

Tracheal Intubation Using Truview PCD™ Videolaryngoscope with Truflex Articulating Stylet in Patients Posted for Lumbar Spine Surgery: A Prospective Study.

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ABSTRACT

Background: Truview PCD™ videolaryngoscope can be used to perform difficult oral and nasal intubations using a minimal amount of force and causing a reduced rate of patient side effects such as sore throat or soft tissue damage.

Material and methods: Forty five patients of American Society of Anesthesiologists (ASA) grade I or II posted for L₄ – L₅ laminectomy and dissection for prolapsed intervertebral disc (PIVD) were intubated using Truview PCD™ videolaryngoscope with Truflex articulating stylet. Primary outcome measures were duration and ease of intubation. Overall success rate, number of attempts, modified Cormack-Lehane (C-L) grading and complications encountered were noted.

Results: All 45 intubations were successful during the first attempt. C-L grade I views were noted in 40 patients (90%) and grade II in 5 patients (10%). The time required to obtain best C-L view was 12.6 ± 3.5 s and for complete tracheal intubation was 35.20 ± 3.25 s. The average numerical rating scale for tracheal intubation was 8.2 ± 0.8. No complications were encountered in any patient.

Conclusion: Truview PCD™ videolaryngoscope with Truflex articulating stylet results in an improved C-L grade and thus facilitates difficult oral and nasal intubations.

KEYWORDS: Truview PCD™ videolaryngoscope, Truflex articulating stylet, Tracheal intubation.

INTRODUCTION

Recent advances in airway management have resulted in the advent of various optical and video laryngoscopes. Videolaryngoscopes are new devices available for intubation which are advantageous over direct laryngoscopy in terms of better view of larynx,¹⁻³ specially in patients with limited cervical spine mobility,^{4,5} reduced tracheal intubation time,⁴ and educational value.^{6,7}

Truview PCD™ videolaryngoscope with Truflex articulating stylet enables difficult oral and nasal intubations to be performed using a minimal amount of force and causing a reduced rate of patient side effects such as sore throat or soft tissue damage. It consists of reusable stainless steel blades, a view tube, an oxygen insufflations port, a camera head that attaches to proximal part of view tube, a handle that provides the light source and a portable (5.5" battery powered) monitor (Fig.1,2). Distal end of its blade contains a prism with a 47 degree anterior view that refracts the line of vision and improves the C-L grade. The proximal

lens magnifies the acquired image. An oxygen jet spray delivered via a unique injector, across the blade lenses during intubation procedure serves to slow the rate of desaturation; prevent misting and remove secretions on the lenses thereby ensuring a clear visual picture throughout the entire intubation procedure.

We conducted this study to evaluate the efficacy of Truview PCD™ videolaryngoscope with Truflex articulating stylet for oral intubation in patients posted for lumbar spine surgery.

MATERIALS AND METHODS

Forty five patients of ASA grade I or II posted for L₄ – L₅ laminectomy and dissection for PIVD, 30 – 60 years of age and with Mallampati grade 1 or 2 were included in the study.

Patients with predictors of difficult intubation, presence of raised intracranial pressure, cervical spine injury and risk of pulmonary aspiration were excluded from the study.



Fig.1 Truphatek Truview PCD™ Videolaryngoscope



Fig.2 Videolaryngoscope blades and handle with Truflex articulating stylet.

Table 1: Observations of present study.

PARAMETERS	OBSERVATIONS
Age (years)	44.25 ± 5.26
Gender (M:F)	28 : 22
Weight (kg)	53.22 ± 7.34
Number of laryngoscopy attempts	
1	45
2	0
3	0
C-L grade	
1	40 (90%)
2	5 (10%)
3	0
Time to get best C-L grade (s)	12.6 ± 3.5
Time to complete tracheal intubation (s)	35.20 ± 3.25
NRS for tracheal intubation	8.2 ± 0.8
Complications	
SpO ₂ ≤ 90%	0
Airway trauma	0

An informed and written consent about the anaesthesia procedure and surgery was obtained from all the patients posted for surgery. Patient's baseline vitals were measured. They were premedicated with inj. glycopyrrolate 0.002mg kg⁻¹ and inj. fentanyl 2mcg kg⁻¹. After preoxygenation with 100% oxygen for 3 minutes induction was done using inj. propofol 2mg kg⁻¹ and inj. vecuronium bromide 0.1mg kg⁻¹; and laryngoscopy was attempted with adjustable length laryngoscope blade set at midpoint.

Truview PCD™ videolaryngoscope series five was inserted in mouth along the midline of the tongue and the blade was advanced until the larynx became visible on screen. Endotracheal tube (size 7.5 for females and 8.0 for males) loaded on a well lubricated truflex articulating stylet was advanced into the oropharynx till

its tip was visible on screen. The lever on the proximal end of Truflex articulating stylet was then depressed resulting in anterior flexion of the endotracheal tube easing its passage through the glottis opening. Lever of the stylet was then released and the stylet was removed. Endotracheal was further passed into the trachea till bilaterally equal and adequate air entry in the lungs was achieved. Anaesthesia was maintained with oxygen, nitrous oxide and isoflurane along with maintenance doses of inj. vecuronium bromide.

