

Digital Intubation without Stylet: Myth or Reality? Case Report

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Abstract

Digital intubation was discovered as one of the first methods to face a difficult airway without direct laryngoscopy. From the very beginning, this technique has been surrounded by much controversy, mainly because it required to be performed by an expert. Nowadays, it remains a useful technique when treating patients with difficult airways, so it is of utmost importance all personnel involved with airway management must know and perfect this technique when scenarios where conventional laryngoscopy or rescue devices for difficult airway are not available or contraindicated. The present work's main objective is to suggest digital intubation as a safe and effective technique for the management of patients with difficult airways when there are no other devices available. The authors present a successful case of digital intubation on a patient with a difficult airway, demonstrating this technique is useful when performed by expert practitioners and when there is no other equipment available.

Keywords

Intubation Intratracheal, Oxygenation, Anesthesia, Airway Management

1. Introduction

Endotracheal intubation is a technique within the management of the airway in

different scenarios in which a tracheal tube is placed either through the mouth or nose, going through the glottis, up to the trachea to provide the patient medicinal gases such as oxygen and inhaled anesthetics [1]. Nowadays, we have at our disposal multiple options for the management of difficult airways, beginning with a more rigid endotracheal cannula or using a cannula for intubation, up to the use of more complex devices, such as supraglottic devices and video laryngoscopes, to mention some which have been developed to increase the success rate for intubation [2].

The digital intubation technique is one of the multiple existing techniques with the variant of being a blind procedure based on anatomical references. It was first performed in 1543 when Andrea Vesalio accomplished intratracheal access of a metallic tube in animals guided by touch. In 1878, Mac Ewen was the first to place an endotracheal cannula in humans using only his touch to administer inhaled anesthetics [3].

Difficulty to secure airway is frequently seen not only in the polytraumatized patient, but also in elective surgical patients. On some occasions, difficult airway predictive scales may not provide an accurate approach to which patients do possess difficult airways. On this note, the anesthesiologist, expert on airway management, and other medical specialties related to airway management, should know, and perform digital intubation when all the other techniques and devices have failed or in environments with limited resources, where healthcare providers do not possess the infrastructure or material necessary to manage airways adequately [3] [4] [5]. Statistics in different studies have shown approximately 30% of all deaths related to anesthetic events are related to difficult airway management, which in turn determines failed intubation and difficult airway management with low incidence problems but serious consequences. Thus, these aspects are considered of utmost importance when airway management in anesthetic events is present [6] [7] [8].

2. Case Report

We present a 58-year-old female patient with indications for a surgical nasal polyp resection and septumplasty for nasal septum deviation and 100% occlusion of right nasal lumen. Previous medical history consists of chronic rhinosinusitis, diabetes mellitus type 2, and systemic hypertension. She referred allergy to aminophylline. Previous surgeries consist of hysterectomy and previous caesarean section managed with regional anesthesia without complications. During preanesthetic evaluation, ASA II was given. Patient entered operating room, and the only preanesthetic medication given was conventional preoxygenation. Anesthetic induction with fentanyl, etomidate and vecuronium (without documenting exact dosage) was performed without incidents.

Direct atraumatic diagnostic laryngoscopy revealed Cromack-Lehane IV, so five intubation attempts were performed by different anesthesiologists without being able to secure airway. Thus, anesthesia reversal was decided, and patient

was rescheduled on a different date.

Anthropometric data and vital signs in **Table 1**.

On airway physical examination, nasal deviation to the left was observed, buccal aperture of 5.5 cm noticed, interdental distance of 4.6 cm registered, Mallampati grade III, thyromental distance grade III, sternomental distance grade III, micrognathia, short neck without noticeable adenomegaly (**Figure 1**).

During the new surgical event, preoxygenation with face mask was performed at 4 flow volumes. Anesthetic intravenous induction was then started as follows: fentanyl 225 mcg, cisatracurium 5.5 mg, propofol 120 mg. After pharmacological latency, digital intubation was realized after a single attempt, confirmed by capnography curve. Hemodynamic stability is confirmed pre- and post-intubation, and surgical event began without incidents. At the end of the surgical event, patient is extubated without accidents or complications, is sent to the PACU, and later discharged and sent to hospitalization floor.

Digital Intubation Technique:

1) Orotracheal cannula must be covered in topical local anesthetic, mainly at the distal portion.

2) Operator must be located on patient's right side (in case of being right-handed, or vice-versa if left-handed) and in front of the patient. Topical local anesthetic must be applied on index and medium finger of introducing hand once the patient has been induced and preoxygenated.

3) The previously mentioned fingers should slide over the superior surface of

Table 1. Anthropometric data and vital signs.

Blood Presue	Heart Rate	Glucose	Weight
127/78 mmHg	85 bpm	85 mg/dl	55 Kg



Figure 1. Airway evaluation.

the tongue until the vallecula is located, where index finger must surpass the epiglottis and remain on the posterior face of the epiglottis. In this way, the posterior face of the epiglottis must be fixed between the finger and the posterior part of the oropharynx (**Figure 2(a)** and **Figure 2(b)**).

4) Index finger should serve as a guide to slide the orotracheal cannula and, once the tube is placed over the anterior surface of the distal phalanx of the medium finger, the index finger should slide the tube over the phalanx with slow yet firm movements until the cannula has crossed the vocal cords (**Figure 3**, **Figure 2(c)** and **Figure 2(d)**).

5) Once the cannula has crossed the vocal cords, the cuff must be inflated so the airway is sealed, and the operator must verify adequate capnography curve and pulmonary auscultation correct tube placement and intubation (**Figure 4**).

