Case Report

# Peri-operative dexamethasone therapy and post-operative psychosis in patients undergoing major oral and maxillofacial surgery

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## Abstract

A broad array of behavioral symptoms, including psychosis, can transpire post-operatively following a variety of surgeries. It is difficult to diagnose the exact cause of post-operative psychosis. We report three cases, which developed psychosis post-operatively after undergoing major oral and maxillofacial surgeries. All the three patients were administered dexamethasone peri-operatively. Dexamethasone is used to prevent or reduce post-operative edema. The exact dose of dexamethasone, which can cause psychosis, is unknown. It is important to raise awareness about this potential complication so that measures for management can be put in place in anticipation of such an event.

**Key words:** Dexamethasone, oral and maxillofacial surgery, post-operative psychosis

## Introduction

Glucocorticosteroids have been used in an attempt to minimize or prevent post-operative edema after oral and maxillofacial surgery.[1] Steroid use is associated with more complications especially in long-term administration.[2] Dexamethasone seems to be the most suitable because it has the highest anti-inflammatory activity, no mineralocorticoid activity and a longest available half-life of 36-54 h.[2] Psychosis is a generic psychiatric term for a mental state often described as involving a "loss of contact with reality." People experiencing psychosis may report hallucinations or delusional beliefs and they may exhibit personality changes and disorganized thinking.[3] We report three maxillofacial cases who experienced post-operative psychosis after peri-operative dexamethasone therapy, as a result of which, the patients had a prolonged stay in the surgical intensive care unit.

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## Case Reports

### Case 1

An 18-year-old, female patient, presented for surgery for mandibular prognathism. She was taken up for orthognathic surgery. Pre-operatively, as per protocol, she received intravenous (IV) dexamethasone 16 mg on the day of surgery at 6 am. Patient was pre-medicated with IV fentanyl 75 μg. General anesthesia was induced with propofol and intubated with vecuronium. Anesthesia was maintained with $N_2O$-$O_2$-sevoflurane. Surgery lasted for 4 h. After extubation, she was transferred to the post-operative care unit (PACU) awake and calm. On arriving at PACU, she was given another dose of dexamethasone, 8 mg. After 2 h, she became agitated, restless and aggressive. IV midazolam, propofol and IV fentanyl were administered for sedation, but the patient remained agitated and confused. Over the next 3 h, IV fentanyl 100 μg, propofol 40 mg, midazolam 4 mg was administered after which the patient was relatively calm. Then, she became restless and delirious. Psychiatry consultation was sought. She was diagnosed with an acute psychotic episode possibly induced by steroids. IV midazolam 2 mg and intramuscular (IM) haloperidol 4 mg were given. An IV dexmedetomidine infusion at 0.4 microgm/kg/min tapered to 0.2 microgm/kg/min, provided sedation for 6 h, after which it was stopped. As the patient continued to be calm over the next 12 h, she was transferred to the ward. She continued to be stable and was discharged on the post-operative day 5.

## Case 2

A 58-year-old, female patient, presented for surgery for wide local excision of squamous cell carcinoma of maxilla and closure with split skin graft. Pre-operatively, as per protocol, she received IV dexamethasone 16 mg on the day of surgery at 6 am. Patient was pre-medicated with IV fentanyl 100 μg. General anesthesia was induced with propofol and intubated with vecuronium. Anesthesia was maintained with $N_2O$-$O_2$-sevoflurane. Surgery lasted for 2 h. After extubation, she was awake and calm. On arriving at PACU, Another dose of 8 mg of dexamethasone was administered. After 6 h, she became restless and delirious. Psychiatry consultation was sought immediately. She too was diagnosed with an acute psychotic episode possibly induced by steroids. IV midazolam 2 mg and IM haloperidol 5 mg were administered. An IV dexmedetomedine infusion providing sedation was administered for 3 h at 0.4 μg/kg/h. She remained calm over the next 4 h after which she again became agitated. Midazolam 2 mg and haloperidol 2.5 mg were repeated. The dexmedetomidine infusion was restarted for next 6 h, initially at 0.4 μg/kg/h tapered to 0.2 μg/kg/h and then stopped. As the patient remained calm over the next 12 h, she was transferred to the ward. She continued to be psychologically stable and was discharged on the post-operative day 6.

## Case 3

An 80-year-old, female patient, weighing 35 kg presented with biopsy proven squamous cell carcinoma of the left side of the mandible. She had no other comorbidities. She was taken up for wide excision with segmental mandibulectomy, modified radical neck dissection and reconstruction with pectoralis major myocutaneous flap. Pre-operatively, as per protocol, she received IV dexamethasone 8 mg on the day of surgery at 6 am. Patient was pre-medicated with fentanyl 50 μg. General anesthesia was induced with propofol and intubated with vecuronium. Anesthesia was maintained with $N_2O$-$O_2$-sevoflurane. Surgery lasted for 4 h. She was electively placed on endotracheal tube (ETT) with T-piece in the post-operative period in view of extensive surgery. In the PACU, another dose of 8 mg was administered. Fourteen hours after surgery, she became restless and she pulled out her ETT and Ryle's tube. She started bleeding from her suture site. She was wheeled into the operation theatre immediately for secondary suturing. After the surgery, she was placed on dexmedetomidine infusion for 12 h, initially at 0.3 μ/kg/h and then tapered to 0.1μ/kg/h (the infusion was stopped intermittently whenever the patient developed bradycardia or hypotension and whenever the patient remained calm). IV midazolam 1 mg and IM haloperidol 2.5 mg were continued 8 hourly for 2 days, after which the rest of post-operative period was uneventful. She was extubated 16 h after the surgery and then shifted back to the ward. She continued to be psychologically stable and was discharged on the post-operative day 8.

