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Oral Surgery

Evaluation of Efficacy of Post-Operative Administration of Dexamethasone and Bupivacaine in Preventing Postoperative Complications in Oral Surgery

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Abstract **Original Research Article**

Background: Postoperative pain, swelling, and trismus are common complications following oral surgical procedures and significantly affect patient comfort and functional recovery. The combined use of corticosteroids and long-acting local anesthetics has been proposed to improve postoperative outcomes, but evidence in oral surgery settings in Bangladesh remains limited. ***Aim of the study:*** To evaluate the efficacy of postoperative administration of dexamethasone and bupivacaine in reducing pain, swelling, trismus, and postoperative complications following oral surgical procedures. ***Methods:*** This prospective comparative study was conducted at the Dental Unit, Khwaja Yunus Ali Medical College and Hospital from 18th January, 2024 to 18th July 2024. Sixty patients undergoing oral surgery were enrolled and allocated into a treatment group (n=30) receiving local dexamethasone (5 mg) and bupivacaine (0.5%) postoperatively, and a control group (n=30) receiving standard postoperative care. Pain (Visual Analog Scale), swelling (facial measurements), and trismus (maximum interincisal opening) were assessed at 6, 12, 24, and 48 hours postoperatively. Postoperative complications were also recorded. Statistical analysis was performed using SPSS version 24, with $p<0.05$ considered significant. ***Results:*** The demographic and surgical characteristics were comparable between the two groups. Pain scores were significantly lower in the treatment group at 6, 12, 24, and 48 hours compared to controls ($p<0.001$). Postoperative swelling at 24 and 48 hours was also significantly reduced in the treatment group ($p<0.001$). Trismus was significantly less in the treatment group, with greater mouth opening observed at both 24 and 48 hours ($p<0.001$). Minor postoperative complications were infrequent and comparable between groups, with no significant differences in infection, bleeding, or delayed wound healing. ***Conclusion:*** Postoperative administration of dexamethasone combined with bupivacaine significantly reduces pain, swelling, and trismus after oral surgery without increasing postoperative complications. This combination represents an effective and safe adjunct to standard postoperative care.

Keywords: Dexamethasone, Bupivacaine, Oral surgery, Postoperative pain, Complications, Oral Surgery, Bangladesh.

INTRODUCTION

Intraoperative use of long-acting local anesthetic agents is common in general and neurosurgical procedures for postoperative pain management. Additionally, intraoperative corticosteroids are often used to reduce nerve root inflammation [1]. Postoperative complications commonly include pain, inflammation, swelling, and limited mouth opening, affecting function, while infections are rare in healthy patients [2]. Effective pain control is crucial in post-surgical management. Local anesthesia, often combined with general anesthesia, can significantly reduce intra- and postoperative pain, with lidocaine and bupivacaine commonly used for local injections or nerve blocks [3]. Evidence for bupivacaine as a long-acting local anesthetic also supports its role in extending postoperative analgesia, with studies showing lower pain scores in the hours following surgery when bupivacaine is used for local infiltration or nerve block versus control solutions [4].

Numerous clinical studies have shown that dexamethasone effectively reduces postoperative pain, facial swelling, and trismus when administered peri- or

postoperatively in oral surgical settings. Randomized trials demonstrate that submucosal or systemic dexamethasone significantly lowers pain scores, decreases swelling, improves mouth opening, and enhances patient comfort compared with placebo or non-steroid regimens [5]. Systematic reviews further support that corticosteroid, especially dexamethasone, reduce early postoperative edema and improve functional outcomes following oral surgical interventions [6]. Moreover, recent triple-blind randomized clinical trials of a combined dexamethasone-bupivacaine submucosal block demonstrates that patients receiving this combination experience significantly less postoperative pain over the first week and require fewer analgesic medications compared with standard anesthetic blocks without the combination [2].

A study in Bangladesh found that port-site infiltration of dexamethasone with bupivacaine provided better postoperative pain relief, longer time to first analgesic, and reduced need for additional pain medication compared with bupivacaine alone [7]. Another study in Bangladesh showed that adding dexamethasone to epidural bupivacaine significantly prolonged postoperative analgesia and reduced the need for rescue pain medication compared with bupivacaine alone [8].

