of childbirth. With each uterine contraction, pressure is transmitted to the cervix causing stretching and distension and activating excitatory nocioceptive afferents.[1-3]

The aim of pain relief in labour is to render parturients relatively pain free whilst still able to participate in the birth experience. Ideally there should be no associated side effects or risks to both mother and baby. In reality, there are several methods of pain relief available but none are ideal.[4]

An ideal labour analgesic should have potent analgesic efficacy with negligible side-effects to be used for pain relief. The newer advances like combined spinal epidurals, low dose epidurals, patient controlled Intravenous, Inhalational and epidural analgesia have revolutionized obstetric anesthesia. But most of modern analgesia practices involve monitory facilities which unfortunately cannot be available in routine obstetric practice in developing countries.[5]

Acetaminophen is also known as paracetamol, is commonly used for its analgesic and antipyretic effects. Its therapeutic effects are similar to salicylates, but it lacks anti-inflammatory, antiplatelet, and gastric ulcerative effects.[6]

Hence, the present study was undertaken for assessing the effectiveness of an intravenous infusion of 1000 mg of acetaminophen during the active phase of labour.

MATERIALS & METHODS

The present study was conducted in the department of gynaecology and obstetrics of medical institute and it included assessment of effectiveness of an intravenous infusion of 1000 mg of acetaminophen during the active phase of labour. A total of 50 pregnant females were enrolled in the present study. Ethical clearance was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol.

Inclusion Criteria:

- Age between 18-35 years.
- The Gestational age between 37-42 weeks.
- Patient seeking analgesia.
- 1st stage of Labour with cervical dilatation 3-4 cm (in active phase).

All the patients were broadly divided into two study groups, with 25 patients in each group, as follows:

Group A: Patients received IV Acetaminophen,
Group B: Patients reviving matched placebo.

The course of events was studied and decrease in intensity of pain if any during labour was accessed by visual analog score. The VAS consists of a 10-mm horizontal line anchored at one end with the words "no pain" and at the other end with the words "worst pain imaginable." All the results were compiled and recorded on Microsoft excel sheet and were analyzed by SPSS software. Chi-square 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

In the present study, a total of 50 subjects were enrolled and were broadly divided into two study groups: group A – included patients who were given acetaminophen, and Group B- included patients who were given placebo. Mean age of the patients of the group A and Group B was found to be 25.4 years and 26.4 years respectively. Majority of the patients of both the study groups belonged to the age group of 31 to 40 years. 60 percent of the patients of Group A and 52 percent of the patients of Group B were of Multigravidae while the remaining patients were of Primigravidae.

In the present study, mean duration of first infusion among the patients of Group A and group B was 256.2 minutes and 426.5 minutes respectively. Significant results were obtained while comparing the mean duration of first injection. Mean VAS after 30 minutes and 60 minutes was significantly higher for patients of group A in comparison to patients of group B.

Table 1: Age-wise distribution of subjects of the study group and control group

Age group	Group A		Group B		p- value
	Number	Percentage	Number	Percentage	
Upto 20	3	12	2	12	0.826
21 to 30	21	84	20	80	
31 to 40	1	4	3	12	
Total	25	100	25	100	
Mean age (±SD)	25.4 ±4.3		26.4 ±5.27		

Table 2: Distribution of subjects of the study group and control group according to Gravida

Gravidity	Group A		Group B		p- value
	Number	Percentage	Number	Percentage	
Primigravidae	10	40	12	48	0.745
Multigravidae	15	60	13	52	
Total	25	100	25	100	

Table 3: Comparison of duration of first infusion

Duration of first injection	Group A	Group A	p- value
Mean	256.2	426.5	0.00 (Sig)
±SD	123.8	174.3	

Table 4: Comparison of VAS after 30 minutes among subjects of the study group and the control group

VAS	Group A	Group B	p- value
Mean	6.76	7.23	0.001
±SD	1.23	1.12	

Table 5: Comparison of VAS after 60 minutes among subjects of the study group and the control group

