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# A Clinical Comparative Study of Post-Operative Analgesia with Tramadol and Pethidine Following Caesarean Section

Dr. Somnath Dey[1*]
*1*Associate Professor, Department of Anesthesiology, Bankura Sammilani Medical College, Bankura, West Bengal.*
*Corresponding Author: Dr. Somnath Dey*

***Abstract***
***Introduction:*** *Post operative pain is an acute pain which starts with surgical trauma and usually ends with tissue healing. When the patient first wakes after surgery, the period of first 'fast' pain is over and the pain of which the patient initially becomes aware in the poorly localized 'second' pain. The pain is accompanied by manuoevers to try to ameliorate it and by autonomic disturbances, there is also a pain component which is not dependent solely on trauma but on the way the patient's perception of pain is influenced by social, cultural and psychologic factors.*
***Materials and Methods:*** *The present study has been carried out in the labour room and labour OT of the Department of Obstetrics and Gynaecology along with the help of the department of anaesthesiology, Rajandra Medical College and Hospitals, Ranchi. A total of hundred patients of ASA I and ASA II presenting for elective or emergency caesarean section were taken up for the study. All the patients were explained about the study of the pain and sedation scores post operatively. A routine pre operative evaluation was done and the following categories of patients were excluded from the study:*
***Results:*** *The results obtained during the course of the study are shown in tabular form below. Individual figures are given in the grand chart, Number of cases in Group I: 50, Number of cases in Group II: 50. The frequency of nausea, sedation, and metoclopramide consumptions was low and not significantly different among the 2 groups. Nausea and vomiting have been major side effects of opioid used for postoperative analgesia. Tramadol appeared to cause substantially more postoperative nausea and vomiting than morphine.*
***Conclusion:*** *In our study, sedation was observed more with pethidine than with Tramadol. Beside, side effects like nausea and vomiting were seen more with pethidine. Hence, Tramadol can be used safely in post operative analgesia following caesarean section as it has no adverse effects on the newborn and has got a superior safety profile than that of pethidine.*
***Key Words: ASA,*** *pethidine, Tramadol, sedation*

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## I. Introduction

"Pain is perfect misery, the worst of all evils,
And, if excessive, overturns all patience"
-Paradise

"Pain is what the patient says hurts" (Twycross, 1995).

International Associations for the study of pain has defined pain as "pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage "(Merskey H.et al) (pain terms : a list with definition and notes in usage). Pain (1997):(6:249).[1]

Post operative pain is an acute pain which starts with surgical trauma and usually ends with tissue healing. When the patient first wakes after surgery, the period of first 'fast' pain is over and the pain of which the patient initially becomes aware in the poorly localized 'second' pain. The pain is accompanied by manuoevers to try to ameliorate it and by autonomic disturbances, there is also a pain component which is not dependent solely on trauma but on the way the patient's perception of pain is influenced by social, cultural and psychologic factors.[2]

Little is known about the types of pain experienced after different operations and what makes it better or worse. The only clear facts are that pain diminishes with time after surgery.

The lack of interest in post operative pain is probably associated with the fact that pain after surgery gets better and gets better fairly rapidly. It is rarely of a degree to cause violent autonomic responses such as those involved in vasovagal attacks, although it can be associated with less serious autonomic disturbances such

as sweating and nausea. The effect of post operative pain are largely psychological causing distress and anxiety.[3]

Most of the side effects like nausea, vomiting, dizziness are comparable with stronger opioids. It is claimed to be less sedative than other available opioids. In the face of frequent non availability of drugs such as morphine and pethidine we have been forced to resort to drugs such as buprenorphine and pentazocin. In this context, tramadol appears to be a suitable option. It has got low addiction potential and freely available In the market. Further no adverse effects have freely available in the market. Further no adverse effects have been reported in the newborn when used in lactating mother.[4]

These features prompted us to take up this study to compare the efficacy of intramuscular pethidine with intramuscular tramadol for post operative analgesia in patients undergoing caesarean section under regional anaesthesia and also compare the side effects of the drugs.

## II. Materials And Methods

The present study has been carried out in the labour room and labour OT of the Department of Obstetrics and Gynaecology along with the help of the department of anesthesiology, Rajendra Medical College and Hospitals, Ranchi.

A total of hundred patients of ASA I and ASA II presenting for elective or emergency caesarean section were taken up for the study. All the patients were explained about the study of the pain and sedation scores post operatively. A routine pre operative evaluation was done and the following categories of patients were excluded from the study:

1. Patients with pre existing cardio respiratory diseases.
2. Those who have received either narcotics or sedatives in the process of labour.
3. Those presenting with foetal distress.

