

Main Article

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Abstract

Objective. Dental and mucosal injuries from laryngoscopy in the peri-operative period are common medico-legal complaints. This study investigated lawsuits arising from laryngoscopy.

Methods. Westlaw, a legal database containing trial records from across the USA, was retrospectively reviewed. Plaintiff and/or defendant characteristics, claimed injuries, legal outcomes and awards were extracted.

Results. Of all laryngoscopy-related dental or mucosal injuries brought before a state or federal court, none (0 per cent) resulted in a defence verdict against the provider or monetary gain for the patient. Rulings in the patient's favour were observed only when laryngoscopy was found to be the proximate cause of multiple compounding complications that culminated in severe medical outcomes such as exsanguination, septic shock or cardiopulmonary arrest.

Conclusion. Proper laryngoscopy technique and a robust informed-consent process that accurately sets patients' expectations reduces litigation risk. Future litigation pursuits should consider the low likelihood of malpractice allegation success at trial.

Introduction

Laryngoscopy is a procedure that enables visualisation of the larynx. It is instrumental in the setting of endotracheal intubation and surgical procedures of the airway. As with any procedure, complications may arise. Mucosal injury involving the lips or angles of the mouth have been reported in up to 75 per cent of suspension laryngoscopy cases.¹ Moreover, dental injury has a highly variable and provider-dependent incidence, which may range from 25–39 per cent to as low as 0.02–0.1 per cent.^{2–15} It is well established that dental injury occurring in the peri-operative period is the most common medico-legal complaint against anaesthesiologists, comprising more than one-third of all legal claims within the specialty.^{9,12,16}

In addition to allegations involving dentition, there are also less-common complications directly mediated by the laryngoscope that may include gingival trauma in edentulous patients;¹⁷ injury to the pharyngeal arches and tonsillolingual sulci;¹⁸ lingual, glossopharyngeal and hypoglossal nerve injury;^{1,19} and ischaemic injury of the tongue.^{20,21} Although the majority of injuries caused by the laryngoscopy are limited in severity, any payment made to patients may be reported and become part of the National Practitioner Data Bank.²² This malpractice reporting is known to affect future job prospects and reduce clinical productivity.^{23–26} Therefore, a clear understanding of these allegations and legal outcomes is of the utmost importance.

Prior reports utilising the Westlaw legal database have addressed related topics that are more rare and severe, such as iatrogenic dysphonia,²⁷ laryngotracheal stenosis,²⁸ and vocal fold paralysis.²⁹ Indeed, such reviews have established the Westlaw database as a representative source of information within the field of otolaryngology.

Capturing information for approximately 20 patients is not uncommon for articles addressing rare events with few corresponding malpractice cases.^{30–32} Given that dental and mucosal injuries are much more prevalent, understanding the legal consequences of these complications may be relevant to a larger population of interested parties, both plaintiffs and defendants. To the best of our knowledge, this is the first report in the literature to use a legal database to retrospectively assess the outcomes of medical malpractice cases involving laryngoscopy in the USA.

The current study seeks to understand the clinical circumstances, medical sequelae, and financial implications of laryngoscopy-associated injury litigation. This pursuit may inform recommendations that enhance patient safety and provide new insights for providers facing a lawsuit alleging negligence during laryngoscopy. Findings from this analysis could also serve as an educational tool for anaesthesiology and otolaryngology residents, nurse anaesthetists in training, and others learning how safely to manipulate the airway.

Materials and methods

An online legal research database (Westlaw, West Publishing Co, St Paul, MN), was used to extract details from pertinent cases for the purposes of this retrospective analysis. This subscription-based database is widely used by legal professionals in the USA to understand trial precedent arising from federal and state court cases. Jury verdict and settlement reports were reviewed for relevance based on the following combination of terms: 'malpractice' AND ('laryngoscopy' OR 'panendoscopy' OR 'microlaryngoscopy') OR 'laryngoscope' OR 'McGrath' OR 'C-MAC' OR 'intubation' OR 'intubate' AND 'tongue' OR 'lip' OR 'mouth' OR 'throat' OR 'gum' OR 'mucosa' OR 'tooth' OR 'teeth' OR 'dental' OR 'bridge.' This study was approved by the Institutional Review Board (IRB) of University of Pennsylvania Health System.