The duration of intubation defined as time from when the videolaryngoscope was inserted into the patient's mouth until end-tidal CO₂ was detected, was recorded. The anaesthetist graded the ease of intubation on a numerical rating scale (NRS, where 0 = most difficult and 10 = easiest).⁸ Other parameters recorded include:

best C-L laryngoscopic view, number of attempts at laryngoscopy required for successful intubation (insertion and removal of laryngoscope was counted as one attempt), airway complications, episodes of hypoxia ($SpO_2 \leq 90\%$) and equipment failure. In case of failed intubation with videolaryngoscope, direct laryngoscopy and intubation was the rescue plan.

RESULTS

We noted that tracheal intubation using Truview PCD™ videolaryngoscope was successful in first attempt in all forty five patients. C-L grade I views were noted in 40 patients (90%) and grade II in 5 patients (10%). The time required to obtain best C-L view was 12.6 ± 3.5 s and for complete tracheal intubation was 35.20 ± 3.25 s. The average NRS for tracheal intubation was 8.2 ± 0.8 . No complications were observed in any patient during the study.

DISCUSSION

The Truview PCD™ videolaryngoscope was designed to improve the view of the larynx in patients where a traditional laryngoscope provides a poor view. It applies the optical principle of light refraction to provide a more anterior view of larynx and thus allow intubation to be performed under direct visualisation more frequently than is possible with a conventional laryngoscope.

Bhalla et al. in their study evaluated the effectiveness of McGrath videolaryngoscope in comparison with Truview laryngoscope for tracheal intubation in patients with simulated cervical spine injury and observed that the mean time required for intubation using McGrath videolaryngoscope was less than the time required for intubation using Truview EVO2 laryngoscope and was statistically significant (30.02 s vs 38.72 s, $p < 0.05$). They reasoned that Truview EVO2 gives a smaller field of vision, where the image of the vocal cords has to be focussed on the prism to get the correct view which takes a few second, whereas McGrath videolaryngoscope has a LCD screen which gives a clear image of the vocal cords and the surrounding anatomy with a larger field of vision.⁹

Li et al. in their study comparing the Truview EVO2 laryngoscope with the direct Macintosh laryngoscope observed that the view of the larynx was better with the Truview EVO2 laryngoscope than with the Macintosh laryngoscope ($p < 0.01$). The average time to intubation was longer in the Truview group and differed by 17 seconds between the two groups. They concluded that this increase in the time to intubation was clinically acceptable for elective cases however; Truview EVO2 laryngoscope may have limitations during rapid sequence induction.¹⁰

Dalal et al. in their study concluded that the Truview EVO2 laryngoscopy offered a better view of the glottis by 1 - 2 C-L grades as compared to the Macintosh blade in patients with anticipated difficult airway. Also less

attempts and rescue techniques were required with the use of Truview EVO2 laryngoscope.¹¹

Raveendra et al. evaluated Truview laryngoscope for nasotracheal intubation (NTI) in 50 patients of ASA grade I or II undergoing orognathic procedures. CL Grade I view was noted in 86% cases and 94% patients had successful NTI and intubation time was < 43 seconds in 50% cases.¹²

Das et al in their study evaluated the efficacy of MacGrath videolaryngoscope in NTI using Schroeder directional stylet in patients posted for tonsillectomy. They noted a 100% success rate of intubation in first attempt with MacGrath videolaryngoscope. C-L grade I and II view were seen in 93% and 7% patients respectively. They observed that time to obtain best C-L view was 9.4 ± 1.5 s, time to complete tracheal intubation was 34.27 ± 3.38 s and NRS for tracheal intubation was 8.7 ± 0.9 . They thus concluded that McGrath videolaryngoscope produces excellent laryngoscopic views in patients in patients with normal airways.¹³

We acknowledge the absence of a control group and exclusion of patients with predictors of difficult intubation as a limitation of our study. Therefore, more studies are warranted to assess and compare the utility of this device compared with other videolaryngoscopes and advanced airway devices in various case scenarios including cases of anticipated difficult intubation. However, we did not find any significant studies reporting tracheal intubation in adult patients using Truview videolaryngoscope and articulating Truflex stylet. Hence, we believe that this study provided useful clinical information about Truview videolaryngoscope.

CONCLUSION

We conclude that laryngoscopy with Truview PCD™ videolaryngoscope results in an improved C-L grade and thus facilitates oral and nasal intubations without significant complications. Truflex articulating stylet prevented the impaction of the endotracheal tube on posterior pharyngeal wall. Therefore, videolaryngoscope is a promising device in situations of predicted difficult laryngoscopy and intubation.

CONFLICT OF INTEREST: None declared.

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