



The Role of Dexmedetomidine in Awake Tracheotomies: increasing patient comfort without airway compromise

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ABSTRACT

Method: We performed a retrospective chart review of awake tracheotomies at our institution between 2008-2011. We reviewed operative reports, anesthesia records and postoperative follow-up notes. Patients were divided into groups based on indication for tracheotomy and if dexmedetomidine was used during the procedure. We reviewed complications and performed a cost analysis.

Results: 16 awake tracheotomies were performed at our institution during the observed time period: 9 related to malignancy, 5 due to impending airway obstruction, 1 due to infection, and 1 due to trauma. Dexmedetomidine was used in 6 cases. Ages of patients ranged from 22-76 with an average age of 53.6 years. No intraoperative complications were reported, however one of the tracheotomies was performed after a failed planned fiber-optic intubation. Two patients eventually succumbed to their illness post-operatively. A cost analysis was performed demonstrating the variability of medication costs.

Conclusion: Anesthesia providers at our institution have safely used dexmedetomidine during awake tracheotomies. No complications occurred during these procedures. Although dexmedetomidine is more expensive than other agents, it avoids the respiratory depression of other commonly used anesthetics/analgesics and provides patients with a high level of comfort and anxiolysis. Further research regarding the use of this medication during awake tracheotomies is needed.

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INTRODUCTION

Awake tracheotomies are an important tool for management of the difficult airway. Awake tracheotomies have classically been performed with a combination of local and IV anesthesia/sedation. Common IV agents include opioids, benzodiazepines and propofol. In addition to providing anesthesia and sedation, these also produce some degree of respiratory depression. Dexmedetomidine is a centrally acting alpha2-adrenoreceptor agonist that provides moderate sedation and analgesia without depressing respiratory drive. Current approved uses of dexmedetomidine include sedation of the critically ill patient, fiberoptic intubation, and procedural sedation [6]. Dexmedetomidine was used in six instances at our institution with good result in patient safety and comfort.

METHODS AND MATERIALS

We performed a retrospective chart review of awake tracheotomies at our institution between Jan 2008 and Dec 2011. We reviewed preoperative notes, operative reports, anesthesia records and postoperative follow-up notes. Patients were divided into groups based on indication for tracheotomy and if dexmedetomidine was used during the procedure. We reviewed complications and performed a cost analysis.

RESULTS

16 awake tracheotomies were performed at our institution during the observed time period: 9 related to malignancy, 5 due to impending airway obstruction, 1 due to infection, and 1 due to trauma. Dexmedetomidine was used in 6 cases: 3 related to malignancy, 2 due to impending airway obstruction, and 1 due to trauma (Chart 1). Ages of patients ranged from 22-76 with an average age of 53.6 years.

Case 1: 22-year-old male with panfacial trauma requiring with no other medical comorbidities (Figure 1).

Case 2: 73-year-old male with large T3 base of tongue SCCA with poorly controlled hypertension, diabetes, glaucoma, hyperlipidemia, GERD and OSA (Figure 2).

Case 3: 50-year-old male with T4a SCCA or right buccal mucosa and lip with previous history of left buccal SCCA and WLE.

Case 4: 55-year-old female with history of T2aN1 NPC s/p chemoXRT complicated by right TVC paralysis with post cord injection dyspnea/airway compromise (Figure 3).

Case 5: 56-year-old male with T4a left buccal SCCA with invasion into mandible/masseter space.

RESULTS

Case 6: 75-year-old male with Parkinson's disease and bilateral TVC paralysis in addition to CHF, lumbago and BPH

Technique: All awake tracheotomies were performed in the operating room with patients in the supine position. Although awake tracheotomies are often performed with the head elevated 15-30 degrees, our patients had no respiratory compromise in the supine position. With exception of 1 patient, all were premedicated with 2 mg of Versed. Each were loaded with dexmedetomidine (1mcg/kg) over 10 minutes. Planned incision sites were injected with 1% Lidocaine with Epinephrine 1:100,000. Dexmedetomidine was then titrated to effect at 0.4-0.7mcg/kg/hr for the duration of the tracheotomy. 2 Patients received no other medications for this procedure, while 1 received only ketamine, another only fentanyl, another ketamine and fentanyl and one only sufentanyl.

No intraoperative complications were reported in either series, however one of the tracheotomies was performed after a failed planned fiberoptic intubation. Two patients (one from each series) eventually succumbed to their illness post-operatively.