From the 155 initial results, cases were excluded for the following reasons: incidental mention of keywords (i.e. laryngoscopy was not an alleged mechanism of injury in litigation) (104) and duplicate cases (31). The remaining 20 verdict and settlement reports were comprehensively evaluated for several details including: year, state, patient demographics, defendant specialty, court type, procedure performed, claimed injury, case outcome, damage amount awarded, and allegations involving either incomplete informed consent, requirement of reparative procedures, functional deficits incurred, psychiatric and/or psychological sequelae, depression and/or loss of enjoyment of life, and other alleged causes of negligence. Data collection was completed in October 2022. Descriptive statistical analyses were performed using SPSS software (version 24, IBM).

Results and analysis

Twenty lawsuits that took place between 1990 and 2018 met inclusion criteria. Cases were stratified into dental and/or mucosal injuries ($n = 12$, 60 per cent) and other laryngoscopy complications involving the tongue, prosthodontic device, pharynx or multifactorial ($n = 8$, 40 per cent) (Table 1). The majority of plaintiffs were female and middle-aged. Implicated providers were most commonly anaesthesiologists and Certified Registered Nurse Anaesthetists (CRNAs). The most frequently cited allegations involved medical negligence (75.0 per cent), improper history and physical exam (33.3 per cent), and incomplete informed consent (16.7 per cent).

Specific claimed injuries are detailed in Table 2. All cases were related to laryngoscope use during pre-operative intubation procedures. No case of dental and/or mucosal injury led to a verdict in favour of the plaintiff. Among all captured dental injury cases, the most severe involved avulsion of three teeth and fracture of a fourth tooth. The least severe injury brought before the courts was a laryngoscope-mediated mucosal laceration that allegedly caused a throat infection. Taken together, the average pay-out for dental and/or mucosal injury was \$0.

Cases culminating in a plaintiff verdict or award were heterogeneous in their site of injury, and were not limited to dental or mucosal structures. These cases tended to have multiple compounding complications that resulted in severe morbidity. The average award for plaintiff verdicts was \$592,119 (range \$0–1.22 million). Of those cases returning a plaintiff verdict, three of six (50.0 per cent) resulted in patient death. For the remaining three non-morbid cases, there was one multifactorial incident in which an internal medicine physician was held liable for excessive prescription of sedatives that caused

Table 1. Comparison of case characteristics, mucosal and/or dental injuries vs other laryngoscopy complications

	Mucosal and/or dental injuries ($n = 12$)	Other laryngoscopy complications ($n = 8$)
Plaintiff gender (n (%))		
– Male	2 (16.7)	1 (12.5)
– Female	10 (83.3)	7 (87.5)
Plaintiff age years, mean (SD)	54.6 (12.9)	60.0 (17.8)
Trial verdict (n (%))		
– Defence	11 (91.7)	2 (25.0)
– Plaintiff	0 (0.0)	6 (75.0)
– Settlement	1 (8.3)*	0 (0.0)
Award amount		
– Range	\$0–0	\$0–1.22 million
– Mean	\$0	\$592,119
Defendant specialty (n (%))		
– Anaesthesiology	8 (66.7)	4 (50.0)
– CRNA	3 (25.0)	2 (25.0)
– Emergency medicine	1 (8.3)	1 (12.5)
– Internal medicine	0 (0.0)	1 (12.5)
– Otolaryngology	0 (0.0)	0 (0.0)
Allegations (n (%))		
– Medical negligence	9 (75.0)	7 (87.5)
– Improper history & physical exam	4 (33.3)	1 (12.5)
– Incomplete informed consent	2 (16.7)	2 (25.0)
– Required reparative procedures	1 (8.3)	0 (0.0)
– Psychiatric and/or psychological sequelae	1 (8.3)	1 (12.5)
– Pain and suffering	1 (8.3)	3 (37.5)
– Unnecessary procedures	1 (8.3)	0 (0.0)
– Lost wages	1 (8.3)	1 (12.5)
– Excessive force to restrain	1 (8.3)	0 (0.0)
– Unqualified provider	0 (0.0)	1 (12.5)
– Undue medical expenses	0 (0.0)	2 (25.0)
– Disfigurement	0 (0.0)	1 (12.5)