VAS	Group A	Group B	P- value
Mean	6.05	6.88	0.001
±SD	0.85	0.96	
Range	2.7	1.9	

DISCUSSION

Acetaminophen is an analgesic which is a COX-2 selective inhibitor and it is often preferred because of its better tolerance. Despite the similarities to NSAIDs, the mode of action of paracetamol has been uncertain, but it is now generally accepted that it inhibits COX-1 and COX-2 through metabolism by the peroxidase function of these isoenzymes.[7] This results in inhibition of phenoxyl radical formation from a critical tyrosine residue essential for the cyclooxygenase activity of COX-1 and COX-2 and prostaglandin (PG) synthesis. Paracetamol shows selectivity for inhibition of the synthesis of PGs and related factors when low levels of arachidonic acid and peroxides are available but conversely, it has little activity at substantial levels of arachidonic acid and peroxides. The result is that paracetamol does not suppress the severe inflammation of rheumatoid arthritis and acute gout but does inhibit the lesser inflammation resulting from extraction of teeth and is also active in a variety of inflammatory tests in experimental animals.[8] Peak analgesic effect of IV paracetamol occurs in 1 hour, with duration of approximately 4-6 hours. Intravenous administration of propacetamol has been shown to be at least as effective as oral administration of an equivalent dose of paracetamol, and the target concentration achieved more rapidly and with less variability in plasma concentrations compared with enteral formulations.[9] Hence, the present study was undertaken for assessing the effectiveness of an intravenous infusion of 1000 mg of acetaminophen during the active phase of labour.

In the present study, a total of 50 subjects were enrolled and were broadly divided into two study groups: group A – included patients who were given acetaminophen, and Group B- included patients who were given placebo. Mean age of the patients of the group A and Group B was found to be 25.4 years and 26.4 years respectively. Majority of the patients of both the study groups belonged to the age group of 31 to 40 years. 60 percent of the patients of Group A and 52 percent of the patients of Group B were of Multigravidae while the remaining patients were of Primigravidae. Das BP et al in another compared the efficacy of intravenous paracetamol and intramuscular tramadol injection as labour analgesic. This prospective-randomized study was conducted in 200 primigravidae at term pregnancy in active labour, distributed into two groups of 100 women each receiving single dose of intravenous 1000mg Paracetamol and other 100mg intramuscular tramadol. After 1 hour of drug administration, in paracetamol group, severe pain 32.7%, moderate pain 57.1% and mild pain 10.2%. In tramadol group, severe pain 52%, moderate pain 44.9% and mild pain 3.1%. After 3 hours of drug administration, in paracetamol group, severe pain 37.8%, moderate pain 46.9% and mild pain 15.3%. In tramadol group, severe pain 58.2%, moderate pain 39.8% and mild pain 2.04%. Differences in the VAS score between the groups were statistically significant. Mean labour duration in paracetamol and tramadol group – 4hrs38min±51.25mins and 5hrs42mins±58.16mins respectively. Complications – in paracetamol group, 5% nausea, 2% vomiting and 5% PPH (mainly traumatic) while in Tramadol group, 9% nausea, 5% vomiting and 3% PPH and 1 NICU admission in tramadol group. Intravenous paracetamol is a more effective labour analgesic. It shortens labour with fewer maternal and foetal adverse effects as compared to intramuscular tramadol.[10]

In the present study, mean duration of first infusion among the patients of Group A and group B was 256.2 minutes and 426.5 minutes respectively. Significant results were obtained while comparing the mean duration of first injection. Mean VAS after 30 minutes and 60 minutes was significantly higher for patients of group A in comparison to patients of group B. In another study conducted by Gupta K et al evaluated 80 parturients were randomly assigned to two groups of 40 each, to receive either 1000 mg (100 ml) i.v. paracetamol or 100 ml normal saline as placebo, 30 min before the procedure. The primary outcome was hourly mean consumption of levobupivacaine and fentanyl mixture (ml.h-1). Secondary outcomes included pain score, sensory and motor block, haemodynamic parameters of mother, duration of second stage of labour, mode of delivery, Apgar scores, foetal heart rate and adverse effects. Results: The hourly mean drug consumption in the Paracetamol group was significantly lower as compared with the Placebo group. The mean number of boluses taken was also significantly less in the paracetamol group. Pain scores decreased in both the groups without significant inter-group differences. From the results, the authors concluded that use of 1000 mg i.v. paracetamol decreases the mean hourly drug consumption through epidural route.[11]

CONCLUSION

From the above results, the authors concluded that Intravenous infusion of acetaminophen during labour

shortened the effective duration of labour and assists in relieving labour pain.

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