# Discussion

Glucocorticosteroids are used extensively for minimizing and preventing post-operative oedema after oral and maxillofacial surgery.[1] Dexamethasone seems to be the most suitable because it has the highest anti-inflammatory activity, no mineralocorticoid activity and a longest available half-life of 36 to 54 h.[2] Dexamethasone has also been in use in the peri-operative period for post-operative nausea and vomiting[3,4] pain management[5-7] and in neurosurgery.[8] Even though, efficacious for preventing and minimizing edema in oral and maxillofacial surgeries, there have been reports attributing post-operative psychosis to peri-operative dexamethasone [Table 1].[9,10] In fact in one of the reports a single dose has been implicated for the development of post-operative psychosis.[9,10] While the incidence of post-operative delirium is 36.8%,[11] acute steroid related psychiatric disorder frequency is 5%.[12] In view of such a high incidence, it may be imperative that, with every case where peri-operative dexamethasone is administered, a post-operative psychotic reaction should be anticipated. In patients who are being post-operatively ventilated, it may be necessary to use restraints to prevent self-extubation and a pre-operative consent for the same would be required. Haloperidol prophylaxis may be used for these cases. The episodes of psychosis can prolong

**Table 1: Patient profile in previously published case reports**

| Authors | Age (years) | Gender | Surgery | Co-existing systemic disorders | Total dose of dexamethasone | Day of presentation of symptoms | Treatment given |
|---|---|---|---|---|---|---|---|
| Silva and Tolstunov 1995[13] | 45 | Male | Left hemimaxillectomy | Ischemic heart disease, deep vein thrombosis, major depression | 60 mg | 2nd post-operative day | Haloperidol, perphenazine |
| Ferris and Eisele 2003[12] | 62 | Male | Parotidectomy | Nil | 24 mg | 2nd post-operative day | Sertraline, risperidone, lorazepam |
| Artukoglu and Asenjo 2007[10] | 33 | Female | Biopsy of humerus | Nil | 8 mg | Immediate post-operative period | Chlorpromazine, haloperidol, propofol infusion |
| Bansal *et al.* 2009[9] | 19 | Female | Enucleation of periapical cyst | Nil | 8 mg | 3rd post-operative day | Lorazepam, risperidone |

the hospital stay[13] or may result in readmission[12] and increase the total cost for the patient. Early recognition and management with sedatives/anti-psychotic drugs is crucial. Once there is a psychotic event, the stay of the patient is prolonged in the intensive care units thereby increasing the costs. The exact dose of dexamethasone that can cause a psychotic reaction is unknown. Since it has been reported that a single dose can cause post-operative psychosis [Table 1] all patients receiving dexamethasone have to be monitored carefully post-operatively. Special care has to be taken in patients who have a previous history of psychiatric disorders.[13]

## Conclusion

Awareness and the ability to diagnose post-operative psychosis following use of peri-operative dexamethasone are crucial to provide better care and effective treatment.

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## References

1. Weber CR, Griffin JM. Evaluation of dexamethasone for reducing postoperative edema and inflammatory response after orthognathic surgery. J Oral Maxillofac Surg 1994;52:35-9.
2. Gilman AF, Rall TW, Nies AS, Taylor P, editors. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 8th ed. New York. NY: Pergamon; 1990. p. 1442-54.
3. Gan TJ, Meyer T, Apfel CC, Chung F, Davis PJ, Eubanks S, *et al*. Consensus guidelines for managing postoperative nausea and vomiting. Anesth Analg 2003;97:62-71.
4. Apfel CC, Korttila K, Abdalla M, Kerger H, Turan A, Vedder I, *et al*. A factorial trial of six interventions for the prevention of postoperative nausea and vomiting. N Engl J Med 2004;350:2441-51.
5. Hong D, Byers MR, Oswald RJ. Dexamethasone treatment reduces sensory neuropeptides and nerve sprouting reactions in injured teeth. Pain 1993;55:171-81.
6. De Oliveira GS Jr, Almeida MD, Benzon HT, McCarthy RJ. Perioperative single dose systemic dexamethasone for postoperative pain: A meta-analysis of randomized controlled trials. Anesthesiology 2011;115:575-88.
7. Waldron NH, Jones CA, Gan TJ, Allen TK, Habib AS. Impact of perioperative dexamethasone on postoperative analgesia and side-effects: Systematic review and meta-analysis. Br J Anaesth 2013;110:191-200.
8. Hockey B, Leslie K, Williams D. Dexamethasone for intracranial neurosurgery and anaesthesia. J Clin Neurosci 2009;16:1389-93.
9. Bansal V, Kumar S, Mowar A, Sharma S, Gupta S. Postoperative psychosis in an adolescent subsequent to oral surgical outpatient procedure. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2009;107:458-61.
10. Artukoglu F, Asenjo JF. Single dose dexamethasone induced postoperative psychosis. Can J Anaesth 2007;54:43631.
11. Dyer CB, Ashton CM, Teasdale TA. Postoperative delirium. A review of 80 primary data-collection studies. Arch Intern Med 1995;155:461-5.
12. Ferris RL, Eisele DW. Steroid psychosis after head and neck surgery: Case report and review of the literature. Otolaryngol Head Neck Surg 2003;129:591-2.
13. Silva RG, Tolstunov L. Steroid-induced psychosis: Report of case. J Oral Maxillofac Surg 1995;53:183-6.

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