*Arbitration with a known award of \$0 and unknown settlement amount; SD = standard deviation; CRNA = Certified Registered Nurse Anaesthetist.

respiratory failure necessitating intubation, which was complicated by dental avulsion from laryngoscope use. The remaining two plaintiff-verdict cases involved a transmural pharynx perforation and prosthetic bridge disruption, the latter of which resulted in the smallest payment awarded (\$7,895).

Discussion

Malpractice litigation is responsible for increased health care costs and is often viewed as adversarial by physicians.^{33–36}

Table 2. Laryngoscopy litigation outcomes and case characteristics

Outcome	State	Plaintiff award (\$)	Site of injury	Claimed injuries	Case reference
Defence verdict	VA	0	Teeth	Damage to molars that required dental care and long-term tongue numbness	Sturgis vs Bajit
Defence verdict	MO	0	Teeth	Damage to dental bridge	Delunas vs Creve Coeur Surgery Center
Defence verdict	VA	0	Teeth	Multiple tooth fractures and 'mouth nerve damage'	Baj vs Sturg
Defence verdict	AL	0	Teeth	Teeth broken and displaced	Shelly Purifoy Nelson vs Cullman Regional Medical Center, Inc and Robin T Hall, MD
Defence verdict	NY	0	Teeth	Dislodgment of three teeth and damage to a fourth tooth	Silverman vs Nyack Hospital <i>et al.</i>
Defence verdict	NJ	0	Teeth	Loss of a tooth, post-traumatic stress disorder, torn rotator cuff, and contusions to tongue	Petrie vs Naik, MD; Voros, MD; University of Medicine and Dentistry of New Jersey
Defence verdict		0	Teeth	Loss of two teeth and excessive use of force in opening mouth	Labella vs New York Hospital Medical Center of Queens; Treiber, MD
Settlement	NY	0	Teeth	Loss of teeth	Roper vs Tumaian; Taquinta; Delaware County Memorial Hospital
Defence verdict	PA	0	Mucosa	Laceration of the right soft palette and tonsil, requiring an emergency tonsillectomy and cancellation of planned surgery	Holley vs Dekalb Anesthesia Associates PA; Dunac, MD
Defence verdict	GA	0	Mucosa	Wound from laryngoscope assisted intubation caused severe throat infection	Brukner vs Zerwas
Defence verdict	MI	0	Mucosa	Laceration of soft palate which required an emergency tracheostomy and surgical repair	Benish vs Prokott, DO; Dayman, CRNA; Great Lakes Anesthesia Associates
Defence verdict	MI	0	Mucosa	Damage to pharynx, respiratory distress, dysphagia, throat pain, hoarseness, and a jagged laceration of the right soft palate	Tan, MD vs Soto, MD
Defence verdict	FL	0	Tongue	Severe tongue trauma resulting in gangrenous change and amputation of anterior two-thirds of tongue	Edith Clute vs Dagan Payne Dalton, MD, Heart of Florida Hospital Association, Inc
Defence verdict	NY	0	Prosthetic device	Laryngoscope dislodged 5-tooth dental bridge	Schneider vs Maimonides Medical Center; Janardhan, MD; Shah, MD
Plaintiff verdict	NJ	7,895	Prosthetic device	Laryngoscope dislodged dental bridge, which resulted in fracture of two natural teeth and malocclusion	Quinn vs Degroot <i>et al.</i>
Plaintiff verdict	FL	400,000	Multifactorial	Tooth loss after excessive prescription of sedatives causing respiratory failure and exacerbation of underlying conditions	Ann Giri Shevetz vs Mark Schor, MD
Plaintiff verdict	IN	938,800	Pharynx	Laryngoscope displaced dentures, pharynx injury, internal bleeding, aspiration, lung collapse, shock, and death	Creviston vs St Mary Medical Center
Plaintiff verdict	IL	1,061,842	Pharynx	Catastrophic exsanguination due to a laryngoscope blade impaling a known congenital vascular malformation resulting in death	Tadros vs Hospital of Cook County; Mcpencow, MD; Konefal, MD
Plaintiff verdict	IL	1,103,413	Pharynx	Perforation of the pharynx, sore throat, difficulty swallowing, and subcutaneous emphysema	Cooper vs Paisansathan
Plaintiff verdict	KS	1,225,000	Tongue	Tongue laceration, swelling of the tongue, airway obstruction, cardiopulmonary arrest, anoxic brain injury, aspiration pneumonia, septic shock, and death.	Newsome vs Anesthesia Associates of Kansas City

