

Intradermal Sterile Water Injection in Sacral Region: A Low Cost Labour Analgesia

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Abstract: Introduction : Labour pain is considered as one amongst the severe pains and managed usually by pharmacological method. The role of nonpharmacologic method-intradermal sterile water administration in the sacral region has the benefit of being noninvasive, low-cost, simple, effective, and without serious adverse effects .**Aim:** To assess the efficacy of intradermal sterile water versus intramuscular pentazocine administration in sacral region (Michaelis rhomboid) as labour analgesia.**Material and method** Parturients in cephalic presentation at first stage of labour were distributed alternately into two groups of fifty parturient each. Sterile water injection group of patients received 6 intradermal injections of 0.5 ml sterile water in the sacral region. In the other group pain relief was provided by IM pentazocine in dose of 30mg. The pain score was monitored at 15 and 90 min by visual analogue scale (VAS).

Result: The mean (VAS) pain score at 0,15 and 90 minutes were 75.3 ± 23.04 , 30.2 ± 12.65 , 42.3 ± 13.76 in sterile water group and 25.2 ± 10.72 , 74.7 ± 23.45 , 25.2 ± 10.72 in pentazocine group, at 0,15 and 90minutes respectively. Eight patients (16%) needed supplementation of inj IM pentazocine in the sterile water group, the pain relief in both the groups were of mild degree after 90 minutes.**Conclusion:** The effectiveness of pain relief by intradermal sterile water administration in the sacral region and inj IM pentazocine are comparable . Intradermal sterile water administration is simple low cost nonpharmacological method of pain relief during labour in low resource settings.

Key words : non pharmacological labour labour analgesia, intradermal sterile water administration .

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I. Introduction:

Labour pain is considered to be one among the severe pains of human perception. Labour pain during first stage of labor is visceral in origin and transmitted at spinal nerve root T10 - L1 due to distension and stretching of lower uterine segment while in second stage of labour pain is somatic in origin affecting the spinal nerve root of S2-S4, due to distension of pelvic and perineal musculofascial structures around birth canal causing compression of LS plexus. There is perceptible difference in both the pains. The intensity and duration of labour pain depends of several factors such as personality, parity, fetal presentation, position, labour augmentation etc. [1]

The spectrum of the varied wishes of parturient range from natural labour with no pharmacological intervention in home delivery to completely painless labour managed by administration of epidural analgesia in a modern birth centre. A wide variety of intervention has been attempted to provide relief to laboring women such as cognitive, behavioral, and sensory pharmacological interventions. [2]

The labour pain, in the peripheral small hospitals is primarily managed by injectable opioid derivatives such as pentazocine, pethidine, etc. Opioids and derivatives are believed to work by activating (agonizing) κ -opioid receptors (KOR) and blocking (antagonizing) μ -opioid receptors (MOR). The side effects of opioids like constipation, nausea, itching, drowsiness and a reduced effort to breathe, also fairly frequently encountered psychological symptoms like hallucinations, nightmares and delusions. The opioid derivatives have respiratory depressant effect on fetus especially in individuals with metabolic enzyme abnormalities. [3]

Pharmacological interventions often are associated with high degree of expertise and cost as well as risk of adverse complications in both mother and fetus. Thus nonpharmacologic methods has a role in management of labour with benefits of being noninvasive, noninvasive, low-cost, simple, effective, and without serious adverse effects. Nonpharmacologic methods have been shown to promote a higher satisfaction with the labor experience because of perceived control and empowerment.[4,5]. A study was designed to assess the efficacy of labour pain management by administration of intradermal sterile water in sacral region compared to intramuscular pentazocine.

Aim: To assess the efficacy of intradermal sterile water versus intramuscular pentazocine administration in sacral region (Michaelis rhomboid) as labour analgesia.

Design: Parturient consisting of singleton primigravida and multigravida in cephalic presentation at first stage of labour were selected alternately into two groups of fifty parturient each. Patients with both spontaneous onset of labour and induced labour were included in the prospective observational study.

II. Material and method

The study was conducted after approval of institutional ethical committee comprising of 100 pregnant patients admitted to the labour room in defence hospital. To qualify for entry into the trial they had to be in the first stage of labor (cervical dilatation around 3- 4 cm) and require pain relief of lower back pain on admission or during their stay in the labour room. Written informed consent was taken from all the patients.

Selection criteria- All patients in first stage of labour were included. Exclusion criteria- Presence of infection in the area of injection and unwilling patients.