3. Discussion

Adequate airway management remains a challenge for the anesthesiologist, either trained or untrained. There are several fewer known alternatives that are

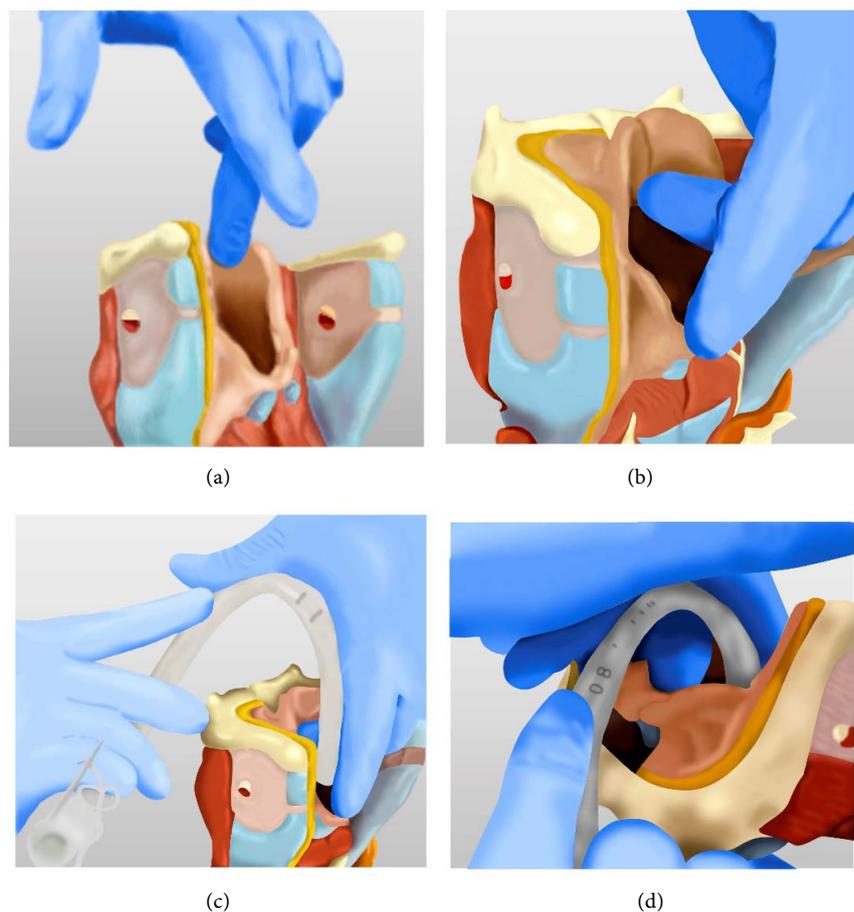


Figure 2. (A) Position of left medium finger displacing the epiglottis. (B) Left medium finger displacing the epiglottis while left index finger is placed in the interarytenoid space. (C) Left posterolateral view. Placement of the endotracheal tube. (D) Upper left view. Placement of endotracheal tube.



Figure 3. Digital introduction of orotracheal cannula.



Figure 4. Correctly placed anesthetic circuit.

not included in the difficult airway management algorithm, such as the digital intubation without stylet [5] [9]. In several situations, preanesthetic evaluation poses challenges that show an airway might be a difficult airway, which in turn forces the specialist to use different methods to securely ventilate the patient [7].

Table 2. Indications, relative contraindications, and complications for digital intubation.

Indications	Relative contraindications	Complications
Failure of other techniques to amange airway, expecting digital intubation to be the next step in management.	Vocal cord visualization, either by direct or video laryngoscopy.	Provider injury caused by patient's teeth.
Oral secretions, vomit, or blood that block direct visualization of vocal cords.	Significant laryngotracheal deformity which masks palpable anatomy.	Injury to patient's soft tissues.
Anatomical variants or deformities, like patients with edentulia.	Possibility of injuries to the provider if the patient bites.	Esophagic intubation.
Failure to realize direct or indirect laryngoscopy.	Provider's unexperience	
Direct or video-laryngoscopy equipment unavailable.		
Unavailable supraglottic devices.		
Severe craneocephalic trauma which conditions spine immobilization.		

Current algorithms remark the posture of awake intubation in patients with difficult airway, yet there are patients who were catalogued as routine airway or non-anticipated difficult airway are found to have difficulties for tracheal cannulation using conventional laryngoscopy [3] [8] [10]. Digital intubation technique has been widely used for intratracheal access, which has indications, relative contraindications, and complications mentioned in **Table 2** [5] [9], yet there are some variations which do use flexible stylet. In the reported case, despite the patient having a difficult airway documented by three different anesthesiologists with adequate laryngoscopy experience, intubation was achieved using digital technique without stylet at first attempt without complications, allowing the surgical team to perform the planned procedure and to extubate the patient without complications, with adequate follow-up by treating medical service until discharge [3] [6].

The most recent literature contains articles reporting the use of digital intubation technique in unanticipated difficult airway patients, yet it is recommended it is performed by expert hands. Currently, there are no protocols that include this technique, even though it has high success ratios according to recent literature. It must be kept in mind this technique should be performed especially in patients with difficulty to access tracheal lumen with conventional laryngoscopy or in environment with scarce resources which present with limited access to resources for difficult airway management [7] [11] [12].

4. Conclusion

Digital intubation without stylet is a poorly described technique, with high success rates when performed in expert hands, with a relative risk of airway damage and orotracheal structures. Some health institutes do not possess the resources

to acquire advanced devices for airway rescue. It is because of this that digital intubation without stylet becomes a useful and rational alternative to overcome a difficult airway or a failed intubation in an environment where resources are limited.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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