MD = Doctor of medicine; DO = Doctor of osteopathic medicine; CRNA - Certified registered nurse anesthetist

Regardless of outcome, litigation can affect a practitioner's reputation among peers and patients.³⁷ Given that dental and mucosal injuries are almost universally presented as possible complications of laryngoscopy during the consent process, some providers may find it perplexing that these complaints comprise more than one-third of all lawsuits in the field of anaesthesiology.^{9,12,16} In many of these cases, poor documentation of existing problems with mucosa or dentition prior to laryngoscopy make such cases viable. In this report, allegations of medical malpractice that culminated in a lawsuit brought before a court of law were comprehensively analysed to reveal new insights into a key gap in the literature.

We report that dental and/or mucosal injury cases were unanimously ruled in favour of the defendant medical provider with none resulting in payment awards to a plaintiff. This outcome was consistently observed among both anaesthesiologist and certified registered nurse anaesthetist defendants. While laryngoscopy is commonly performed by otolaryngologists, there was no documented lawsuit brought before the court involving laryngoscopy-associated injury alleged against an otolaryngologist. This could be due to a lower volume of laryngoscopies performed among otolaryngologists. Although anaesthesia providers do perform the majority of these procedures in the peri-operative period, the fact that no allegation involved an otolaryngologist could suggest variability in technique and strain forces utilised between different specialties. Simulation-based exercises are one effective method to help minimise laryngoscope-associated injuries. Such educational resources may prove useful in training clinicians on best practices for laryngoscopy.^{38–40} Regardless of the specialty involved, a dental- or oral-surgery consultation should be sought upon recognition of any iatrogenic dental injury.

In addition to dental and mucosal injuries, it is also important to be mindful of delicate soft-tissue structures in contact with the laryngoscope. Indeed, the highest award (\$1,225,000) was returned for a case in which a GlideScope® caused a tongue laceration, which led to swelling of the tongue, airway obstruction, cardiopulmonary arrest, anoxic brain injury, aspiration pneumonia, septic shock and death.

Fortunately, severe complications directly attributable to laryngoscopy were rare. When such events did occur, they were commonly due to unforeseen anatomical circumstances. For instance, one case involved displacement of dentures causing transmural pharynx perforation, internal bleeding, aspiration, lung collapse, shock and death. Another case involved exsanguination due to disruption of a known congenital vascular malformation. As a result of the aforementioned cases, improper history and physical examination was the second most commonly cited allegation among all cases. This highlights the need for continued focus on peri-operative evaluation that adheres to previously established American Society of Anesthesiologists guidelines and consensus statements (<https://www.asahq.org/standards-and-guidelines>).

