Aesth. Plast. Surg. 29:181–183, 2005
DOI: 10.1007/s00266-004-0028-2

Aesthetic Plastic Surgery

Blepharoplasty and Otoplasty: Comparative Sedation with Remifentanil, Propofol, and Midazolam

G. A. Ferraro, M.D., A. Corcione, M.D., G. Nicoletti, M.D., F. Rossano, M.D., A. Perrotta, M.D., and F. D' Andrea, M.D.

Naples, Italy

Abstract. Three different methods of sedation or sedoanalgesia using remifentanil, Propofol, or midazolam to increase intra- and postoperative comfort and to reduce neuroendocrine stress in patients who had undergone typical ambulatory cosmetic surgery under local anesthesia were studied. A sample of 90 patients who underwent upper and lower eyelid blepharoplasty to correct baggy eyelids or otoplasty to correct protruding ears was selected according to standard criteria for the study. Remifentanil provided the best tolerability profile and the most effective perioperative pain control among the substances studied, demonstrating it to be a valid drug for modern sedoanalgesia aimed at increasing the well-being of patients undergoing ambulatory cosmetic surgery.

Key words: Blepharoplasty—Otoplasty—Sedonalgesia—Localnesthesia—Cosmetic surgery

Currently, the search for pharmacologic agents that improve comfort for patients undergoing ambulatory cosmetic surgery is increasingly important. Certainly, the objective for these drugs is to increase the safety and effectiveness of the anesthesia procedure contemporaneously, allowing efficient postoperative analgesia and rapid recovery of the patient, thus reducing hospitalization. Three different methods of sedation or sedoanalgesia using remifentanil, propofol, or midazolam to reduce intra- and postoperative pain and neuroendocrine stress in patients who had undergone typical ambulatory cosmetic surgery under local anaesthesia were studied.

Correspondence to G. A. Ferraro, Via Campiglione 18, 80100 Napoli, Ital; email: gaferraro@libero.it

Midazolam is a hydrosoluble benzodiazepine, the first produced for anaesthetic purposes [13]. Propofol is an endovenous anesthetic that belongs to the alkyl phenols (oils at room temperature and therefore insoluble in water, but highly liposoluble) [3]. Remifentanil is an opioid with rapid onset, metabolized by nonspecific, nonsaturated hematic and tissue esterases [1].

Blepharoplasty and otoplasty, the two types of cosmetic surgery most frequently performed in outpatient settings, were chosen for this study. Both have similar operating times, sedation intensity, and postoperative analgesia duration.

Materials and Methods

With written consent, 90 patients (64 females and 26 males) ages 18 to 67 years (average, 46 ± 8 years) were studied. These patients had an American Society of Anesthesiology (ASA) classification of I or II, and a body weight of 52 to 88 kg (average 67 ± 9 kg). They had undergone cosmetic blepharoplasty surgery for upper and lower eyelid bags or otoplasty for protruding ears. The average operating time was 68 ± 11 minutes and for blepharoplasty 56 ± 8 minutes for otoplasty.

The patients were divided into three homogeneous groups according to their age, weight, ASA class, and type of surgery. The propofol group is denominated as GP, the remifentanil group as GR, and the Midazolam group as GM.

The infusion regimen, aiming to obtain, a sedative level equivalent to grades II and III on the Ramsey Scale (Table 1), was initiated before the anesthetic block was performed. Local anaesthesia was achieved by infiltration of mepivacain hydrochloride with 2%

Table 1. (Ramsay Scale)[a]

Grade	Description
I	Patient anxious, alert and/or restless
II	Patient collaborative, oriented, calm
III	Patient sleepy but responds when called
IV	Patient sleepy with lively response to luminous stimulus, to the glabellar reflex, or to a low auditory stimulus
V	Patient sleepy with slow response to luminous stimulus, to the glabellar reflex or to a low auditory stimulus
VI	Patient sleepy but cannot be aroused

[a]Reference 9

Table 2. Intraoperative infusion regimen[a]

Sedative	Dosage n (range)
Propofol (GP)	1.2 mg/kg/h (1.0–1.5 mg/kg/h)
Midazolam (GM)	0.18 mg/kg/h (0.1–0.2 mg/kg/h)
Remifentanil (GR)	0.08 mg/kg/min (0.05–0.12 m/kg/min)

[a]Reference 4, 6, and 11 GP, protocol group; GM, midezolam group; GR, remifentanil group

adrenalin in prepackaged form (maximum, 35 ml perpatient). Intraoperative monitoring was performed using SBP (systemic blood pressure), DBP (diastolic blood pressure), MBP (mean blood pressure), electrocardiogram (II der.), HR (heart rate), arterial oxyhemoglobin saturation (SpO_2) frequency of respiration, and an visual analog scale intraoperative (VAS). Eventual adverse side effects were reported (e.g., nausea vomiting). The Students *t* test was used for statistical analysis of the result. Values of $p < 0.05$ were considered significant.

