Evaluating Glidescope® Injuries: A Case Series of 16 Patients and Technical Considerations

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Abstract

Introduction:
Video laryngoscopy has increasingly become the preferred method of visualization in intubation performed by anesthesiologists when managing difficult airways. This single-institution study describes 16 Glidescope-related intubation injuries. Data collected included patient demographics, procedural details, and injury classifications.

Methods:
This retrospective case series examines patients who sustained intubation trauma when a Glidescope video laryngoscopy system was utilized at our tertiary care hospital or ambulatory surgery centers between June 2014 and August 2023. Fisher's exact test and independent t-tests/ Mann-Whitney U tests were used for statistical analysis of categorical and continuous variables, respectively. Injury severity, determined by the need for surgical repair, was used to assess associations with patient- and procedure-related factors.

Results:
Injuries were primarily identified as located in the oropharynx (n=8) and soft palate (n=15), with including the anterior tonsillar pillars (n=3), posterior pharyngeal wall (n=3), and uvula (n=3), with lacerations being the most common injury (n=10). Intubations were performed by certified registered nurse anesthetists (CRNA) and physicians. All intubation injuries associated with the need for surgical intervention were performed by a CRNA. No specific trends were observed when evaluating patient demographics including age, number of intubation attempts, history of radiation, kyphosis or limited cervical extension, trismus, Mallampati score, structural abnormalities, or tonsillar hypertrophy.

Conclusion:
This case series highlights the absence of significant patient or provider-related commonalities associated with Glidescope ® injuries. The lack of identifiable risk factors in Glidescope injuries drives home the importance of proper intubation techniques, including direct visualization when passing the ET tube into and through the oropharynx rather than focusing on the video screen alone, to reduce soft tissue injuries in the oral cavity and pharynx.

Introduction

- Video laryngoscopy (VL) improves first-pass intubation success and glottic visualization, especially in difficult airways. [1-4]
- VL use is increasing due to real-time video display and shared visualization with the airway team.
- A meta-analysis found VL was superior to DL in success rate (RR = 1.09), intubation time (MD = -6.92s), and injury rate (RR = 0.15) [7].
- Despite advantages, VL does not eliminate risk of upper aerodigestive injuries.
- VL limits spatial awareness; the screen often only shows the larynx and vocal cords, not the full course of the ETT.
- Prior case reports describe soft tissue injuries (e.g., soft palate lacerations and pharyngeal trauma) during VL, but few large series exist. [6,8,9]

Our study presents the largest known single-institution case series of VL-associated intubation injuries.

Results

Category	Characteristic	Value
Demographics	Age (years), median (range)	55.5 (36-89)
	Female, n (%)	11 (68.8%)
Clinical History	History of Radiation, n (%)	2 (12.5%)
	Kyphotic/Limited Extension, n (%)	3 (18.8%)
	Trismus, n (%)	3 (18.8%)
Airway Assessment	Mallampati Score 3-4, n (%)	4 (25.0%)
Procedural Factors	Intubated by CRNA, n (%)	6 (37.5%)
	Intubated by Physician (MD/DO), n (%)	3 (18.8%)
	Intubation provider unclear, n (%)	6 (37.5%)
	OSH Intubation, n (%)	1 (6.3%)
	Single attempt intubation, n (%)	8 (50.0%)
	Multiple attempts (≥2), n (%)	6 (37.5%)
	Attempts unknown, n (%)	2 (12.5%)
Injury Characteristics	Soft palate involvement, n (%)	11 (68.8%)
	Posterior pharyngeal wall involvement, n (%)	4 (25.0%)
	Anterior tonsillar pillar involvement, n (%)	3 (18.8%)
	Uvula involvement, n (%)	3 (18.8%)
	Epiglottis/Arytenoids involvement, n (%)	2 (12.5%)
	Retromolar Trigone involvement, n (%)	1 (6.3%)
	Vallecula involvement, n (%)	1 (6.3%)
	Injury location unclear, n (%)	1 (6.3%)
Injury Type	Laceration, n (%)	10 (62.5%)
	Hematoma, n (%)	4 (25.0%)
	Edema, n (%)	2 (12.5%)
	Ulceration, n (%)	1 (6.3%)
Surgical Repair	Required surgical repair, n (%)	5 (31.3%)
	No surgical repair needed, n (%)	11 (68.8%)
Injury Size	Size of Injury (cm), median (range)	2.6 (1.0-4.4)

Table 1. Summary of patient demographics and patient characteristics.