The patients were premedicated with h2 blockers one hour before. 15 ml of 0.3 M Sodium citrate, orally given 10 minutes before starting the block. A drip was set up and baseline pulse, blood pressure, respiratory rate were taken. All patients were preloaded with 1 liter of balanced salt solution that is rigner s lactate solution. A conventional subarachnoid anaesthetic using 2.5 ml of 0.5% bupivacaine (heavy) injected (by 1 25G spinal needle) with the patient in right lateral position and afterwards turned to her back on a table with a slight head down tilt with a wedge under the right hip and shoulder to remove pressure, especially at the pelvic brim, on the vena cava from the gravid uterus. Lateral tilt was used to avoid pressure of the gravid uterus on the vena cava. The enlarging uterus, by interfering with the movements of the diaphragm tends to produce hypoxia of the mother, so oxygen was given to the mother from the onset. Intraoperatively management was based on generally accepted guidelines. The following patients were excluded from the study: patients who received narcotics sedatives or supplemental general anaesthesia and patients who suffered persistent hypotension due to any reason.

After conclusion of the surgery, the patients were monitored and the time of regression of two spinal segments was noted. This was designated as '0' hour. The pulse rate, blood pressure and respiratory rate were noted. At this time, patients were randomly allotted to either of the groups, group I patients receiving pethidine 1 mg/kg body weight and group II patients received tramadol 1.5 mg/kg body weight intramuscularly. The drug was repeated every six hours irrespective of the patient status.

The rescue analgesic was in the form of 10 mg, IV pethidine every 10 minutes. When patients complained of pain. The following variables were note for 18 hours after the first injection. Pulse rate, blood pressure and respiratory rate every three hours and at 45 minutes following each injection. Pain score by Numerical Rating Scale (NRS) were measured at 3 hour intervals and 45 minutes after each injection, and side effects such as nausea and vomiting. If any were recorded. A sedation score was maintained at 3 hour intervals and 45 minutes after each injection as follows:

I. Awake, restless and complaining of pain.
II. Awake, restless.
III. Awake, comfortable.
IV. Asleep, Arousable.
V. Asleep, Arousable only to persistent call or touch.

Any additional analgesia in the form of incremental pethidine was noted.
The parameters were charted in a proforma.

## III. Results

The results obtained during the course of the study are shown in tabular form below. Individual figures are given in the grand chart,

Number of cases in Group I: 50.
Number of cases in Group II: 50.

**Table 1: Distribution pattern of age**

| No of patients | | | | | |
|---|---|---|---|---|---|
| Group | **15-20 yrs** | **21-25 yrs** | **26-30 yrs** | **31-35 yrs** | **Mean age** |
| I | 9 | 32 | 6 | 3 | 23.84 |
| II | 9 | 18 | 20 | 3 | 25.18 |

Maximum age: 25 years Minimum age: 18 years

**Table 2: Distribution pattern of Body Weight (in kg)**

| No of patients | | | | | |
|---|---|---|---|---|---|
| Group | **46-50 yrs** | **51-55 yrs** | **56-60 yrs** | **61-65 yrs** | **Mean age** |
| I | 6 | 12 | 18 | 14 | 57.1 |
| II | 3 | 10 | 23 | 14 | 57.74 |

Maximum body weight: 65 kg Minimum body weight: 48 kg

**Table 3: Incidence of caesarean section**

| **Indication** | **Group I** | **Group II** |
|---|---|---|
| Post casarean section | 18 | 25 |
| Cephalo pelvic disproportion (C.P.D) | 18 | 13 |
| Post dated pregnancy | 11 | 10 |
| Elderly primigravidae | 1 | 2 |
| Placenta Previa | 2 | Nil |

**Table 4: APGAR Score at 5 minutes**

| **Group** | **APGAR Score** | | | **Mean** |
|---|---|---|---|---|
| | **7-10** | **5-6** | **Below** | |
| **I** | 47 | 3 | Nil | 8.32 |
| **II** | 50 | Nil | Nil | 8.36 |

**Table 5: Mean pulse rate of both groups at pre determined times in beats per minute**

| **Group** | **Pulse rate** | | | | | |
|---|---|---|---|---|---|---|
| | **Pre induction** | **5 min** | **10 min** | **15 min** | **30 min** | **After skin closure** |
| **I** | 81.42 | 84.68 | 88.94 | 91.29 | 93.15 | 81.24 |
| **II** | 79.50 | 82.83 | 85.94 | 88.63 | 89.38 | 80.12 |

**Table 6: Mean arterial pressure of both groups in pre determined times**

| Group | Mean arterial pressure | | | | | |
|---|---|---|---|---|---|---|
| | **Pre induction** | **5 min** | **10 min** | **15 min** | **30 min** | **After skin closure** |
| **I** | 96.52 | 92.46 | 90.28 | 89.06 | 88.84 | 95.73 |
| **II** | 97.69 | 95.57 | 94.36 | 91.14 | 89.97 | 96.84 |