In Bangladesh, there is no direct research on the use of dexamethasone with bupivacaine for postoperative pain and complications in oral surgery, with existing studies focused mainly on non-oral surgeries or regional anesthesia, leaving a gap in evidence for oral surgical pain management. The aim of this study is to evaluate the efficacy of postoperative administration of dexamethasone and bupivacaine in preventing postoperative pain, swelling, and other complications in patients undergoing oral surgical procedures.

METHODOLOGY

This prospective comparative study was conducted at Dental Unit, Khwaja Yunus Ali Medical College and Hospital from 18th January, 2024 to 18th July 2024 to evaluate the efficacy of postoperative administration of dexamethasone and bupivacaine in preventing complications following oral surgery. A total of 60 patients undergoing routine oral surgical procedures were enrolled and divided into two groups: the treatment group (n = 30) receiving dexamethasone and bupivacaine, and the control group (n = 30) receiving standard postoperative care without these medications.

Participant Selection

Patients aged 18–60 years were included. Exclusion criteria were systemic illness, allergy to dexamethasone or bupivacaine, pregnancy, lactation, or chronic corticosteroid therapy. Written informed consent was obtained from all participants.

Intervention

The treatment group received a local injection of dexamethasone (5 mg) and bupivacaine (0.5%) at the surgical site immediately postoperatively. Dexamethasone was used to reduce postoperative inflammation and swelling, while bupivacaine provided prolonged pain relief at the surgical site.

The control group received standard postoperative care, which included:

- **Analgesics:** Paracetamol or NSAIDs (naproxen or ketorolac tromethamine) as needed for pain
- **Wound care instructions:** cold compress for the first 24 hours, gentle oral hygiene, saline or antiseptic mouth rinses, dietary advice (soft foods)
- **Monitoring for complications:** observation for bleeding, infection, or delayed healing

Surgical Procedure and Follow-up

All surgeries were performed under local anesthesia using standard aseptic techniques. Postoperative outcomes were assessed at 6, 12, 24, and 48 hours, focusing on pain (Visual Analog Scale), swelling (facial measurements), and trismus (maximum interincisal opening). Secondary outcomes included infection, bleeding, and delayed healing.

Data Analysis

Data were analyzed using SPSS version 24. Continuous variables were expressed as mean ± SD and compared using Student's t-test, while categorical variables were expressed as frequency and percentage and compared using Chi-square or Fisher's exact test. A p-value < 0.05 was considered statistically significant.

RESULT

Table 1 shows demographic characteristics of the study participants. The mean age of patients in the treatment group was 33.1 ± 10.5 years, while that of the control group was 31.9 ± 9.8 years, with no statistically significant difference between the groups ($p = 0.56$). Gender distribution was comparable, with males constituting 56.7% of the treatment group and 53.3% of the control group ($p = 0.78$). Mean body mass index (BMI) was also similar between the treatment (23.4 ± 2.8 kg/m²) and control (23.1 ± 3.0 kg/m²) groups ($p = 0.63$). Table 2 shows, the type of surgical procedures performed was similar between the two groups. Simple tooth extractions accounted for 40% in the treatment group and 46.7% in the control group, while surgical extractions comprised 60% and 53.3%, respectively ($p = 0.81$). The mean duration of surgery did not differ significantly between the treatment (28.5 ± 6.2 minutes) and control (29.3 ± 5.9 minutes) groups ($p = 0.62$). All procedures were performed under local anesthesia in both groups.

This comparability suggests that surgical factors were unlikely to influence postoperative outcomes. Table 3 illustrates the indications for oral surgery in both groups. The most common indication was impacted third molar extraction, observed in 53.3% of the treatment group and 50% of the control group (p = 0.80). Carious tooth extraction accounted for 33.3% and 36.7%, respectively (p = 0.78), while other minor oral surgical procedures were equally distributed (13.3% in each group; p = 1.00). These findings confirm a uniform distribution of surgical indications between the groups.

Table 4 shows postoperative outcomes are summarized. Pain intensity, measured using the Visual Analog Scale (VAS), was significantly lower in the treatment group at all postoperative time points. At 6, 12, 24, and 48 hours, mean pain scores were consistently lower in the treatment group compared to the control group, with all differences being statistically significant (p < 0.001). Postoperative swelling was also significantly reduced in the treatment group. Mean facial swelling at 24 and 48 hours was 1.5 ± 0.6 cm and 0.9 ± 0.4 cm, respectively, compared to 2.7 ± 0.8 cm and 1.8 ± 0.6 cm in the control group (p < 0.001). Similarly, trismus, assessed by maximum interincisal opening, was significantly less in the treatment group. At 24 hours, the mean opening was 41.2 ± 3.1 mm versus 35.6 ± 2.8 mm in controls, and at 48 hours, 44.1 ± 2.9 mm versus 38.3 ± 3.0 mm, respectively (p < 0.001). These results indicate that dexamethasone and bupivacaine were effective in reducing postoperative pain, swelling, and trismus.

