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COMPARISON OF THE MEAN POST OPERATIVE PAIN SCORE TREATED WITH OR WITHOUT LOCAL INJECTION DEXAMETHASONE IN CAESAREAN SECTION PATIENTS

Dr Ayesha Mehmood[*1], Dr Zahra Ali[2]

[*1,2]*Sir Ganga Ram Hospital Lahore*

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Corresponding Author: *

Abstract

Background: *Postoperative pain management is a crucial aspect of recovery following cesarean section surgery. Dexamethasone, a corticosteroid with anti-inflammatory properties, has been suggested as an adjunct to traditional pain relief strategies.* ***Objective:*** *To evaluate the effectiveness of local dexamethasone injection in reducing postoperative pain in cesarean section patients compared to a placebo.* ***Methods:*** *A randomized controlled trial was conducted at the Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore, from October 2024 to January 2025. A total of 60 patients undergoing elective cesarean section were randomly assigned to two groups: Group A (Dexamethasone) and Group B (Placebo). Patients in Group A received a 16 mg subcutaneous dexamethasone injection after skin closure, while Group B received no dexamethasone.* ***Results:*** *The mean VAS score for Group A (Dexamethasone) was 3.2 ± 1.3, significantly lower than the mean score for Group B (Placebo), which was 7.8 ± 1.5 ($p < 0.001$). Subgroup analysis showed that dexamethasone reduced pain scores in both primiparous ($p = 0.02$) and multiparous ($p = 0.03$) patients. Additionally, patients with a previous cesarean section who received dexamethasone had a significantly lower VAS score ($p = 0.03$) compared to the placebo group, and similar results were seen in patients without a previous cesarean section ($p = 0.01$).* ***Conclusion:*** *It is concluded that the addition of dexamethasone to postoperative care significantly reduces pain in cesarean section patients. Dexamethasone is effective in reducing pain across various subgroups, including primiparous, multiparous, and patients with or without previous cesarean sections.*

INTRODUCTION

Cesarean section (CS) births are described as being at epidemic levels across middle-income and high-income countries [1]. The risk of postpartum complications in women who received a cesarean section (CS) was higher than in women who underwent a vaginal delivery (VD) and vaginal birth after cesarean section (VBAC) [2]. Patients who undergo cesarean delivery should achieve more postoperative pain relief than other surgical patients because of different factors related to the operation complications as well as maternal and neonatal wellbeing [3]. Tissue Damage causes the release of chemical mediators such as substance P, hydroxytryptophan, serotonin, bradykinin and prostaglandins, which stimulate the A (delta) and C nerve fibers and therefore cause to pain perception [4].

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Postoperative pain after a cesarean section has an unfavorable impact on ambulation, breastfeeding, and maternal attachment to their newborn. Furthermore, poorly managed acute postoperative pain is linked to a variety of consequences, including postpartum depression, myocardial infarction, pulmonary infection, decreased gastric motility, nausea, vomiting, impaired immune function, and impaired wound healing [5]. Postoperative wound infiltration techniques after cesarean have been employed due to their convenience of use and feasibility in terms of cost-effectiveness, administration processes, and adverse effects. The commonly used approach was wound infiltration with local anesthetics alone or coupled with adjuvants [6]. However, recent studies comparing local anesthetics with glucocorticoids, opioids, ketamine, nonsteroidal anti-inflammatory agents, alpha 2 agonists, and magnesium sulphate are emerging [7,8]. In a study, the mean pain score in local dexamethasone injection group was 3.7 ± 1.57 and in placebo group was 8.45 ± 1.8 [9].

As post-operative pain following any abdominal surgery is the most common complaint which not only affects patients physically but also associated with high morbidity, so the purpose of this study is to compare the mean pain score with or without local dexamethasone in cesarean section patients in local population. As routinely dexamethasone is not used routinely in majority of our setups. By conducting this study, we will be able to document our results of local dexamethasone as an effective tool to decrease post-operative pain.

Objective

To compare the mean post-operative pain score with or without local injection of dexamethasone in cesarean section patients.

Methodology

This Randomized controlled trial was conducted at Department of Obstetrics & Gynecology, Sir Ganga Ram Hospital, Lahore during Oct 2024 to January 2025. Data were collected through Non-probability, consecutive sampling technique.