A cost analysis was performed demonstrating the variability of medication costs (Table 1). The average cost of IV sedation medication was \$32.49 for cases using dexmedetomidine and only \$2.00 on average for cases using other forms of IV sedation. However, for cases not using dexmedetomidine, on average 2.4 times the amount of narcotics were typically required for adequate sedation

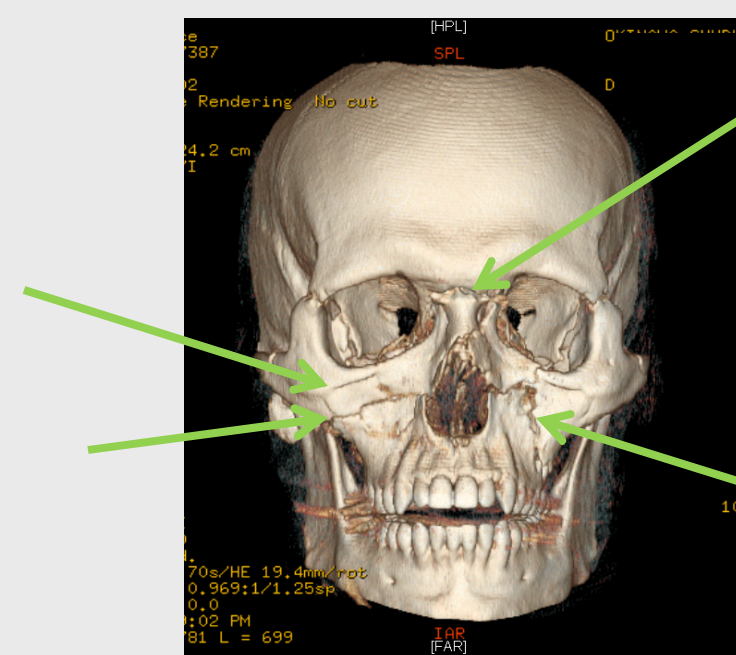


Figure 1. Panfacial fracture.

	w/ Dex	w/o Dex
Average Cost of IV Medications	\$32.49	\$2.00
Hi	\$43.32	\$4.63
Low	\$20.91	\$0.66
Historical Procedure Cost	\$1997.90-\$2071.70 (Levin)	
% of Total cost	1.6%	0.10%

Table 1. Cost comparison [4].



Figure 2. Base of Tongue SCCA.

Timing of Complication	Complication	Rate (%)
Intraoperative	-Death	0.4-0.7
	-Pneumothorax	0.2-0.26
Early Postoperative	-Hemorrhage	0.8-2.6
	-Infection	0.44-0.9
	-Decannulation	0.35-0.8
Late Postoperative	-Tracheal Stenosis	1.7-1.85
	-Tracheocutaneous fistula	0.53-0.8
	-TEF	0.08

Table 2. Tracheotomy historical complication rates [2,3].

DISCUSSION

The awake tracheotomy can be an anxiety producing event for patient, surgeon and anesthesiologist. A delicate balance between patient comfort/sedation and a protected airway must be maintained. Dexmedetomidine provides arousable sedation similar to a sleepy, dreamlike state [1]. At our institution, patients who received dexmedetomidine were calm and talking to the surgeons throughout the case. Unlike benzodiazepines, propofol, and opiates; dexmedetomidine has the unique characteristic of providing anesthesia and sedation without respiratory depression [5].

In addition to patient comfort, dexmedetomidine is safe. Reported complications for tracheotomies include tracheal stenosis, hemorrhage and even death (Table 2), but none of these occurred in our series. There has only been one report of dexmedetomidine use for an awake tracheotomy [1] and no complications were reported. In the six awake tracheotomies performed at our institution, intraoperative or postoperative complications were not noted, however one patient did succumb to a premonitory condition several months later.

Despite patient comfort and safety, one of the biggest criticisms of dexmedetomidine is cost. Based on pricing at our institution, the cost for using dexmedetomidine is approximately tenfold that of alternative medications. However when comparing overall procedure costs, this accounts for 0.10%-1.6% of expenses (Table 1).