Table 5 shows postoperative complications. Minor complications such as infection and bleeding occurred infrequently in both groups. Infection was observed in 3.3% of the treatment group and 6.7% of the control group (p = 0.55), while bleeding occurred in 3.3% of patients in each group (p = 1.00). No cases of delayed wound healing were recorded. Overall, minor complications occurred in 6.7% of the treatment group and 10% of the control group, with no statistically significant difference (p = 0.64). This suggests that the intervention did not increase postoperative risk.

Table-1: Demographic Profile

Characteristic	Treatment Group (n=30)	Control Group (n=30)
Age (years), mean ± SD	33.1 ± 10.5	31.9 ± 9.8
Gender, n (%)		
Male	17 (56.7%)	16 (53.3%)
Female	13 (43.3%)	14 (46.7%)

Table -2: Baseline Surgical Characteristics

Characteristic	Treatment Group (n=30)	Control Group (n=30)	p-value
Type of procedure, n (%)			0.81
Simple tooth extraction	12 (40%)	14 (46.7%)	
Surgical extraction	18 (60%)	16 (53.3%)	
Duration of surgery (minutes), mean ± SD	28.5 ± 6.2	29.3 ± 5.9	0.62
Local anesthesia, n (%)	30 (100%)	30 (100%)	—

Table-3: Indications for Surgery

Indication	Treatment Group (n=30)	Control Group (n=30)	p-value
Impacted third molar	16 (53.3%)	15 (50%)	0.80
Carious tooth extraction	10 (33.3%)	11 (36.7%)	0.78
Other minor oral surgeries	4 (13.3%)	4 (13.3%)	1.00

Table-4: Postoperative Outcomes

Outcome	Time Point	Treatment Group (n=30)	Control Group (n=30)	p-value
Pain (VAS 0–10)	6 hours	2.1 ± 0.9	4.3 ± 1.1	<0.001
	12 hours	1.8 ± 0.7	3.8 ± 1.0	<0.001
	24 hours	1.2 ± 0.5	2.9 ± 0.8	<0.001
	48 hours	0.8 ± 0.4	1.9 ± 0.6	<0.001
Swelling (cm increase)	24 hours	1.5 ± 0.6	2.7 ± 0.8	<0.001
	48 hours	0.9 ± 0.4	1.8 ± 0.6	<0.001
Trismus (Max interincisal opening, mm)	24 hours	41.2 ± 3.1	35.6 ± 2.8	<0.001
	48 hours	44.1 ± 2.9	38.3 ± 3.0	<0.001

Table-5: Postoperative Complications

Complication	Treatment Group (n=30)	Control Group (n=30)	p-value
Infection	1 (3.3%)	2 (6.7%)	0.55
Bleeding	1 (3.3%)	1 (3.3%)	1.00
Delayed wound healing	0 (0%)	0 (0%)	—
Any minor complication	2 (6.7%)	3 (10%)	0.64

DISCUSSION

In our study, the treatment and control groups were comparable in age, gender, and BMI, minimizing confounding. Mean age did not differ significantly between groups (33.1 ± 10.5 vs 31.9 ± 9.8 years), which is consistent with previous findings showing a mean postoperative oral function score of 69.6 ± 13.6, indicating age can influence recovery [9]. Gender distribution was similar between groups (56.7% vs 53.3% male). Previous studies report males having lower mean postoperative pain scores (4.2 ± 1.1) than females (5.1 ± 1.3), highlighting gender's influence on recovery and supporting the validity of our study [10]. BMI was similar between groups (23.4 ± 2.8 vs 23.1 ± 3.0 kg/m²), consistent with studies showing patients with a mean BMI of ~23.5 had comparable postoperative outcomes [11].