Patients in sterile water injection group received 6 intradermal injections of 0.5 ml sterile water in the sacral region in the left lateral lying position of the patient. (Point.1) One injection was given at the posterior superior iliac spine on both sides represented as dimple of Venus on the skin ; (Point.2) second injection at 1 cm medial and 3 cm inferior to the first point and (Point.3) the last one 3 cm vertically bellow the point 2 using an insulin needle. Similarly intradermal injection was given in the symmetrically opposite points. The intradermal sterile water raises the skin as a localized firm raised area like a papule. Patients experience an acute burning sensation for a short period of few minutes. The relief of pain usually starts within minutes and the effect usually fades away by 90 to 120 minutes. The procedure may be repeated after two hours, usually the procedure is repeated thrice for average laboring women.

Labour was monitored by conventional method of partography and delivery was conducted as per obstetric protocol. Neonatal APGAR score were recorded. The degree of pain sensation was recorded by VISUAL ANALOG SCALE of 0- 100 on a 10 cm paper. The patient was asked to draw a line from 0 mark toward 100 mark by a pencil on the VAS scale. Smaller the length of the line, better the pain relief. Pain intensity was recorded as none, mild, moderate, or severe, the following cutoff points on the VAS have been considered : no pain (0–4 mm), mild pain (5–44 mm), moderate pain (45–74 mm), and severe pain (75– 100 mm) . After 15 minutes of administration of intradermal sterile water if intensity of pain sensation remained in the moderate to severe degree then IM pentazocine dose of 30 mg was administered. In the other arm of the study pain relief was provided by IM pentazocine dose of 30mg. The pain score was monitored at 15 min , and 90 min by VAS. The data was collected by on duty nursing staff.

III. Result

Total number of 100 women in labour were divided into two groups of 50 in each . The sample size was calculated to achieve a significant end point of pain score of 100 to pain relief pain score of 30 in VAS was 6 in each group to achieve a power of 80%. Statistical analysis was done by using T- test for equality of means of patient age and gestational age and also for Apgar score, Chi-square tests for parity, cervical dilatation. Mann-Whitney U and Wilcoxon W tests respectively were done for VAS at 0, 15, 90minutes between groups. The demographic characteristics in both the groups were similar as shown in table 1.

Table 1
Demographic and clinical data before treatment (mean \pm SD)

Characteristics	Sterile water group (mean \pm SD)	Inj Pentazocine(mean \pm SD)
Age (years)	27.80 \pm 3.61	27.30 \pm 3.64
Parity(primi/multi)	28/22	27/23
Gestational age (weeks)	37.90 \pm 1.38	38.10 \pm 1.35
Cervical dilatation(cm)	3.6 \pm 0.6	3.8 \pm 0.7

The mean VAS score recorded at table 2, at before treatment (0 Hr) was 82.3 in sterile water group and 84.1 in pentazocine group with no statistical significant difference between both groups. The mean VAS pain score 15 minutes after treatment when compared to the pretreatment score was found to be reduced 30.2 \pm 12.65 in sterile water group and 25.2 \pm 10.72 in pentazocine group (statistically highly significant) in both the group . Mean VAS pain score at 90min were also found to be reduced to 42.3 \pm 13.76 , and 33.7 \pm 20.41 respectively in two groups. Eight patients needed supplementation of inj IM pentazocine in sterile water group, the pain relief in both the group was upto milds level after 90 minutes. None of the patient had complete relief of pain in both the study group.

Table 2: Mean VAS score at different times

Group	VAS at 0 min	VAS at 15 min	VAS at 90 min
Sterile water (n=42)	75.3±23.04	30.2±12.65	42.3±13.76
Pentazocine(n=50)	74.7±23.45	25.2±10.72	33.7±20.41
Sterile water and pentazocine(n=8)	75.3±23.04	55.2±5.72	8.1±1.71
Significance	p>0.05	P <0.05	P<.0.05

The mean period between injections and delivery was 5.03±1.15 hrs in sterile water group and 4.17±2.10 hrs in pentazocine group. The difference was not significant. Mean Apgar score in 5 min of the newborns in the groups were 7.8±0.9 and 8.18±0.25 respectively. There was no difference in Apgar score between the two groups shown in table 3.

