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**Original Research Article**

# THE EFFECT OF A SINGLE DOSE OF INTRAVENOUS DEXAMETHASONE ON POST-OPERATIVE ANALGESIA AFTER LOWER SEGMENT CAESAREAN SECTION - A PROSPECTIVE RANDOMIZED COMPARATIVE SINGLE - BLIND STUDY

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**ABSTRACT**

**Background:** Cesarean section is one of the common surgeries of women, estimated to be done in about 15% of births worldwide. The present study was conducted to assess the effect of a single dose of intravenous dexamethasone on post operative analgesia after lower segment cesarean section.

**Materials & Methods:** 100 patients with term pregnancy were divided into two groups of 50 each (Group A and Group B). Group A received a single dose of Dexamethasone (8mg/2ml) intravenously. Group B received a single dose of Normal saline (2ml) intravenously. Parameters such as heart rate, blood pressure, arterial pulse saturation (SpO2) and VAS score were compared.

**Results:** A significantly better post-op analgesia was observed among cases of dexamethasone group. Mean VAS score was significantly lower among dexamethasone group cases throughout all the reading during first 24 hours ($p<0.01$). Duration of analgesia was 226.5 minutes in group A and 153.4 minutes in group B, total dose of analgesia was 2.7 minutes in group A and 3.9 minutes in group B. No difference was observed with respect to heart rate among the two groups at baseline and during thecourse of the surgery ($p> 0.05$). No difference was observed with respect to mean systolic and diastolic blood pressure among the two groups at baseline and during the course of the surgery ($p> 0.05$). No difference was observed with respect to oxygen saturation among the two groups at baseline and during the course of the surgery ($p> 0.05$). PONV was seen in 3 in group A and 6 in group II. The difference was significant ($p< 0.05$).

**Conclusion:** IV dexamethasone after lower segment cesarean section is an excellent option for pain control if no relative or absolute contra indications to its use exist.

**Key words:** Cesarean section, pain, Dexamethasone

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## 1. Introduction

Acute pain in the peri-operative setting is defined as pain that is intolerable in the surgical patient because of pre-existing disease, surgical procedure or combination of these. This pain results in physiological and psychological responses in the patient, the majority of which are detrimental to post-operative outcome.[1]

Cesarean section is one of the common surgeries of women, estimated to be done in about 15% of births worldwide. Acute post-operative pain is one of the recognized post- operative complications. Cesarean Section patients require adequate analgesia in the immediate post-operative period because of the need for rapid ambulation to care for the infant and prevention of postoperative morbidity in the mother.[2] Adequate pain relief gets translated to better predictive outcome. The goal for postoperative pain management is to reduce and eliminate pain and discomfort with minimum side effects, in a very cost-effective manner. Post Caesarean pain consists of a somatic and a visceral component. Visceral pain originates from uterine incision and contractions. The somatic component arises from nociceptors within the surgical site (nerves from T6 to L1). There is no gold standard for post caesarean pain management.[3]

Nowadays, different treatments have been reported for pain relief. One of them is Dexamethasone as a part of multimodal analgesia.[4] Multiple studies demonstrated dexamethasone's ability to lower the post-operative pain and then there are others which report no such effect. With its anti- inflammatory effect along with long half-life, dexamethasone should be useful in lowering pain, nausea and vomiting.[5] To allow for an evidence-based judgement on the effects of intravenous (i.v.) dexamethasone after single-shot spinal anaesthesia in lowering pain, further studies are needed.[6,7] The present study was conducted to assess the effect of a single dose of intravenous dexamethasone on post operative analgesia after lower segment cesarean section.

## 2. Materials & Methods

The present study comprised a total of 100 patients at SBLS Civil hospital, Jalandhar, with term pregnancy falling under ASA grade I and II, admitted in the obstetrics and gynaecology department scheduled for elective lower segment caesarean section (LSCS) and giving informed consent.

Data such as name, age etc. was recorded. These 100 cases were divided into two groups of 50 each (Group A and Group B). Group A: received a single dose of Dexamethasone (8mg/2ml) intravenously. Group B received a single dose of Normal saline (2ml) intravenously. Detailed history and proper physical examination was done in all patients. Patients were admitted a day before surgery after relevant investigation, pre-anaesthetic check-up and fitness for surgery.

Patient's clinical history, general physical and systemic examination, and basic routine investigations such as hemoglobin, bleeding time, clotting time, urine for albumin, and sugar

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was noted. All patients were pre-medicated before surgery in the morning with intravenous pantoprazole.