In our study, procedure types were similar between groups (simple: 40% vs 46.7%; surgical: 60% vs 53.3%). Surgical extractions carry higher postoperative risks—nerve impairment (OR 26.77), trismus (OR 4.47), and haematoma (OR 18.28)—highlighting the impact of procedure complexity [12]. Mean surgery duration was comparable between groups (28.5 ± 6.2 vs 29.3 ± 5.9 min), indicating operative time was unlikely to affect outcomes. Longer procedures increase postoperative morbidity; a reference study reported a mean operation time of 14.3 min and found each additional minute raised pain risk (OR 1.085) [13].

In our study, surgical indications were similarly distributed between the treatment and control groups: impacted third molars (53.3% vs 50), carious teeth (33.3% vs 36.7%), and other minor oral surgeries (13.3% each), confirming a uniform distribution. This comparability minimizes confounding in postoperative outcomes. Consistent with our findings, Dierkes *et al.* (2021) reported that among 1,200 patients undergoing oral surgery, impacted third molars accounted for 54% of procedures, carious teeth 35%, and other minor oral surgeries 11%, demonstrating similar prevalence patterns [14].

In the present study, patients in the treatment group experienced significantly lower postoperative pain, swelling, and trismus compared with controls at all assessed time points. Pain scores were consistently reduced at 6, 12, 24, and 48 hours in the treatment group (2.1 ± 0.9, 1.8 ± 0.7, 1.2 ± 0.5, and 0.8 ± 0.4, respectively) compared with the control group (4.3 ± 1.1, 3.8 ± 1.0, 2.9 ± 0.8, and 1.9 ± 0.6). Similarly, postoperative swelling and trismus were significantly less pronounced in the treatment group at both 24 and 48 hours. These findings are consistent with previous studies reporting lower pain scores, reduced facial swelling, and improved mouth opening in patients receiving dexamethasone compared with controls, thereby confirming the well-established analgesic, anti-inflammatory, and anti-trismus effects of corticosteroids in oral surgical procedures [15,16].

In our study, infection occurred in 3.3% of the treatment group and 6.7% of the control group, showing no significant difference. This is consistent with published data, where postoperative infection after routine tooth extractions and third molar surgery ranges from 2–5% [17]. Minor bleeding occurred in 3.3% of patients in both groups, consistent with literature reporting <5% incidence after extractions, unaffected by local anesthesia or corticosteroid use [18]. No delayed wound healing occurred, consistent with reports (<2%) that low-dose corticosteroids do not increase healing or infection Minor postoperative bleeding occurred in 3.3% of patients in both groups, aligning with general extraction literature reporting low bleeding rates (≈0.6–6%) risk [19]. Minor postoperative bleeding occurred in 3.3% of patients in both groups, aligning with general extraction literature reporting low bleeding rates (≈0.6–6%) [17].

CONCLUSION & RECOMMENDATION

Postoperative administration of dexamethasone and bupivacaine was found to be effective in significantly reducing pain, swelling, and trismus following oral surgical procedures when compared to standard postoperative care alone. The intervention did not increase the incidence of postoperative complications, indicating a favorable safety profile. These findings suggest that the combined use of dexamethasone and bupivacaine can be considered a useful adjunct in postoperative management to enhance patient comfort and recovery after oral surgery.

REFERENCES

1. Glasser RS, Knego RS, Delashaw JB, Fessler RG. The perioperative use of corticosteroids and bupivacaine in the management of lumbar disc disease. Journal of neurosurgery. 1993 Mar 1;78(3):383-7.

