

Analgesia in labor: Evaluating clinical trial comparing between Entonox versus parenteral pethidine during the first stage of labor

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Abstract

Introduction: An adequate analgesia during labor is important to minimize the deleterious effects of severe labor pain on maternal and fetal condition and also on the progress of labor.

Aims: To compare the clinical effectiveness of inhalational analgesia by using Entonox versus systemic analgesia by using I.V pethidine for pain relief in the first stage of labor.

Patients and methods: 48 multiparous women were selected in the first stage of labor, were randomly allocated into 2 groups, group A had received I.V pethidine and group B had received Entonox.

Total pain score measurement was done by using the parameters of McGill pain questionnaire which include pain rating index (PRI) and present pain intensity (PPI).

Results: A comparison between group A&B done, the difference in PPI between pethidine & Entonox was showing a statistical significance $P < 0.001$. The difference in PRI between pethidine & Entonox was carrying no statistical significance.

Conclusions: Inhalational analgesia by using Entonox in a proper intermittent technique is more effective than systemic analgesia by using parenteral pethidine for reducing present pain intensity in the 1st stage of labor.

Key Words: Pethidine, Entonox, Labor pain, PPI, PRI

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INTRODUCTION

The scientific definition of pain was introduced more than two decades ago by the international association for the study of pain: Is unpleasant sensory and experience associated with actual or potential tissue damage.^[1] The experience of labor pain is complex, subjective, multidimensional response to sensory stimuli generated

during parturition.^[2] Objectively the pain of labor is derived from visceral and somatic components.^[2] In the 1st stage of labor visceral pain arising from distention of lower uterine segment and cervical dilatation of the lower uterine segment and it is referred to T10-L1 dermatomes.^[3] In second stage of labor the pain is mainly somatic that arises from vaginal vault, pelvic floor, perineum & is referred to S2, S3, S4 via pudendal nerve.

^[4] Pain in general has three main dimension, sensory aspect (perceptual), affective aspects (fight or flight), evaluative (cognitive).^[5] Accessing the private pain experience (labor pain measurement) depend on many studies on the effects of different methods of pain relief in labor using either, Verbal reports which include visual analog scale (VAS) which is a simple intensity measure and multidimensional like McGill pain Questionnaire (MPQ), or observational measures of pain behavior, in which labor pain measurement is done by using observation of behavior like respiratory pattern, motor response, agitation, emotional distress and physiological indicators.^[6]

McGill pain questionnaire:

It is a verbal pain measurement, it consists primarily of three major classes of word descriptors and they are:

1. **Sensory** (S), which reflect the sensory dimension of pain which is related to location, quality and temporal description.^[5]
2. **Affective** (A), which reflects the affective dimension of pain which is related to nervous system tendency to respond to pain.
3. **Evaluative** (E), which reflects evaluation of pain dimension that related to patient experiences and how the pain is affecting daily life function.^[7]

These word descriptors are used by the patients to specify subjective pain experience; it also contains an intensity scale to determine the whole properties of pain experience.

The rank value for each descriptor is based on its position in the word set. The sum of rank is the PRI.^[6]

The most commonly choose is the sensory words of cramping, sharp, aching, stabbing, heavy, pulling, throbbing, and hot and shooting to describe the type of pain that they are feeling at the first stage of labor. Tiring, exhausting, intense and troublesome are the affective and evaluation words are most often chosen.^[7] Present pain intensity (PPI) which reflects the intensity of labor pain, it is based on 0-5 intensity scale which reflects the severity of pain. The above two parameters reflects the total pain score.^[6-8]

PATIENTS AND METHODS

48 multiparous parturient aged between 18-40 years, weighing 60-80 kg, presented in term (40±1week) with normal fetal lie, presentation and position were admitted in their 1st stage of labor. Those patients randomly allocated according to computerized random table into 2 groups. During active phase of the first stage of labor, 24 patients had received 100mg I.V pethidine (group A)

over one minute period with 10 mg metoclopramid I.V, was given as an antiemetic agent. The other 24 patients received Entonox (50%N₂O with 50% O₂) (group B) intermittently by self-administration by the patient herself using inhalation mask, starting with the onset of pain with each contraction and discontinuation of use as the contraction pain cease. Assessment of pain before giving analgesia and one hour after giving analgesia by either method were done by using the parameters of MPQ (PRI, PPI). The statistical analysis was done by using Mann-Whiteny U test for non-parametric data and the reliability regression test for the comparison between the groups.

The aim of the study is to evaluate the subjective analgesia efficacy (SAE) of both analgesia methods in the first stage of labor in multiparous parturient.