Results

The medium infusion regimen for the sedation level mentioned earlier (Ramsay Scale grades II and III) is shown in Table 2. The proposed level of sedation was achieved for all the patients. Better hemodynamic stability was achieved for the GR and GM patients than for the GP patients [1,6]. Bradycardia (45 bpm) was recorded for 20% of the GP group as compared with 10% of the GM group and 6.6% of the GR group. However in the latter group, the heart rate never fell below 50 bpm. Hypertension also was recorded in more GP patients (n = 3) than GM (n = 2) and GR (n = 0) patients.

In 16.6% of the GM and in 20% of the GP patients, the respiratory rate fell to fewer than 10 breathsper minute. Consequently, it was necessary to assist ventilation by mask for six GP and five GM patients in spontaneous respiration because of desaturation (SpO_2, 94%), whereas this maneuver was not necessary for GR patients.

Table 3. Study result

Parameter	GM	GR	GP
Bradycardia (n)	3	2	6[a]
Hypotension (n)	2	—	3
FR < 10 breaths/min (n)	5[a]	—	6[a]
$SpO_2 \leq 94\%$ (n)	5[a]	—	6[a]
Nausea (n)	3	5	3
Vomit (n)	3	2	—
VAS mm (range)	22(19–26)[a]	9(7–25)	24(21–29)[a]

[a]$p < 0.05$ GM, midazolam group; GR, reminfentail group; GP, propofol group; FR, frequency of respiration; SpO_2, arterial oxyhemoglobin saturation

The results of the study are shown in Table 3. Statistically significant differences were observed in a composition ($p < 0.05$) of the GM and GP groups with the group GR in terms of all the effects studied, except for nausea and vomiting. Furthermost should be noted that superior intraoperative pain control was demonstrated in the GR patients [7,8].

Conclusions

Most opioids reduce sympathetic and increase parasympathetic and vagal tones. However, these effects appear only when they are administered in boluses and in high doses. Remifentanil does not exihibit these effects because of its pharmacokinetic properties [10]. In this study, remifentanil provided an overall better tolerability profile than the other substances [2,5,12]. It also offered the best control of intraoperative pain, proving to be safe and valid for use in analgosedation. It surely improved the comfort and well-being of patients undergoing cosmetic surgery because of its more effective and lasting control of perioperative pain.

References

1. Cohen J, Royston D: Remifentanil (review). *Curr Opin Crit Care* **7:**227–231, 2001
2. Ganzberg S, Pape RA, Beck FM: Remifentanil for use during conscious sedation in outpatient oral surgery. *J Oral Maxillofac Surg* **60:**244–250 discussion 250–251, 2002
3. Ghouri AF, Taylor E, White PF: Patient-controlled drug administration during local anesthesia: A comparison of midazolam, propofol, and alfentanil. *J Clin Anesth* **4:**476–479, 1992
4. Irwin MG, Thompson N, Kenny GN: Patient-maintained propofol sedation: Assessment of a target-controlled infusion system. *Anaesthesia* **52:**525–530, 1997
5. Krenn H, Deusch E, Jellinek H, Oczenski W: Fitzgerald RD: Remifentanil or propofol for sedation during carotid endarterectomy under cervical plexus block. *Br J Anaesth* **89:**637–640, 2002
6. Krugliak P, Ziff B, Rusabrov Y, Rosenthal A, Fich A, Gunnan GM: Propofol versus midazolam for con-

scious sedation guided by processed EEG during endoscopic retrograde cholangiopancreatography; A prospective, randomized, double-blind study. *Endoscopy* **32:**677–682, 2000
7. Litman RS: Conscious sedation with remifentanil during painful medical procedures. *J Pain Symptom Manage* **19:**468–471, 2000
8. Maroco-Trischitta MM, Bandiera G, Camilli S, Stillo F, Cirielli C, Guerrini P: Remifentanil conscious sedation during regional anaesthesia for carotid endarterectomy; Rationale and safety. *Eur J Vasc Endovasc Surg* **22:**405–409, 2001
9. Miller RD: *Trattato di Anestesia* Roma: Antonio Delfino Editore, 1993
10. Pitts MC, Pamore MM, Salmenpera MT, et al. Pilot study: Hemodynamic effects of intravenous GI18708B (GI) in patients undergoing elective surgery. *Anaesthesiology* **77:**A101, 1992
11. Sanchez-Izquierdo-Riera JA, Caballero-Cubedo RE, Perez-Vela JL, Ambros-Checa A, Cantalapiedra-Santiago JA, Alted-Lopez E: Propofol versus midazolam: Safety and efficacy for sedating the severe trauma patient. *Anesth Analg* **86:**1219–1224, 1998
12. Servin FS, Reader JC, Merle JC, Watteil M, Hanson AL, Lauwers MH, Aitkenhead A, Martry J, Reite K: Martisson S, Wostyn L: Remifentanil sedation compared with propofol during regional anaesthesia. *Acta Anaesthesiol Scand* **46:**309–315, 2002
13. White PF, Negus JB: Sedative infusions during local and regional anesthesia: A comparison of midazolam and propofol. *J Clin Anesth* **3:**32–9, 1991