Although the field of anaesthesiology was implicated in the majority of laryngoscope-associated malpractice allegations, the authors think that the results of this report are of greatest relevance to otolaryngologists. In contrast to laryngoscopy performed by anaesthesia providers, laryngoscopy performed by otolaryngologists is often prolonged in duration and holds more potential for complications. Otolaryngologists routinely perform in-office flexible laryngoscopy, indirect mirror laryngoscopy, laryngeal stroboscopy, direct laryngoscopy and suspension laryngoscopy. When considering the high

combined prevalence of these procedures, the fact that no laryngoscope injury malpractice case tried to date has implicated an otolaryngologist suggests that laryngoscopy procedures are highly safe and low-risk when performed by an otolaryngologist-head and neck surgeon. This represents an important counselling point that may provide a source of reassurance to patients who are averse to laryngoscopy. While the procedure may be uncomfortable and fear-inducing in some cases, patients may find it reassuring to know that no patient has ever taken their otolaryngologist to court over complications arising from a procedure to visualise the larynx.

Although claims of dental injury are very common, formal lawsuits brought before the courts are exceedingly rare. While prior reports have documented thousands of such dental injury claims,^{41,42} these tend to culminate in out-of-court settlements, arbitration or a summary judgement motion without a trial. The present study is unique in that it is the first to analyse lawsuit outcomes as determined by objective review via trial by jury in a federal or state courtroom. A recent comprehensive review of a French legal database identified just 24 lawsuits involving peri-operative dental injuries.⁴³ This relatively low case number highlights the rarity of these trials and reaffirms our assertion that the present review successfully captures all available court records on laryngoscope-mediated dental injuries. This report, therefore, may represent a valuable resource for predicting future litigation outcomes and may be referenced by expert witnesses under oath as precedent to justify verdicts.

- Dental and mucosal injuries caused by laryngoscopy procedures in the peri-operative period are common sources of frustration for patients
- No malpractice court trial pertaining to laryngoscopy-related dental or mucosal injuries has successfully proven this allegation in court
- No allegations were levied against otolaryngologists; primary defendants were most commonly anaesthesiologists (60 per cent) and certified registered nurse anaesthetists (20 per cent)
- Given that laryngoscopy complications comprise more than one-third of all lawsuits against anaesthesiologists, the findings of this report are of interest to a large group of providers

There are several limitations to this study. Included cases were limited to those attributable to laryngoscopy, but not the process of intubation, which can be an independent source of litigation with a distinct set of injuries. Moreover, the Westlaw database only contains jury verdict reports from federal or state courts, thereby failing to capture cases that do not progress to this stage. Verdict and settlement summaries are also highly heterogeneous sources of information with variable degrees of information disclosed, as deemed necessary by attorneys privy to the case. Finally, most malpractice litigation does not go to trial, with up to 85 per cent of cases being dismissed in a summary judgment or resolved with an out-of-court settlement.^{44,45} Because the cost of defending cases in court can be vastly disproportionate to the cost of dental repairs, many dental claims may be settled informally.¹¹ Taken together, the cases presented herein likely represent a small subset of all allegations surrounding laryngoscopy-associated injuries. Despite these limitations, our analysis provides important insights that can be used to better understand laryngoscopy litigation, inform educational endeavours and improve patient care.

Conclusion

Among laryngoscopy-associated injury cases, complications involving dental and mucosal structures in the peri-operative period were the most commonly litigated cases. No case

limited to dental or mucosal injury resulted in monetary gain for the patient. Given that laryngoscopy complications may comprise more than one-third of all legal claims against anaesthesiologists, these findings are of interest to a relatively large group of providers and offer evidence-based reassurance that lawsuits will most likely return a defence verdict if the case is tried before a jury. Efforts should be made to perform laryngoscopy with proper caution and thoroughly discuss risks delineated on consent forms to ensure that patients are fully aware of potential complications.

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Ethical standards. The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional guidelines on human experimentation set forth by the University of Pennsylvania Health System and Helsinki Declaration of 1975, as revised in 2008.

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