Monitoring was done using multi-parameter monitor having non-invasive blood pressure (NIBP), and arterial pulse saturation (SpO2). Patients were oxygenated and operated under spinal anaesthesia with appropriately sized needle and dose of Bupivacaine (heavy). Continuous intraoperative monitoring of the following parameters were recorded: Heart rate (HR), Non-invasive blood pressure (NIBP), respiratory rate (RR) and Oxygen saturation (SpO2). These parameters were recorded every 5 minutes for the first 20 minutes, then at an interval of 10 minutes till the end of the surgery. Readings were noted in the recovery room for every 15 minutes for 2 hour and in the postoperative ward every 2 hourly for the next 10 hour, then at 16, 20, and 24 hours. Pain intensity was assessed using VAS (0–10 point scale) every 1 hour for the first 6 hours and then every 4 hours till 24 hours of surgery postoperative in the ward. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

## 3. Results

**Table I Distribution of patients**

| **Groups** | **Group I** | **Group II** |
|---|---|---|
| Status | Dexamethasone (8mg/2ml) intravenously | Normal saline (2ml) intravenously. |
| Number | 50 | 50 |

Table I shows that group A received a single dose of Dexamethasone (8mg/2ml) intravenously and group B received a single dose of normal saline (2ml) intravenously. Each group had 50 patients.

**Table II Mean heart rate comparison among study groups**

| **HR** | **Group** | **Mean** | **SD** | **P value** |
|---|---|---|---|---|
| 0 min | Group A | 75.8 | 6.3 | 0.985 |
| | Group B | 75.8 | 5.7 | |
| 5 min | Group A | 79.6 | 5.1 | 0.113 |
| | Group B | 77.9 | 4.4 | |
| 15 min | Group A | 80.8 | 2.9 | 0.305 |
| | Group B | 81.6 | 4.3 | |
| 30 min | Group A | 76.8 | 4.8 | 0.544 |
| | Group B | 77.4 | 4.3 | |
| 45 min | Group A | 79.4 | 5.2 | 0.717 |
| | Group B | 79.0 | 4.0 | |

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| | | | | |
|---|---|---|---|---|
| 60 min | Group A | 80.7 | 3.1 | 0.524 |
| | Group B | 80.2 | 4.5 | |
| 90 min. | Group A | 76.6 | 4.9 | 0.248 |
| | Group B | 77.7 | 3.6 | |
| 120 min. | Group A | 77.1 | 4.7 | 0.246 |
| | Group B | 78.2 | 3.7 | |

Table II shows that no difference was observed with respect to heart rate among the two groups at baseline and during thecourse of the surgery ($p > 0.05$).

**Table III Mean systolic and diastolic blood pressure comparison among study groups**

| **SBP** | **Group** | **Mean** | **SD** | **P value** |
|---|---|---|---|---|
| 0 min | Group A | 128.3 | 7.0 | 0.117 |
| | Group B | 126.1 | 5.3 | |
| 5 min | Group A | 123.9 | 6.2 | 0.344 |
| | Group B | 122.6 | 5.5 | |
| 15 min | Group A | 117.5 | 6.4 | 0.39 |
| | Group B | 118.8 | 6.9 | |
| 30 min | Group A | 117.6 | 5.7 | 0.332 |
| | Group B | 116.2 | 7.5 | |
| 45 min | Group A | 122.8 | 5.6 | 0.968 |
| | Group B | 122.9 | 5.5 | |
| 60 min | Group A | 114.5 | 5.4 | 0.258 |
| | Group B | 113.0 | 6.0 | |
| 90 min. | Group A | 113.2 | 5.5 | 0.38 |
| | Group B | 115.6 | 6.1 | |
| 120 min. | Group A | 110.3 | 5.1 | 0.425 |
| | **Group B** | 111.2 | 5.5 | |
| **DBP** | **Group** | **Mean** | **SD** | **P value** |
| 0 min | Group A | 98.6 | 6.4 | 0.127 |
| | Group B | 96.6 | 5.4 | |
| 5 min | Group A | 91.9 | 5.0 | 0.27 |
| | Group B | 90.7 | 5.1 | |
| 15 min | Group A | 87.8 | 5.8 | 0.787 |
| | Group B | 88.1 | 4.0 | |
| 30 min | Group A | 85.8 | 5.2 | 0.389 |
| | Group B | 86.7 | 4.0 | |
| 45 min | Group A | 82.6 | 5.8 | 0.413 |

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| | | | | |
|---|---|---|---|---|
| | Group B | 83.5 | 3.8 | |
| 60 min | Group A | 81.7 | 4.3 | 0.387 |
| | Group B | 82.4 | 3.4 | |
| 90 min. | Group A | 81.2 | 4.6 | 0.954 |
| | Group B | 81.3 | 3.0 | |
| 120 min. | Group A | 79.7 | 5.5 | 0.928 |
| | Group B | 79.8 | 4.3 | |

Table III shows that no difference was observed with respect to mean systolic and diastolic blood pressure among the two groups at baseline and during the course of the surgery (p> 0.05).