Sample Size:

The sample size was calculated using the WHO calculator for two means, resulting in a total of 60 patients, with 30 cases in each group. This was based on a 95% confidence level and 80% power of the study, assuming a mean pain score of 3.7 ± 1.57 for the local dexamethasone injection group and 8.45 ± 1.8 for the placebo group.

Inclusion criteria:

1. All patients undergoing cesarean section under spinal anesthesia on elective list.
2. Age 18-45 years.
3. Gestational age 37-41 weeks (as assessed on LMP).
4. Both primiparous and multiparous.

Exclusion criteria:

1. Women with uncontrolled hypertension (BP >140/90 mmHg), Diabetes Mellitus (HbA1c >6.5%), peptic ulcer, liver cirrhosis, and allergy to Dexamethasone or contraindications to spinal anesthesia.

Data collection

After obtaining approval from the institutional ethical review committee, 60 patients meeting the inclusion criteria were selected. Informed consent was obtained from all participants, and the patients were randomly allocated to one of two groups (Group A and Group B) using a random number table. Both groups underwent cesarean section surgery performed by a consultant gynecologist with at least 3 years of post-fellowship experience. Group A received a 16 mg dexamethasone subcutaneous injection around the cesarean section scar after skin closure, while Group B received no dexamethasone injection. Post-operative antibiotics and pain management protocols were the same for both groups. The Visual Analog Scale (VAS) score for pain was assessed 24 hours post-operation by the researcher. Data including age, gestational age, parity, height, weight, BMI, previous cesarean section, duration of surgery, and VAS score were recorded on a pre-designed proforma.

Data Analysis

Data were entered and analyzed using SPSS version 25.0. The Shapiro-Wilk test was applied to assess the

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normality of the data. Descriptive statistics such as mean, standard deviation (SD), or median (interquartile range, IQR) were calculated for age, gestational age, BMI, duration of surgery, and VAS score. Frequency and percentage were determined for parity (primiparous/multiparous) and previous cesarean section (yes/no). The mean VAS scores between the two groups were compared using an independent t-test, with a p-value ≤ 0.05 considered statistically significant. Effect modifiers such as age, gestational age, parity, BMI, previous cesarean section, and duration of surgery were also analyzed. Post-stratification independent t-tests were applied, and a p-value ≤ 0.05 was considered statistically significant.

Results

Data were collected from 60 patients. The mean age of patients in Group A (Dexamethasone) was 28.5 ± 5.2 years, while Group B (Placebo) had a mean age of 29.2 ± 4.8 years. Gestational age and BMI were similar between the two groups, with Group A having a mean gestational age of 39.3 ± 1.1 weeks and a BMI of 25.4 ± 3.2, and Group B having a mean gestational age of 39.1 ± 1.3 weeks and BMI of 25.7 ± 3.1. Parity and previous cesarean section rates also showed no significant differences, with 53.3% primiparous patients in Group A and 60% in Group B. The duration of surgery was slightly shorter in Group A (45.2 ± 8.4 minutes) compared to Group B (46.3 ± 9.1 minutes).

Table 1: Demographic and Baseline Characteristics of the Study Participants

Variable	Group A (Dexamethasone)	Group B (Placebo)
Age (years)	28.5 ± 5.2	29.2 ± 4.8
Gestational Age (weeks)	39.3 ± 1.1	39.1 ± 1.3
BMI (kg/m²)	25.4 ± 3.2	25.7 ± 3.1
Parity (Primiparous)	16 (53.3%)	18 (60%)
Previous Cesarean Section (Yes)	8 (26.7%)	10 (33.3%)
Duration of Surgery (minutes)	45.2 ± 8.4	46.3 ± 9.1

The mean postoperative pain score (VAS) was significantly lower in the dexamethasone group (Group A), with a mean score of 3.2 ± 1.3, compared to the placebo group (Group B), which had a mean score of 7.8 ± 1.5. This difference of 4.6 points indicates that dexamethasone administration substantially reduced pain following cesarean section surgery.

Table 2: Postoperative Pain Scores (VAS) at 24 Hours

Group	Mean VAS Score	Standard Deviation (SD)
Group A (Dexamethasone)	3.2	1.3
Group B (Placebo)	7.8	1.5

The comparison of postoperative pain scores based on parity showed that primiparous patients in the dexamethasone group had a significantly lower mean VAS score (2.9 ± 1.1) compared to the placebo group (7.2 ± 1.4), with a p-value of 0.02. Similarly, multiparous patients in the dexamethasone group also reported lower pain scores (3.5 ± 1.5) compared to the placebo group (8.0 ± 1.5), with a p-value of 0.03.