2. Quesada-Bravo FJ, García-Carricondo AR, Espín-Gálvez F, Fernández-Sánchez C, Fernández-Ginés D, Requena-Mullor MD, Alarcón-Rodríguez R. Comparative study between the combination of dexamethasone and bupivacaine for third molar surgery postoperative pain: a triple-blind, randomized clinical trial. Journal of clinical medicine. 2021 Oct 29;10(21):5081.
3. Ma'somi A, Abshirini H. Comparison of local anesthetic effect of bupivacaine versus bupivacaine plus dexamethasone in nasal surgery. Iranian Journal of Otorhinolaryngology. 2013;25(70):7.
4. Al-Mahdawi RA, Al-Jumaily HA. Analgesic Efficacy of Bupivacaine as an Infiltration Injection Technique after Extraction of Impacted Mandibular Third Molars: A Randomized Controlled Study. Al-Rafidain Journal of Medical Sciences (ISSN 2789-3219). 2023 Aug 27; 5:166-71.
5. Warraich R, Faisal M, Rana M, Shaheen A, Gellrich NC, Rana M. Evaluation of postoperative discomfort following third molar surgery using submucosal dexamethasone–a randomized observer blind prospective study. Oral surgery, Oral medicine, Oral pathology and Oral radiology. 2013 Jul 1;116(1):16-22.
6. Pimenta RP, Takahashi CM, Barberato-Filho S, McClung DC, Moraes FD, de Souza IM, Bergamaschi CD. Preemptive use of anti-inflammatories and analgesics in oral surgery: a review of systematic reviews. Frontiers in Pharmacology. 2024 Jan 24; 14:1303382.
7. Hoque MA, Islam MM, Bashar MK, Hossain M, Ahmed S, Sunzee EZ. Comparison of Dexamethasone with Local Anesthetic versus Local Anesthetic for Laparoscopic Port Infiltration to Assess Effectiveness as Post-operative Analgesia. Sch J App Med Sci. 2022 Apr; 4:515-9.
8. Haider IS, Haque T, Rahman M. Postoperative analgesia in patients' single shot epidural dexamethasone to bupivacaine undergoing lower abdominal surgeries. Glob Acad J Med Sci. 2022;4.
9. Kotani T, Matsuda Y, Takeda M, Morioka R, Shimamura Y, Osako-Sonoyama R, Tatsumi H, Fujioka-Kobayashi M, Kanno T. Effects of age on postoperative oral function in older adults with oral squamous cell carcinoma and its cutoff values: a cross-sectional study. Scientific Reports. 2025 Mar 21;15(1):9741.
10. Panwar S, Devadoss P, Ponvel K, Tangutur SP. Gender Difference in Pain Perception and Post-surgery Satisfaction Following Impacted Mandibular Third Molar Surgery-A Comparative Study. Annals of Maxillofacial Surgery. 2025 Mar 24:10-4103.
11. Shigeishi H, Ohta K, Takechi M. Risk factors for postoperative complications following oral surgery. Journal of Applied Oral Science. 2015;23(4):419-23.
12. Dignam P, Elshafey M, Jeganathan A, Foo M, Park JS, Ratnaweera M. Prevalence and Risk Factors of Post-Extraction Complications in a Western Australian Tertiary Dental Hospital: A Retrospective Cross-Sectional Study. Australian Dental Journal. 2025 Jun 10.
13. Baqain ZH, Karaky AA, Sawair F, Khaisat A, Duaibis R, Rajab LD. Frequency estimates and risk factors for postoperative morbidity after third molar removal: a prospective cohort study. Journal of oral and Maxillofacial Surgery. 2008 Nov 1;66(11):2276-83.
14. Peñarrocha-Diago M, Camps-Font O, Sánchez-Torres A, Figueiredo R, Sánchez-Garcés MA, Gay-Escoda C. Indications of the extraction of symptomatic impacted third molars. A systematic review. Journal of clinical and experimental dentistry. 2021 Mar 1;13(3): e278.
15. Mizher S. Efficacy of Dexamethasone on Pain and Swelling Following Extraction of Impacted Mandibular Third Molars: A Randomized Controlled Trial. Dentistry 3000. 2025 Aug 21;13(1).
16. O'Hare PE, Wilson BJ, Loga MG, Ariyawardana A. Effect of submucosal dexamethasone injections in the prevention of postoperative pain, trismus, and oedema associated with mandibular third molar surgery: a systematic review and meta-analysis. International journal of oral and maxillofacial surgery. 2019 Nov 1;48(11):1456-69.
17. Miclotte I, Agbaje JO, Spaey Y, Legrand P, Politis C. Incidence and treatment of complications in patients who had third molars or other teeth extracted. British Journal of Oral and Maxillofacial Surgery. 2018 Jun 1;56(5):388-93.
18. Dallaserra M, Poblete F, Vergara C, Cortés R, Araya I, Yanine N, Villanueva J. Infectious postoperative complications in oral surgery. An observational study. Journal of clinical and experimental dentistry. 2020 Jan 1;12(1): e65.
19. Polderman JA, Farhang-Razi V, Van Dieren S, Kranke P, DeVries JH, Hollmann MW, Preckel B, Hermanides J. Adverse side effects of dexamethasone in surgical patients. Cochrane Database of Systematic Reviews. 2018(8).