

Safety of Remifentanyl in Transsphenoidal Surgery: A Single-Center Analysis of 540 Patients

David J Cote BS; William T Burke BS; Joseph P Castlen BS; Chih King MD, PhD; Hasan A Zaidi MD; Timothy R Smith MD
PhD MPH; Edward R. Laws MD, FACS; Linda S Aglio MD

Departments of Neurosurgery and Anesthesiology, Perioperative, and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, MA



Introduction

- Remifentanyl is frequently used during transsphenoidal surgery as an anesthetic adjunct during periods of intense noxious stimulation or to control blood pressure.
- It also allows for a rapid and well-controlled emergence, which is particularly desirable in transsphenoidal surgery when there is no surgical incision to close.
- Although some studies have examined the safety of remifentanyl in patients undergoing neurosurgical procedures, none has examined its safety in transsphenoidal operations specifically.
- We analyzed 540 patients undergoing transsphenoidal surgery to evaluate the relative safety of intra-operative use of remifentanyl.

Methods

- All transsphenoidal operations performed by the senior author from 2008 to 2015 were retrospectively reviewed.
- Patients with missing anesthesia records were excluded.

Learning Objectives

By the conclusion of this session, participants should be able to:

- 1) Understand the uses of remifentanyl in transsphenoidal surgery
- 2) Discuss the safety of remifentanyl in patients undergoing pituitary surgery

Table 1: Complications in Transsphenoidal Patients with and without Remifentanyl

Complication	Total (n=540)	With Remifentanyl (n=443)	Without Remifentanyl (n=97)	P-value
Syndrome of inappropriate secretion of ADH	38 (7.1)	32 (7.2)	6 (6.2)	0.829
Transient diabetes insipidus	105 (19.8)	92 (21.1)	13 (13.8)	0.118
Permanent diabetes insipidus	15 (3.0)	12 (2.9)	3 (3.4)	0.737
CSF leak	16 (3.0)	12 (2.7)	4 (4.1)	0.506
Epistaxis	22 (4.1)	16 (3.6)	6 (6.2)	0.257
Visual field defect	16 (3.0)	15 (3.4)	1 (1.0)	0.327
Reoperation	20 (3.7)	18 (4.1)	2 (2.1)	0.552
Hemorrhage	10 (1.9)	9 (2.0)	1 (1.0)	1.000
Sinus infection	13 (2.5)	12 (2.8)	1 (1.1)	0.480
Readmission	42 (8.1)	38 (8.9)	4 (4.3)	0.204
Carotid damage	2 (0.4)	2 (0.5)	0	1.000
Abscess	1 (0.2)	1 (0.2)	0	1.000
Meningitis	5 (0.9)	5 (1.1)	0	0.591
Infection	8 (1.5)	8 (1.5)	0	0.362

Results

- During the study period, 540 transsphenoidal operations were identified.
- Of these, 443 (82.0%) patients received remifentanyl intra-operatively; 97 (18.0%) did not.
- The two groups were well-matched with regard to demographic categories, comorbidities, and pre-operative medications ($p>0.05$), except pre-operative tobacco use ($p=0.021$).
- Patients who received remifentanyl were more likely to harbor a macroadenoma (78.1% vs. 67.0%, $p=0.025$), and had slightly longer anesthesia time on average (269.2 min vs. 239.4 min, $p=0.024$).
- Analysis of post-operative complications showed no significant difference between patients who received remifentanyl and those who did not.
- Complications included post-operative SIADH, transient diabetes insipidus (DI), permanent DI, cerebrospinal fluid leak, epistaxis, visual field deficit, reoperation, hemorrhage, sinus infection, readmission, carotid damage, abscess, meningitis, infection, and estimated blood loss.

Conclusions

- In a well-matched series of 540 patients undergoing transsphenoidal surgery, remifentanyl was found to be a safe anesthetic adjunct.
- There was no significant difference in post-operative complications in patients who did and did not receive intra-operative remifentanyl.

References

1. Guy J, Hindman BJ, Baker KZ, et al. Comparison of remifentanyl and fentanyl in patients undergoing craniotomy for supratentorial space-occupying lesions. *Anesthesiology*. Mar 1997;86(3):514-524.
2. Hans P, Bonhomme V. Anesthetic management for neurosurgery in awake patients. *Minerva anesthesiologica*. Oct 2007;73(10):507-512.
3. Joo HS, Perks WJ, Kataoka MT, Errett L, Pace K, Honey RJ. A comparison of patient-controlled sedation using either remifentanyl or remifentanyl-propofol for shock wave lithotripsy. *Anesthesia and analgesia*. Nov 2001;93(5):1227-1232.
4. Maurtua MA, Deogaonkar A, Bakri MH, et al. Dosing of remifentanyl to prevent movement during craniotomy in the absence of neuromuscular blockade. *Journal of neurosurgical anesthesiology*. Oct 2008;20(4):221-225.
5. Necib S, Tubach F, Peuch C, et al. Recovery from anesthesia after craniotomy for supratentorial tumors: comparison of propofol-remifentanyl and sevoflurane-sufentanyl (the PROMIFLUNIL trial). *Journal of neurosurgical anesthesiology*. Jan 2014;26(1):37-44.
6. Sneyd JR, Whaley A, Dimpel HL, Andrews CJ. An open, randomized comparison of alfentanil, remifentanyl and alfentanil followed by remifentanyl in anaesthesia for craniotomy. *British journal of anaesthesia*. Sep 1998;81(3):361-364.