**Table 7: mean respiratory rate in pre determined times**

| **Group** | | **Respiratory rate** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Pre induction** | **0 hour** | **3 hrs** | **3.45 hrs** | **6 hrs** | **6.45 hrs** | **9 hrs** | **9.5 hrs** |
| **I** | 21.86 | 21.67 | 21.64 | 21.72 | 21.67 | 21.59 | 21.62 | 21.58 |
| **II** | 22.78 | 22.56 | 22.59 | 22.63 | 22.60 | 22.64 | 22.73 | 22.68 |

**Table 8: Average extra dose of inj pethidine IV in both groups when needed**

| | Group I | Group II |
|---|---|---|
| **Average dose of rescue analgesic** | 6.4 mg | 5.8 mg |

**Table 9: Incidence of side effects of both groups in percentage**

| Side effects | Group I | Group II |
|---|---|---|
| **Nausea, vomiting** | 18% | 4% |
| **Respiratory depression** | Nil | Nil |
| **Others** | Nil | Nil |

## IV. Discussion

Our data showed that VAS scores both at rest and on coughing were significantly lower in groups P and T when compared with groups B and C. Previous works demonstrated that, subcutaneously tramadol provided local anesthesia equal to lidocaine in patients undergoing minor surgery (lipoma excision and scar revision) under local anesthesia. Moreover, tramadol extended the pain-free period after operation and

significantly decreased the need for postoperative analgesia. Also, it was shown that tramadol had a local anesthetic effect similar to that of prilocaine after intradermal injection.[5]

Initially, it was thought that tramadol produced its anti-nociceptive and analgesic effects through spinal and supraspinal sites rather than via a local anesthetic action.[6] However, several clinical studies have shown that it might have peripheral local anesthetic type properties. By direct tramadol application to the sciatic nerve in rats, it was proven that tramadol exerts a local anesthetic type effect.[7]

In the present study, tramadol had a local anesthetic action similar to that of bupivacaine and because of its anti-nociceptive effect, it could extend the postoperative pain-free period. When extracellular sodium concentration decreases, the nerve fiber becomes sensitive to local anesthetics. Jou *et al*.[8] suggested that tramadol affects sensory and motor nerve conduction by a similar mechanism to that of lidocaine, which acts on the voltage-dependent sodium channel, leading to an axonal blockage. However, Mert *et al*. proposed that tramadol might have a mechanism, different from that of lidocaine for producing conduction blocks, the presence of a large $Ca^{2+}$ concentration in the external medium increases tramadol's activity whereas decreasing lidocaine activity.[9]

Tramadol is structurally-related codeine, which is, in fact, a methyl-morphine. Tramadol exerts its action on central monoaminergic systems, and this mechanism may contribute to its analgesic effect. After IM injection, tramadol was rapidly and almost completely absorbed, and peak serum concentrations were reached in 45 minutes on average; subcutaneous pethidine infusion analgesia has advantage over conventional intramuscular bolus injections. It was judged acceptable to both patients and ward staff. The findings of the other studies in this regards is in accordance with the results of our study. In our study, the total amount of consumed analgesic in the postoperative period was considerably less in groups P and T compared with groups B and C, respectively.

Bupivacaine wound instillation induced relatively poor post-cesarean analgesia. It should be remembered that tissue response to surgery-induced injury initiates in nociception, inflammation, and hyperalgesia. Thus, it is not surprising that agents with different mechanisms of action modulate this cascade. Local anesthetic agents modulate peripheral pain transduction by inhibiting the transmission of noxious impulses from the site of injury. Furthermore, despite the fundamental differences in mechanism of action, basic science investigations suggest that both local anesthetic agents and opioids decrease peripheral and central sensitization via direct central nervous system effect. As our study showed, one study demonstrated that subcutaneous wound infiltration with bupivacaine 0.5% did not decrease morphine requirements on the first postoperative day after lower segment cesarean section.[10]

The frequency of nausea, sedation, and metoclopramide consumptions was low and not significantly different among the 4 groups. Nausea and vomiting have been major side effects of opioid used for postoperative analgesia. Tramadol appeared to cause substantially more postoperative nausea and vomiting than morphine.

## V. Conclusion

In conclusion, it may be said that the search for an ideal analgesic agent is continuing. For post operative pain relief, intramuscular opioid administration is the oldest and the most widely practiced method because of its case of applicability and universal acceptance.

In our study, sedation was observed more with pethidine than with Tramadol. Beside, side effects like nausea and vomiting were seen more with pethidine.

Hence, Tramadol can be used safely in post operative analgesia following caesarean section as it has no adverse effects on the newborn and has got a superior safety profile than that of pethidine.

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