**Table IV Mean oxygen saturation comparison among study groups**

| Spo2 | Group | Mean | SD | P value |
|---|---|---|---|---|
| 0 min | Group A | 98.2 | 0.8 | 0.561 |
| | Group B | 98.3 | 0.7 | |
| 5 min | Group A | 98.4 | 0.7 | 0.42 |
| | Group B | 98.2 | 0.9 | |
| 15 min | Group A | 98.2 | 0.8 | 0.304 |
| | Group B | 98.4 | 0.7 | |
| 30 min | Group A | 98.5 | 0.6 | 0.865 |
| | Group B | 98.4 | 0.7 | |
| 45 min | Group A | 98.3 | 0.6 | 0.522 |
| | Group B | 98.2 | 0.7 | |
| 60 min | Group A | 98.4 | 0.5 | 0.589 |
| | Group B | 98.5 | 0.7 | |
| 90 min. | Group A | 98.4 | 0.6 | 0.869 |
| | Group B | 98.3 | 0.8 | |
| 120 min. | Group A | 98.3 | 0.7 | 0.22 |
| | Group B | 98.5 | 0.8 | |

Table IV shows that no difference was observed with respect to oxygen saturation among the two groups at baseline and duringthe course of the surgery (p> 0.05).

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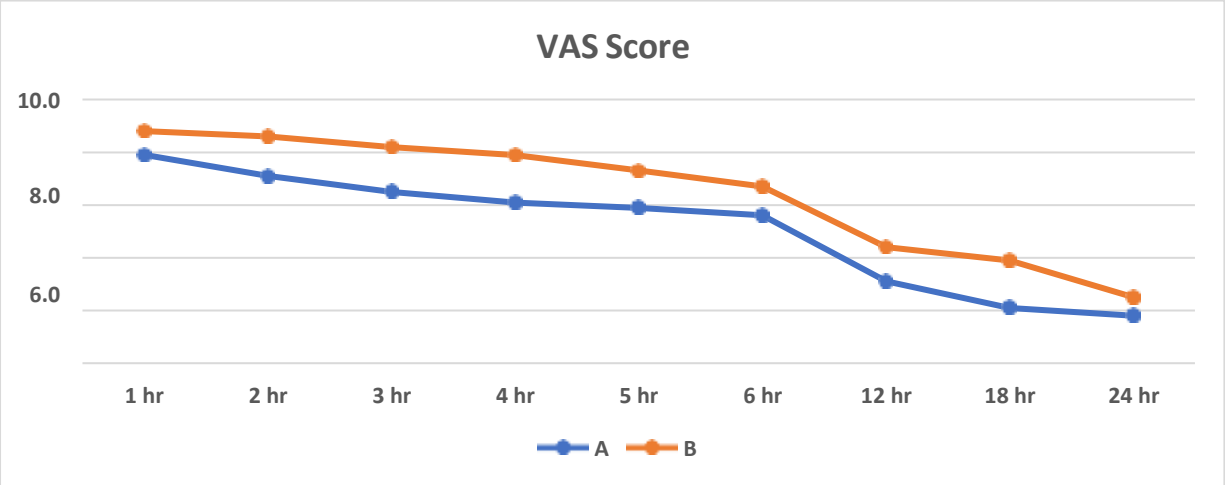
**Graph I Mean pain score (VAS) comparison among study groups**




Graph I shows significantly better post-op analgesia was observed among cases of dexamethasone group. Mean VAS score was significantly lower among dexamethasone group cases throughout all the reading during first 24hours ($p<0.01$).

**Table V Comparison of parameters**

| Parameters | Group A | Group B | P value |
|---|---|---|---|
| Duration of Analgesia (mins) | 226.5 | 153.4 | 0.02 |
| Total Dose of Analgesia | 2.7 | 3.9 | 0.05 |
| PONV | 3 | 6 | 0.01 |

Table V shows that duration of analgesia was 226.5 minutes in group A and 153.4 minutes in group B, total dose of analgesia was 2.7 minutes in group A and 3.9 minutes in group B. PONV was seen in 3 in group A and 6 in group II. The difference was significant ($P< 0.05$).