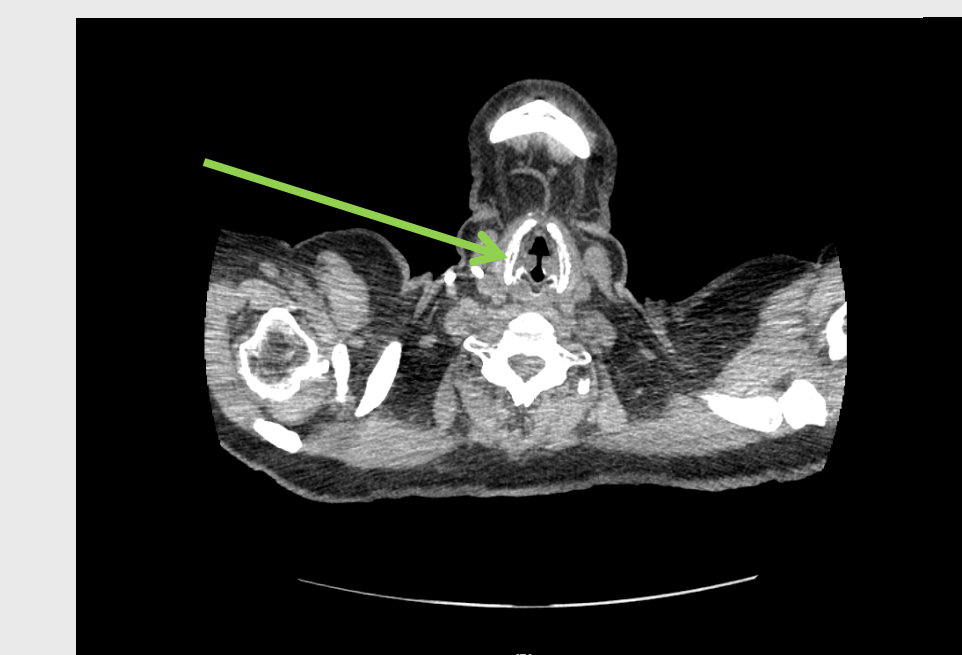


Figure 3. TVC Paralysis.

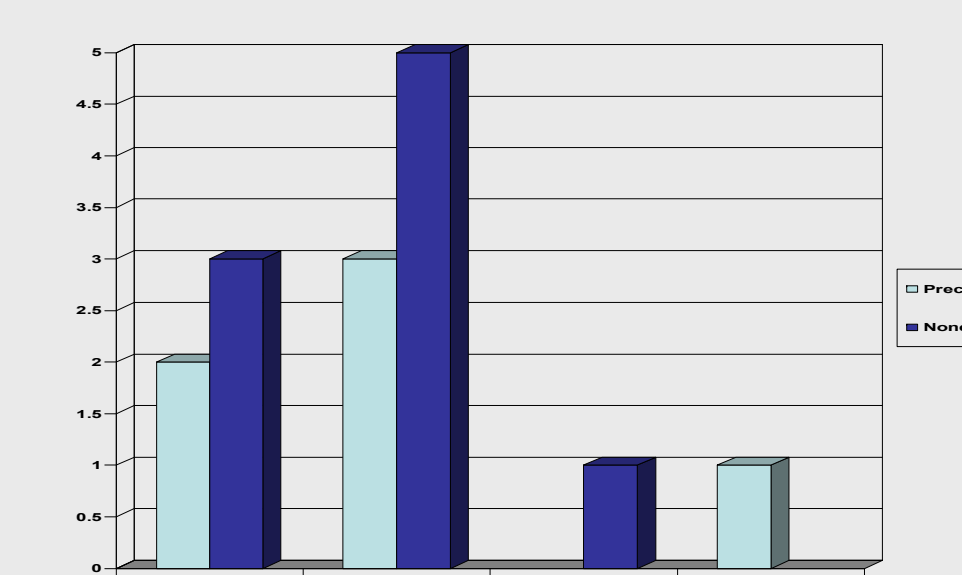


Chart 1. Cases based on indication

CONCLUSIONS

Anesthesia providers at our institution have safely used dexmedetomidine during awake tracheotomies. Patients appear less anxious and more comfortable when using dexmedetomidine than with traditional sedatives (opiates, propofol, and benzodiazepines). In addition, dexmedetomidine avoids the risks of respiratory depression associated with traditional sedatives. At our institution, no complications occurred during these procedures.

In addition to its safety and comfort profile, dexmedetomidine does not significantly increase the cost of awake tracheotomies (although it is significantly more expensive than other agents). In addition, these procedures occur so infrequently that hospitals can justify its use on a case by case basis.

Further research regarding the use of this medication during awake tracheotomies is needed not only to characterize its safety profile more accurately, but also to deliver a better balance between patient safety and adequate sedation while not compromising a tenuous airway. A standardized tool should be used to objectively measure patient comfort and anxiety.

REFERENCES

- David M, Marchi L. Dexmedetomidine sedation for awake tracheotomy: case report and literature review. Journal of Clinical Anesthesia; Elsevier Inc, 2010
- Goldenberg D, Ari E, Golz A, Danino J, Netzer A, Joachims H. Tracheotomy complication: A retrospective study of 1130 cases. Otolaryngology Head and Neck Surgery, Oct 2000.
- Halum S, Ting J, Plowman E, Belafsky P et al. A Multi-Institutional Analysis of Tracheotomy Complications. The Laryngoscope, Jan 2012.
- Levin R, Trivikram L. Cost/Benefit Analysis of Open Tracheotomy, in the OR and at the Bedside, With Percutaneous Tracheotomy. The Laryngoscope; Lippincott Williams & Wilkins Inc, July 2001
- Levy J, Ramsay M. Alpha2 adrenergic agonists as adjuncts to anesthesia in the perioperative setting. Special report. Anesthesiology News. New York: McMahon Publishing Group; Oct. 2004
- Lexicomp. Dexmedetomidine: Drug Information. 2011