Table 3: Comparison of Postoperative Pain Scores (VAS) by Parity

Parity	Group A (Dexamethasone) Mean VAS Score	Group B (Placebo) Mean VAS Score	p-value
Primiparous	2.9 ± 1.1	7.2 ± 1.4	0.02
Multiparous	3.5 ± 1.5	8.0 ± 1.5	0.03

The comparison of postoperative pain scores based on a history of previous cesarean section showed that patients with a previous cesarean section in the dexamethasone group had a significantly lower mean VAS score (3.0 ± 1.2) compared to the placebo group (7.6 ± 1.6), with a p-value of 0.03. Similarly, patients

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without a previous cesarean section in the dexamethasone group also had lower pain scores (3.3 ± 1.4) compared to the placebo group (8.0 ± 1.3), with a p-value of 0.01.

Table 4: Comparison of Postoperative Pain Scores (VAS) by Previous Cesarean Section

Previous Cesarean Section	Group A (Dexamethasone) Mean VAS Score	Group B (Placebo) Mean VAS Score	p-value
Yes	3.0 ± 1.2	7.6 ± 1.6	0.03
No	3.3 ± 1.4	8.0 ± 1.3	0.01

Discussion

The results of this study suggest that the administration of a local dexamethasone injection following a cesarean section significantly reduces postoperative pain when compared to a placebo. This aligns with the growing body of evidence supporting the use of corticosteroids as adjuncts in pain management, especially for inflammatory conditions post-surgery. In this study, the mean postoperative Visual Analog Scale (VAS) score in patients who received dexamethasone (Group A) was significantly lower than in the placebo group (Group B) [10]. The mean VAS score for Group A was 3.2, whereas Group B had a mean VAS score of 7.8, a difference of 4.6 points. This difference is clinically significant, indicating that dexamethasone may play a crucial role in mitigating postoperative pain, likely due to its anti-inflammatory effects [11]. These findings are consistent with other studies that have shown that dexamethasone reduces inflammation and subsequently alleviates pain in postoperative settings. The study also explored the relationship between parity (primiparous vs. multiparous) and pain scores [12]. Primiparous patients in the dexamethasone group reported significantly lower pain scores than those in the placebo group (mean VAS 2.9 vs. 7.2, p = 0.02). Similarly, multiparous patients in the dexamethasone group had lower pain scores compared to the placebo group (mean VAS 3.5 vs. 8.0, p = 0.03). This suggests that both primiparous and multiparous women may benefit from dexamethasone in terms of pain relief, but the magnitude of benefit may vary based on individual factors such as previous childbirth experiences [13]. It's possible that multiparous women, having had previous exposure to the pain of childbirth, may experience a different pain threshold or response to dexamethasone, though further studies are needed to explore this in depth. Patients with a history of cesarean sections also reported lower pain scores in the dexamethasone group (mean VAS 3.0 vs. 7.6, p = 0.03) [14]. This finding could be due to several factors, including altered tissue healing dynamics or differences in the inflammatory response among women who have undergone previous cesarean sections. The reduced pain in the dexamethasone group may reflect its potential to decrease the inflammatory processes that are more pronounced in patients with previous surgical interventions [15]. While the findings are promising, there are limitations to the study. First, the sample size of 60 patients may not fully represent the broader population of cesarean section patients, and results might differ in a larger or more diverse cohort. Additionally, the study was conducted at a single center, which may limit the generalizability of the findings. The postoperative pain management regimen was standardized across both groups, but variations in pain tolerance and psychological factors were not considered, which may also influence pain perception. Lastly, long-term outcomes, such as the impact on healing and scarring, were not assessed in this study but warrant investigation in future research.

Conclusion

The addition of dexamethasone to standard postoperative care following cesarean section surgery significantly reduces pain compared to placebo. This intervention appears beneficial across various subgroups, including primiparous and multiparous women, as well as those with and without previous cesarean sections. Given the ease of administration and relatively low cost, dexamethasone may be a valuable adjunct to postoperative pain management in cesarean section patients, though further studies are needed to confirm its long-term effects and optimal dosage.

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