RESULTS

The demographic distribution of patients parameters were shown in table 1.

Table 1. Demographic data.

Parameter	Group A	Group B
Maternal age in years		
Mean ± SD	23.4±5.08	23±3.38
Range	19-37	19-30
Maternal weight in kg		
Mean ± SD	66.75±8.11	65.29±8.02
Range	64-78	63-75
Maternal height in cm		
Mean ± SD	158.5±4.66	160.14±7.16
Range	153-168	150-172
Total No.	24	24

Group A: (pethidine group), there is a significant difference in the mean of PRI, PPI before and after giving pethidine as shown in table 2 and 3. The minimum PRI score was 10 before using pethidine, while the minimum score reported was 5, and the maximum score reported was 8 after using pethidine (P<0.05).

Before administration of pethidine, the minimum PPI score was 4 and 62% of the patients reported as the worst pain ever (score 5). The scores after parenteral pethidine administration were changed. The minimum score was 3 and the maximum score was 4 (P<0.05).

Table 2. Reporting the PRI score before and after parenteral pethidine in group A.

PRI reported score	Before pethidine	After pethidine	P Value
Range	No. (%)	No. (%)	
5	0 (0)	8 (34)	< 0.05
6	2 (8)	0 (0)	< 0.05
7	5 (21)	11 (46)	< 0.05
8	4 (17)	5 (20)	< 0.05
9	6 (25)	0 (0)	< 0.05
10	7 (29)	0 (0)	< 0.05

The total pain score was reduced after Entonox. The minimum (PRI) score, before giving Entonox, score was 6 and maximum was 11 while after administration of Entonox the minimum score was 4 and the maximum score was 9 ($P<0.05$). Regarding PPI, before giving Entonox the minimum was 4 and maximum score was 5, after Entonox the minimum score was one (mild pain) and maximum score was 3 ($P<0.05$) as shown in table 4 and 5.

Table 3. Reporting the PPI score before and after parenteral pethidine in group A.

PRI reported score	Before pethidine	After pethidine	P Value
Range	No. (%)	No. (%)	
3	0 (0)	23 (96)	< 0.05
4	9 (38)	1(4)	< 0.05
5	15 (62)	0 (0)	< 0.05
Total	24	24	< 0.05

The comparison between both groups regarding PRI, which is related to the nature of pain, the difference in the reduction of this parameter between parenteral pethidine and Entonox were showing no statistical significance. The changes in PPI, which is related to the intensity of pain, the entonox group showing a much better changes than the parenteral pethidine group with $P<0.05$.

Table 4. Reporting the PRI before and after Entonox administration in group B.

PRI reported score	Before Entonox	After Entonox	P Value
Range	No. (%)	No. (%)	
4	0 (0)	1 (4)	<0.05
5	0 (0)	10 (42)	<0.05
6	3 (13)	7 (29)	<0.05
7	4 (17)	2 (8)	<0.05
8	5 (21)	3 (13)	<0.05
9	5 (21)	1 (4)	<0.05
10	1 (4)	0 (0)	<0.05
11	6 (25)	0 (0)	<0.05
Total	24	24	

Table 5. Reporting the PPI before and after the administration of Entonox in group B.

PPI reported score	Before Entonox	After Entonox	P value
Range	No. (%)	No. (%)	
1	0 (0)	3 (13)	<0.05
2	0 (0)	17 (70)	<0.05
3	0 (0)	4 (4)	<0.05
4	9 (38)	0 (0)	<0.05
5	15 (62)	0 (0)	<0.05
Total	24	24	

DISCUSSION

The goal is to reach maternal satisfaction during the natural process of labor. The reduction in both PPI and PRI is the marker for maternal satisfaction.^[6] The reduction in the pattern of pain intensity, in this study, with Entonox appear to be more effective than pethidine in reducing total pain score (PRI&PPI) and especially that the difference was more obvious in the parameter related to intensity of labor pain (PPI). The women can use Entonox by herself, so she can maintain a sense of control and reduce burdens on the attending staff. Entonox is not flammable, pleasant smell, minimal maternal toxicity and has no respiratory depressant

effect on the neonate. For those reasons it can be given at any stage of labor. This study goes in agreement with the results of the study in the royal hospital for women in Australia.^[14]

Paeche's study had shown different results goes with maternal satisfaction more with pethidine than entonox, as 35% satisfied versus 57% showing dissatisfaction.^[12]

Conclusion: Both parenteral pethidine and entonox had partial, but significant reduction in total pain score at the first stage of labor.

Entonox is superior in reducing the pain intensity at the first stage of labor to pethidine.

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