Original Article

Comparative randomised study of GlideScope® video laryngoscope versus flexible fibre-optic bronchoscope for awake nasal intubation of oropharyngeal cancer patients with anticipated difficult intubation

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ABSTRACT

Background and Aims: Awake flexible fibre-optic bronchoscope (FFS) is the standard method of intubation in difficult airway in oral cancer patients. We decided to evaluate GlideScope® video laryngoscope (GL) for intubation as compared to the standard FFS for nasal intubation in such patients. **Methods:** After the ethical committee approval, we included 54 oropharyngeal cancer patients divided randomly into two equal groups: Group G and Group F. After pre-medication and pre-oxygenation, awake nasal intubation was performed using GL in Group G and FFS in Group F. In both groups, we compared intubation time in seconds (mean ± standard deviation) (primary outcome), success rate of the first intubation attempt, percentage of Cormack and Lehane glottic score and incidence of complications. We assumed that GL could be a suitable alternative for the standard FFS in nasal intubation of patients with oropharyngeal cancer. Success rate of the first attempt and Cormack and Lehane glottic score were compared using Chi-square test. **Results:** Intubation time in seconds was significantly shorter in Group G (70.85 ± 8.88 S) than in Group F (90.26 ± 9.41 S) with ($P < 0.001$). The success rate of the first attempt intubation was slightly higher in Group G (81.5%) than Group F (78.8%). Cormack and Lehane glottic Score I and II showed insignificant difference between both Group G (92.6%) and Group F (96.3%). We detected three cases of sore throat in each group. **Conclusion:** GlideScope® could be a suitable alternative to FFS in nasal intubation of oropharyngeal cancer patients.

Key words: Awake intubation, flexible fibre-optic bronchoscope, GlideScope video laryngoscope, oropharyngeal cancer

INTRODUCTION

Intubation of patients for resection of oropharyngeal cancer is a challenge due to anatomical airway distortion.[1] Awake intubation using flexible fibre-optic scope (FFS) is the gold standard technique in anticipated difficult intubation patients.[2,3] Awake intubation of oropharyngeal cancer patients is usually preferred via nasal rather than oral route to avoid interference with the surgical field.[4] GlideScope® video laryngoscope (GL) is a useful device to facilitate intubation in patients with suspected difficult intubation.[5] GL can be used for awake intubation after topical anaesthesia of the upper airway.[6,7] Both GL and FFS were compared in the recent studies in morbidly obese patients[8] and patients with traumatic cervical spine injury.[9] However, there are insufficient data regarding comparison of their use in patients with oropharyngeal cancers. We assumed

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that GL could be used as a suitable alternative to the standard FFS for nasal intubation of oropharyngeal cancer patients. We compared GL and FFS in terms of safety and efficacy of intubation of these patients.

METHODS

This randomised, prospective study was conducted from January 20, 2016, to March 13, 2016, after obtaining the institutional ethical committee approval and written informed consent from each patient. We included 54 patients. Inclusion criteria were patients undergoing elective surgery for oropharyngeal cancer, aged 20–60 years, belonging to the American Society of Anesthesiologists Physical Status I or II with Mallampati Score[10] II or III. Exclusion criteria included patient refusal, restricted mouth opening, bleeding tendency or any contraindication to nasal intubation. Patients were divided randomly (by computed randomisation codes maintained in sequentially numbered opaque envelopes) into two equal groups: Group G in which intubation was done using GL (Verathon Medical, Bothell, WA, USA) and Group F in which intubation was performed using FFS (Karl Storz Endoscopy, Tuttlingen, Germany).

Each patient was studied inside the operating room after connecting basic monitors (pulse oximeter, electrocardiogram, non-invasive blood pressure and end-tidal CO_2). Patients of both groups received pre-medication with glycopyrrolate 0.3 mg intravenous (IV), phenylephrine nasal drops, then nebulisation using 2% lignocaine for 10 min, followed by topical anaesthesia of the mucosa of the nose, tongue, nasopharynx and oropharynx[7] using lignocaine 10% nasal spray and sedation by IV infusion of remifentanil hydrochloride (Ultiva®, Mylan) starting at 0.1 μg/kg/min. It was gradually increased till target Ramsay Sedation Scale[11] 3 was reached (Ramsay Scale: (1) anxious and agitated or restless, (2) co-operative, oriented, (3) responsive to commands only, (4) responsive to light glabellar tap or loud auditory stimulus, (5) sluggish response to light glabellar tap or loud auditory stimulus, (6) unresponsive). Pre-oxygenation was provided with 100% oxygen using closed circuit and face mask for 3 min till the point of end-tidal O_2 >80%. The opaque envelope was opened (both devices were prepared and ready for use), and then we started awake nasal intubation attempt by one of the two authors (both well trained and familiar with both GL and FFS). In both groups, we measured intubation time in seconds (our primary outcome) using stopwatch (defined as the time from start of insertion of either GL or FFS till detection of end-tidal CO_2 >20 mmHg from endotracheal tube); secondary outcomes were success rate on the first attempt (considered a failed attempt if intubation time >3 min); Cormack and Lehane glottic score[12] (Grade 1: Most of the glottic opening can be seen, Grade 2: Only the posterior portion of the glottis or only arytenoid cartilages, Grade 3: Only the epiglottis but no portion of the glottis, Grade 4: Neither the glottis nor the epiglottis can be seen) and incidence of complications (e.g., sore throat, post-intubation bleeding). Sore throat was evaluated once at 2 h after full recovery of general anaesthesia.