Methods

Design: Retrospective case series (June 2014 to August 2023).
Setting: Tertiary academic hospital and affiliated surgery centers.
Inclusion: Patients with documented oropharyngeal injuries during VL-assisted intubation.
Exclusion: Injuries from direct laryngoscopy.
Data collected:

- Demographics (age, BMI, radiation, neck mobility, trismus, Mallampati).
- Procedural factors (intubator role, number of attempts).
- Injury characteristics (site, type, need for surgical repair).

Statistical analysis: Descriptive stats, Fisher's exact, t-tests/Mann-Whitney U ($\alpha = 0.05$).

Results Continued: Case Highlights

ETT pierced anterior tonsillar pillar → dissected posterior pharyngeal wall → entered hypopharynx behind arytenoids.

ENT management: Original ETT removed; new tube placed over rigid rod under direct visualization.
Outcome: Two 2 cm mucosal defects managed with antibiotics and secondary intention healing. No postoperative complications.

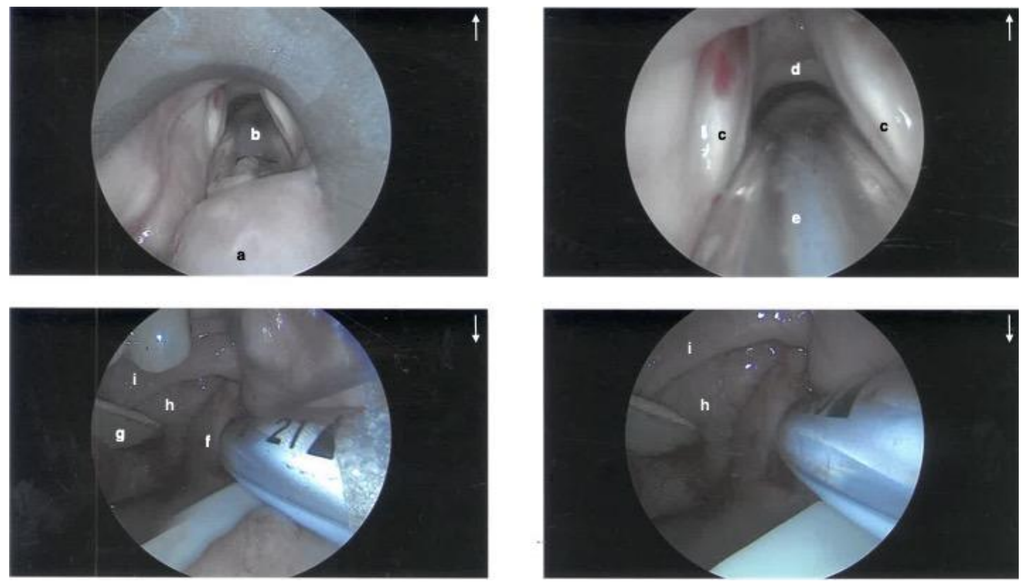

Figure 1. Intraoperative view obtained via DL using a 0-degree Storz endoscope, demonstrating the endotracheal tube emerging through a defect in the posterior pharyngeal wall. Labeled structures: (a) posterior pharyngeal wall, (b) ETT emerging from defect in posterior pharyngeal wall, (c) vocal cords, (d) glottis, (e) ETT through vocal cords/ glottic inlet, (f) ETT going through the anterior tonsillar pillar where it then dissects the retropharyngeal space, (g) tongue being depressed by tongue depressor, (h) tongue, (i) edentulous mandibular gumline. Arrows in the upper right-hand corner point cephalad (superior) orientation.

Figure 2. Depiction of an endotracheal tube piercing the soft palate after video laryngoscopy assisted- intubation before (left) and after (right) repair.

Conclusion

- No consistent patient or procedural risk factors identified.
- VL blade angulation and reliance on video screen may increase injury risk, especially when using rigid stylets [6,10-13].
- Recommendation: Maintain direct visualization during ETT advancement–avoid blind passage based solely on the VL screen [13].
- Smaller oropharyngeal dimensions in females may contribute to injury vulnerability [14].

Although no definitive predictors were found, attention to technique and anatomy remains essential.

References