Int. J. Oral Maxillofac. Surg. 2017; 46: 1267–1270
http://dx.doi.org/10.1016/j.ijom.2017.03.026, available online at http://www.sciencedirect.com

International Journal of Oral & Maxillofacial Surgery

Clinical Paper
Trauma

Postoperative nausea and vomiting in facial fracture patients: A Randomized and controlled trial on the effect of dexamethasone

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A. Haapanen, H. Thorén, J. Törnwall, A.L. Suominen, J. Snäll: Postoperative nausea and vomiting in facial fracture patients: A Randomized and controlled trial on the effect of dexamethasone. Int. J. Oral Maxillofac. Surg. 2017; 46: 1267–1270. © 2017 Published by Elsevier Ltd on behalf of International Association of Oral and Maxillofacial Surgeons.

Abstract. This study aimed to establish the incidence of postoperative nausea and vomiting (PONV) in facial fracture patients. The specific aim was to investigate the effect of perioperative dexamethasone on PONV. A total of 119 adult patients with facial fractures were analysed in this prospective study. Patients were randomized to receive perioperatively either a total dose of 30 mg of dexamethasone i.v. and i.m., or no glucocorticoid (control). PONV was evaluated every 6 hours during the first postoperative 24 hours and when pain medications were given. PONV occurred in 20 out of 119 patients (16.8%). The only significant ($P = 0.016$) association with PONV was postoperative administration of opioids. Slightly more cases of PONV occurred for patients who had not received dexamethasone (20%) compared to those who had (13.6%). PONV was also non-significantly more common in patients $\geq$40 years (21.3%) than in patients $<$ 40 years (12.1%), after orbital floor reconstruction (28.0%) compared with mandibular (11.6%) and zygomatic (15.6%) fractures surgeries, and also after anaesthesia lasting >97 minutes (21.7%) compared with a shorter duration (11.3%). Alternative medications should be used for prevention of post-surgery nausea and vomiting in facial fracture patients.

Key words: facial fracture; dexamethasone; postoperative nausea and vomiting.

Accepted for publication 22 March 2017
Available online 24 May 2017

Postoperative nausea and vomiting (PONV) is the most frequent side effect of general anaesthesia and a major cause of significant morbidity. It is known to cause dehydration and electrolyte imbalance. Vomiting also causes pressure on the sutured site, which can lead to further complications in wound healing, including dehiscence[1]. The incidence of PONV varies greatly. For example, it is often reported to be around 30%[2] but some studies have reported PONV to be as high

as 80% in high-risk patients, including females, history of motion sickness or PONV, non-smokers, use of postoperative opioids[3]. Patients find PONV highly unpleasant[1] and it can lead to delayed discharge, which affects the total treatment costs[4].

Findings on the incidence rate of PONV in maxillofacial surgery also vary. Phillips et al.[5] studied patients undergoing orthognatic surgery and reported a rate of 67% for postoperative nausea (PON) and nearly one-third of their patients suffered from postoperative vomiting (POV). Slightly lower rates were found after orthognathic surgery in the study by Silva et al.[6], whereby 40% of patients experienced PONV. A study of facial fracture patients reported a lower incidence of PONV[7]. The overall incidence of PONV in was 12.5%. A total of 150 patients in that same study were randomized to receive metoclopramide, gabapentin, chlorpromazine, dexamethasone, or placebo. Patients given metoclopramide, gabapentin, or chlorpromazine medications had significantly reduced PONV. However, a dose of 5 mg of dexamethasone showed no significant effect in PONV reduction. There were only 30 patients in each group, so a broader conclusion needs to be made with larger number of patients.

Use of dexamethasone in preventing PONV

Among other anti-emetics, dexamethasone was shown to be effective for preventing PONV[8]. There is no clear guideline about the proper dose on dexamethasone in preventing PONV, although De Oliveira et al.[9] showed that there is no effect for doses of dexamethasone between 4–5 mg i.v. and 8–10 mg i.v.

The aims of the present study were to determine the rate of PONV after surgical treatment of facial fractures, investigate the effect of perioperatively administered dexamethasone on PONV and indicate any possible causes for the results.

Patients and methods

Inclusion and exclusion criteria

Patients were recruited between June 1, 2006, and December 31, 2010. Patients who were included had to be aged at least 18 years and they also about to undergo one of the following three procedures: (1) surgical treatment of mandibular fracture (one or two fractures in the dentate area) with titanium miniplates, (2) open reduction and miniplate fixation of unilateral zygomatic complex fracture, and (3) reconstruction of orbital floor fracture (uni- or bilaterally). Patients with infected fractures, a history of liver or kidney dysfunction, a history of peptic ulcer, a history of psychosis because of steroid use, pregnancy, breastfeeding, or allergy to any constituent of the dexamethasone preparation used were excluded from the study.

Table 1. Descriptive statistics of 119 patients with facial fracture.

	No. of patients	% of 119
Gender		
Male	96	80.7
Female	23	19.3
Age (years)		
Range 18.1–82.4		
Mean 39.1, median 40.6		
40 or more	61	51.3
Less than 40	58	48.7
Site of surgery		
Zygomatic complex	51	42.9
Mandible	43	36.1
Orbital floor	25	21
Surgical approach		
Intraoral or intra- and extraoral	69	58
Extraoral	50	42
Duration of anaesthesia (minutes)		
Range 49–200		
Mean 101, median 97		
Less than 97 minutes	60	49.6
97 minutes or more	59	50.4
Postoperative administration of opioids		
Yes	96	80,7
No	23	19.3
Administration of dexamethasone		
No	60	50.4
Yes	59	49.6

PONV, postoperative nausea and/or vomiting.

Study design

Patients were randomly assigned to one of two groups for each fracture type. Randomization between dexamethasone treatment and control was carried out at the time of recruitment and it was conducted with sealed envelopes. The patients in the study group received dexamethasone and patients in the control group received none. No placebo was used. The dexamethasone group received 10 mg of dexamethasone intravenously during anaesthesia induction and an additional 10 mg intramuscularly every 8 hours over 16 hours, up to a total dose of 30 mg of dexamethasone.

Anaesthesia was initiated with propofol and maintained with sevo- or desflurane. Fentanyl was administered for pain during surgery. Patients received paracetamol 1,000 mg every 6 hours postoperatively for analgesia. Oxycodone-hydrochloride 0.2–0.4 mg per 10 kg was given intravenously in the recovery ward, followed by 1 mg per 10 kg intramuscularly in the inpatient ward when needed. A throat pack was used in patients with intraoral surgery to minimize blood leaking to digestive tract.

PONV was evaluated regularly during the first postoperative 24 hours. Patients were asked if they had any nausea every 6 hours, and were administered ondansetron if needed. The enquiry was additionally performed when oxycodone-hydrochloride was given. Retching and vomiting occurring on other occasions were registered.

Study variables

The outcome variable was PONV. The primary predictor variable was the perioperative use of dexamethasone. Other predictor variables included in the analysis were age, sex, site of surgery, surgical approach, duration of surgery, and postoperative administration of opioids.

The final analyses included the following outcomes, age categorized as (1) 40 years or more and(2) less than 40 years; site of surgery as (1) mandible, (2) zygomatic complex, and (3) orbital floor; surgical approach as (1) extraoral and (2)