The sample size was estimated based on the paper published by Abdelmalak *et al*., 2011,[6] who reported that the median (IQR [range]) time to intubation was 37 (25–48 [19–81]) s with the GlideScope and 43 (35–58 [26–96]) s with the flexible fibreoptic bronchoscope. A total sample size54 patients (27 in each group) was arrived at withpower 80% and significant level of 5% to detect a difference of 45 secs or greater.

Statistical Package for Social Sciences (Chicago, IL, USA) version 17.0 was used for statistical analysis. Mean ± SD was used for description of intubation time. Percentage was used to compare success of first attempt and Cormack and Lehane glottic score using Chi-square test. *P* values were set as statistically significant at 0.05.

RESULTS

The total number of participants of the study was 54 patients who were randomly assigned, received intended treatment and were analysed for the primary outcome. There were no losses and exclusions after randomisation as all participants continued in the study.

Demographic data were comparable in both groups as shown in Table 1. The mean intubation time was significantly shorter in Group G (70.85 ± 8.88 S) than Group F (90.25 ± 9.41 S) with $P < 0.001$.The success rate of the first attempt intubation was similar between the groups (81.5% [22 patients] and 78.8% [21 patients] in Group G and Group F, respectively).

There was no significant difference between both groups in Cormack and Lehane glottic visualisation grades [Table 2].

We did not detect any case of post-intubation bleeding in both study groups; the incidence of sore throat was 11.1% (three patients), in each group ($P = 1.00$).

Table 1: Gender and age of the patients		
Gender and age	**Group G**	**Group F**
Male, *n* (%)	14 (51.9)	15 (55.6)
Female, *n* (%)	13 (48.1)	12 (44.4)
Age (mean±SD)	52.41±7.12	52.44±5.47

SD – Standard deviation

Table 2: Cormack and Lehane glottic visualisation grades			
Cormack and Lehane Grade	**Group G, *n* (%)**	**Group F, *n* (%)**	***P***
Score I	15 (55.6)	15 (55.6)	1.00
Score II	10 (37.0)	11 (40.7)	
Score III	2 (7.4)	1 (3.7)	

DISCUSSION

The results of our study showed that the intubation time (secs, our primary outcome) was found to be significantly shorter in Group G (70.85 ± 8.88 S) with better success rate on the first attempt (81.5%) than Group F (90.26 ± 9.42 S), success rate of 78.8%, and there was no significant difference between them in terms of success rate of the first attempt. These results match with the results of two recent studies that found that intubation time in seconds was shorter in GL Group with better success rate on the first attempt than in FFS Group.[6,8] However, both studies included morbidly obese patients and oral route and in addition, one of them had studied the intubation under anaesthesia.[6] Our results coincide also with the results of another recent study which found that intubation time was significantly shorter in GL Group than FFS Group; it also found the percentage of first successful intubation attempt was higher (although statistically not significant) in GL Group than in FFS Group; the authors however studied in patients with traumatic cervical spine injury and where oral intubation was performed.[9]

There was no difference in the percentage of Cormack and Lehane glottic grading of I and II between Groups G (92.6%) and F (96.3%). This result is similar to those of a recent study of morbidly obese patients undergoing oral intubation.[8]

Regarding complications, we did not detect any case of post-intubation bleeding; only three cases of the sore throat in each group was observed.

One of the limitations to our study was we included patients with Mallampati airway class 2 and 3 only and the second limitation was that we did not consider adding other airway assessment parameters such as thyromental distance and neck mobility. The sample size was relatively small. We recommend adding these parameters and use of larger sample sizes during future studies.

CONCLUSION

GL could be a useful alternative to the standard FFS for nasal intubation of patients with oropharyngeal cancer with shorter intubation time, excellent glottic view, and similar rate of intubation success for with minimal rate of complications.

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Conflicts of interest
There are no conflicts of interest.

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