



Original contribution

Laryngoscope plastic blades in scheduled general anesthesia patients: a comparative randomized study

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Abstract

Study Objective: To compare two brands of disposable plastic laryngoscope blades, Vital View plastic blades and Heine XP plastic blades, with the reusable Heine Classic+ Macintosh metal blades.

Design: Prospective randomized, controlled, single-blinded study.

Setting: Operating room of a university-affiliated hospital.

Patients: 519 patients without criteria for predicted difficult intubation, undergoing scheduled surgery during general anesthesia.

Interventions: Patients were randomized to three groups according to laryngoscope blade brand.

Measurements: Difficult tracheal intubation was evaluated by the Intubation Difficulty Scale (IDS) (IDS > 5 = procedure involving moderate to major difficulty).

Main Results: The percentage of intubations with an IDS > 5 was 3.1% in Group M (metal blade group), 5.1% in Group V (Vital View plastic blade group), and 10.0% in Group H (Heine plastic blade group). A significant difference was noted between Groups M and H ($P = 0.02$) but not between Groups M and V.

Conclusions: Intubation may be more challenging when using Heine XP plastic blades but no significant difference exists between Vital-View plastic blades and Heine Classic+ metal blades.

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1. Introduction

Anesthesia providers must take appropriate precautions to reduce the potential transmission of infectious agents to patients. Cross-contamination during anesthesia has never been established but we know that protein and bacterial residues remain on equipment and on anesthetic laryngoscope blades after routine cleaning [1-5]. In 1997, a new variant of Creutzfeldt-Jacob disease was discovered on a tonsillar biopsy [6]. Furthermore, after thermal decontamination there could be a deterioration of the devices (reduction in light intensity with some laryngoscope blades) [7]. As a consequence, disposable devices for airway management such as disposable laryngoscope blades have been recommended for routine tracheal intubation provided their efficacy is the same as reusable devices [8]. A recent study has suggested that disposable plastic blades, Lite-blade (Rush, Kern, Germany), were worse than non-disposable metal blades for orotracheal intubation during rapid-sequence induction of anesthesia [9]. There are many other disposable blades available on the market, and a study performed in manikin models showed that some plastic blades were probably better than others [10].

This study compared two different brands of plastic blades with the Heine Classic+ reusable Macintosh metal blade.

2. Materials and methods

This prospective, randomized, multi-center study was approved by the Human Subjects Committee of the Robert Ballanger Hospital, Aulnay, France. Written information about the study was given to each patient. However, since disposable plastic laryngoscope blades were used routinely by the anesthesiologists participating in this study, the Human Subjects Committee decided that only verbal consent was necessary from each patient.

Adult patients (age ≥ 18 yrs) undergoing elective surgery and in whom orotracheal intubation with direct laryngoscopy was indicated were studied. Patients were excluded from the study if they had a previous history of difficult intubation or were at risk of pulmonary aspiration of gastric contents.

Ten attending anesthesiologists participated in patient recruitment, induction of anesthesia, and the recording of data. All had used plastic and metal blades in routine tracheal intubation. Before induction of anesthesia, the anesthesiologists recorded 7 criteria that may predict difficult orotracheal intubation. Based on these criteria, a multifactorial risk index, described by Arné et al. [11], was defined (Table 1).

In the operating room, heart rate, arterial blood pressure, electrocardiography (ECG), oxygen saturation, and end-tidal carbon dioxide and oxygen tensions were continuously monitored. After preoxygenation of the patient, anesthesia was induced with propofol (3.0 mg/kg) or etomidate (0.3 mg/kg) and analgesic agents were given at the discretion of the attending anesthetist. Neuromuscular blockade was obtained

Table 1 Multifactorial risk index for difficult intubation prediction [11]

| Risk factors | Points |
|---|--------|
| Previous knowledge of difficult intubation | |
| No | 0 |
| Yes | 10 |
| Pathologies associated with difficult intubation | |
| No | 0 |
| Yes | 5 |
| Clinical symptoms of airway pathology | |
| No | 0 |
| Yes | 3 |
| Interincisor gap (IG) and mandible luxation (ML) assessment in 3 levels | |
| IG ≥ 5 cm or ML > 0 | 0 |
| 3.5 cm $<$ IG $<$ 5 cm and ML = 0 | 3 |
| IG $<$ 3.5 cm and ML $<$ 0 | 13 |
| Thyromental distance: | |
| ≥ 6.5 cm | 0 |
| $<$ 6.5 cm | 4 |
| Maximum range of head and neck movement graded in 3 levels: | |
| above 100° | 0 |
| about 90° | 2 |
| below 80° | 5 |
| Mallampati examination divided into 4 classes: | |
| 1: soft palate, fauces, uvula and pillars seen | 0 |
| 2: soft palate, fauces and uvula seen | 2 |
| 3: soft palate and base of uvula seen; | 6 |
| 4: soft palate not visible. | 8 |

The index score was the sum of each criterion. Difficult intubation may be predicted if the score exceeds 11.

with atracurium (0.5 mg/kg) or succinylcholine (1.0 mg/kg). Neuromuscular blockade was confirmed using a peripheral nerve stimulator monitoring the orbicularis oculi and the goal was to obtain no twitch with the train-of-four stimulation. A size 3 or 4 blade was selected in accordance with height, weight, and gender of patients.

Intubation difficulty was assessed using the Intubation Difficulty Scale (IDS) developed by Adnet et al. on the basis of seven criteria associated with difficult intubation [12] (Table 2). A score of 0 represents an ideal intubation: one performed by the first operator on the first attempt, with use of the first technique and with full visualization of the glottis and little effort [12]. An IDS score between 1 and 5 represents slight difficulty, and an IDS score greater than 5 represents moderate to major difficulty. If intubation is impossible, the IDS score is the value attained before abandonment of intubation attempts.

The anesthesia provider performing the anesthesia induction and orotracheal intubation recorded all of these data.

2.1. Randomization

The study was conducted from 01 July 2003 to 01 July 2005. We compared Vital View plastic blades (Vital signs

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