## 4. Discussion

An ideal post caesarean analgesic regimen must be cost effective, simple to implement with minimal impact on staff workload.[8] Drug transfer in to breast milk must also be minimal with no adverse effect on the new born. Non-opioid analgesics are favoured world-wide as they are devoid of opioid induced side effects and lesser post-operative monitoring is required.[9] Dexamethasone is potent, selective glucocorticoid having minimal mineralocorticoid action. Dexamethasone has found widespread use in anaesthesia for the prevention of nausea and vomiting.[10] In addition, there are reports that dexamethasone can reduce postoperative pain.

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The suggested mechanisms behind this effect are the anti-edematous, anti-inflammatory properties of dexamethasone, possibly enhanced by positive psychotropic effects.[11,12]

Our study included a total of 100 patients with term pregnancy falling under ASA grade I and II, scheduled for elective lower segment caesarean section (LSCS) and giving informed consent. These 100 cases were divided into two groups of 50 each (Group A and Group B): Group A: received a single dose of Dexamethasone (8mg/2ml) intravenously and Group B received a single dose of Normal saline (2ml) intravenously. The mean Age of Group A and B was 23.83 and 23.73 years respectively (p-0.88). Out of total 100 cases, 67% were in ASA grade I and 33% in grade II respectively (p-0.08). Mean duration of surgery was 40.3 minutes in group A while it was 40.7 mins in group B (p-0.916). No difference was observed with respect to heart rate, systolic and diastolic blood pressure and respiratory rate among the two groups at baseline and during the course of the surgery ($p > 0.05$). A study conducted by Sachdeva J aimed to study the effect of dexamethasone as additive to ropivacaine on the duration of Transverse Abdominis Plane (TAP) block as assessed by time to first analgesic (TFA). Patients in Group I received ultrasound-guided bilateral TAP block at the end of surgery using 40 ml ropivacaine 0.2% and 2 ml saline, and patients in Group II received the block using 40 ml ropivacaine 0.2% and 2 ml (8 mg) dexamethasone. TFA was significantly longer in Group II ($5.92 \pm 1.02$ vs. $3.11 \pm 0.82$ h, $P = 0$). Group II also had decreased tramadol requirement postoperatively ($100.00 \pm 0.00$ vs. $140.00 \pm 50.26$ mg, $P = 0.046$).

Our study observed significantly better post-op analgesia was observed among cases of dexamethasone group. Mean VAS score was significantly lower among dexamethasone group cases throughout all the reading during first 24 hours ($p<0.01$). Mean duration of post-op analgesia score was significantly more in cases of dexamethasone group as compared to controls (225.5 vs 153.4 mins; $p<0.01$). Mean dose of rescue analgesia required during the first 24 hours was significantly less in cases of dexamethasone group as compared to controls (2.7 vs 3.9 doses; $p<0.01$). Similar results have been observed in our study as seen in the study Shahraki[13] that aimed to evaluate the effect of administration of intravenous (IV) Dexamethasone on reducing the pain after caesarean. The results showed that post-cesarean administration of Dexamethasone (8 mg single dose) leads to better post- op analgesia and reduction in the need for analgesic consumption. Total Morphine use between treatment (average of 4 mg) and control (average of 8 mg) groups ($P < 0.001$).

Similar results were observed in our study as seen in The Melese E study[14] which aimed to determine the effect of preoperative dexamethasone on prolongation of the analgesic effect of spinal anesthesia after elective cesarean section. Groups' comparison indicated significant difference in terms of severity of postoperative pain, in which the dexamethasone group were lower with $p=0.015$. Similarly, time to the requirement of first rescue analgesia was prolonged in dexamethasone group with median (interquartile range) score of 6.5 (2.4) as compared to non-dexamethasone group 4.1 (1.8).

The Heesen M[14] study performed a meta-analysis for the primary outcome regarding consumption of intravenous morphine in the first 24 postoperative hours. Dexamethasone use was associated with a significant reduction in 24-h morphine consumption, the mean difference (95%CI) being -4.01 (-5.01 to - 3.01) mg. The time to first analgesic request was

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significantly prolonged by 86.62 (10.62–162.62) min, in the dexamethasone group. The same observation regarding the consumption of intravenous paracetamol as rescue analgesia in first 24-h has been observed in our study.

Dexamethasone has an antiemetic effect by inhibition of releasing prostaglandins and serotonin in the gastrointestinal tract and endorphin in the nervous system. We observed the incidence of post-op nausea and vomiting as 6% in dexamethasone group while it was 12% in controls. The difference was not statistically significant.

## 5. Conclusion

Authors found that IV dexamethasone after lower segment cesarean section is an excellent option for pain control if no relative or absolute contra indications to its use exist. However further research works with larger sample size are suggested to draw definitive conclusions and influence formulation of post operative pain management strategy.

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