Table 3. Length of labour and Apgar

Group	Length of labour hrs	Apgar Score at 5 min
Sterile water (n=42)	5.03±1.15	7.8±0.9
Pentazocine(n=50)	4.17±2.10	8.18±0.25
Significance	p>0.05	p>0.05

IV. Discussion

Pain management during childbirth is the alleviation of pain that a woman may experience during labor and delivery, which is one of the severest pain women experience. In India, practice of labor analgesia is low.. only 23% of parturients accept labor analgesia according to the previous survey done in Delhi and Chennai. Building a positive outlook on childbirth and managing fear may also help some women cope with the pain. Labor pain is not like pain due to illness or injury. Instead, it is caused by contractions of the uterus that are pushing the baby down and out of the birth canal. In other words, labor pain has a purpose] Apprehension of severity of labor pain for some pregnant women is a deterrent for vaginal delivery and many opt for elective caesarean delivery. (6,7,8)

In one survey with Indian anaesthesiologist, labour analgesia was provided to (31.16%) in corporate hospitals, (32.34%), private nursing home, (12.44%) private medical college and (2.96%). government hospital (9).

Due to inadequate number of staff and lack of knowledge and expertise of labour analgesia, large number of women in Indian hospitals suffer the excruciating labour pain. Various noninvasive methods such as hydrotherapy, acupuncture, yoga, music, counterpressure, acupressure, relaxation, breathing techniques, positioning/movement, and transcutaneous electrical nerve stimulation and pharmacologic treatments (nitrous oxide, opioids, and regional analgesia techniques: spinal, epidural, and combined epidural analgesia are available for managing labour pain. Regional anaesthesia methods (epidural, spinal, or epidural-spinal combination) are considered the most popular and most effective methods for addressing labour pain. (10) Birthing techniques such as hydrotherapy, hypnobirthing, patterned breathing, relaxation, and visualization can increase the production of endogenous endorphins that bind to receptors in the brain for pain relief. Other methods of comfort therapy such as effleurage (light rhythmic stroking of the abdomen), massage, emptying the bladder and hydrotherapy can provide pain relief and reduce the need for narcotic analgesia or anesthesia by naturally creating competing impulses in the central nervous system that can prevent the painful stimuli of labor contractions from reaching the brain. Birthing ball, patterned breathing, beverages, movement and position changes, superficial heat and cold, counter-pressure, touch and massage, aromatherapy, hydrotherapy, focus and distraction and audio-analgesia, TENS are some of the methods used as non pharmacologic labour analgesia with varying degree of success. The new subcutaneous method of administering sterile water, as well as the earlier described intracutaneous injection method, was effective for the relief of pain in labour.(11)

Antenatal preparatory classes for labour and delivery prepare women well for impending planning of delivery and gives a positive result. In addition to available methods of labour analgesia such as inhalational agents, injectable analgesic including opioid and neural blocks the nonpharmacological method becomes handy and very low cost for underprivileged section of society. The intracutaneous injections of sterile water was also found to be an effective treatment against lower back pain during the first stage of labor in a Thy study.(12)

Intradermal sterile water injection at sacral region partially alters the pain pathway from uterus and cervix at dorsal spinal nerve roots. Injecting solutions of osmolality other than blood irritates biological tissues. Sterile water injection evokes intense pain, probably due to the difference in osmolality. Women given sterile water injection experience less labour pain compared to women given acupuncture.(13,14)

It may be a very useful treatment for low back pain during the initial part of the first stage of labour even for those women that may require epidural analgesia when labour proceeds. It can easily be administered by the patient's midwife and no side effects have been observed other than a burning pain lasting for a few seconds. There is only limited evidence that TENS reduces pain in labour and it does not seem to have any impact (either positive or negative) on other outcomes for mothers or babies. (15)

In the study, pain relief by intra dermal sterile water administration at six points in contrast to four points in earlier studies was achieved by reducing the intensity from severe to mild, although it was not completely abolished. Parturients, who needed supplementation with pentazocine also achieved higher pain relief than pentazocine alone. The length, Apgar score of the neonate were similar in both the groups. Thus, for poor resource health care set up, intradermal sterile water administration may be attempted as first line of labour analgesia. Those parturients who are not satisfied with the level of pain relief may be supplemented with available analgesics.

V. Conclusion

Labour pain is one of the severe pains women encounters while bringing forth a new life to the world. Every attempt should be taken to provide relief to her pain by the available facilities. Intradermal sterile water administration is simple low cost nonpharmacological method of pain relief in low resource settings.

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