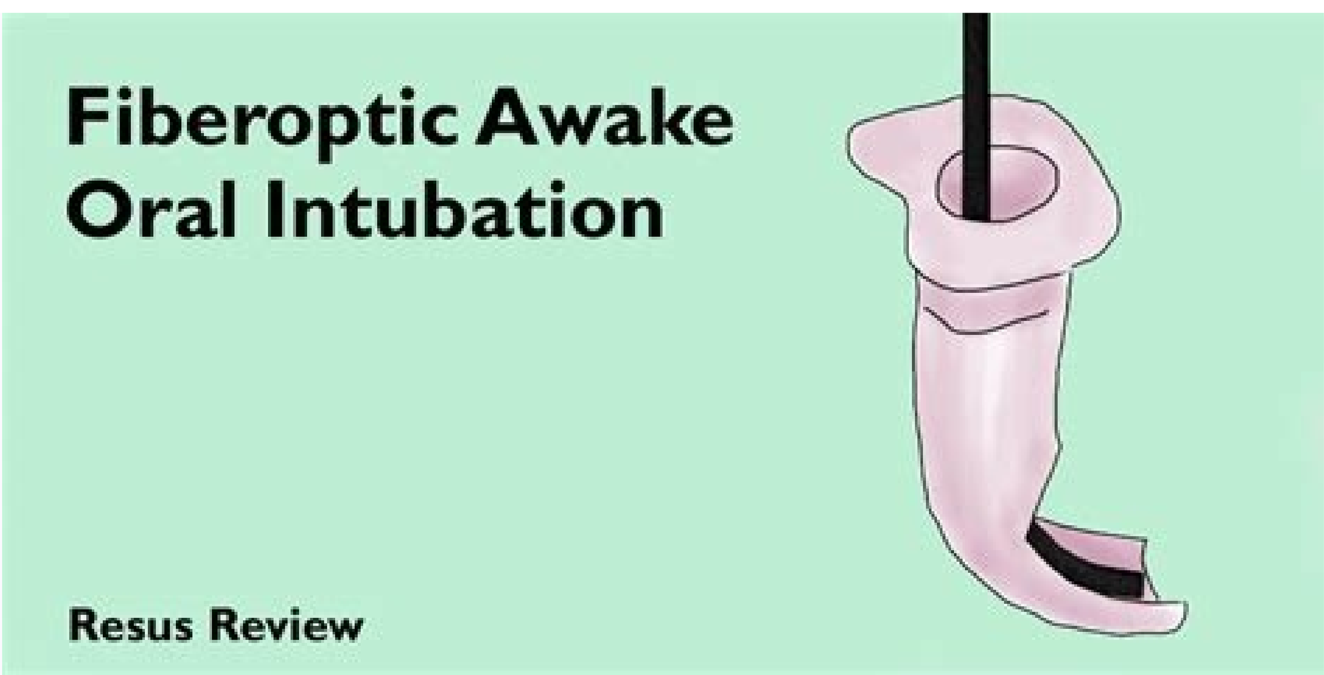
Awake fiberoptic intubation case report




Original Article
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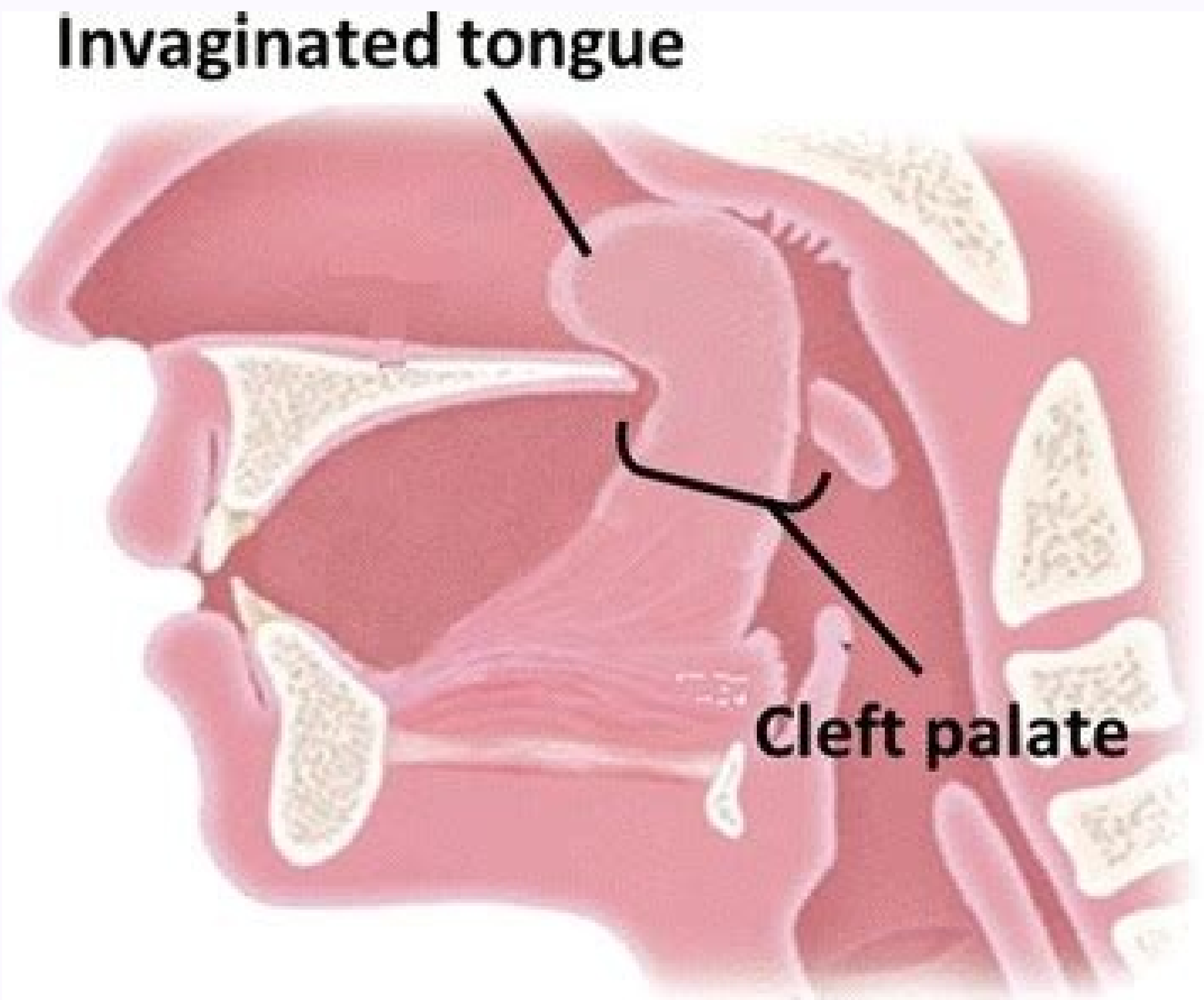
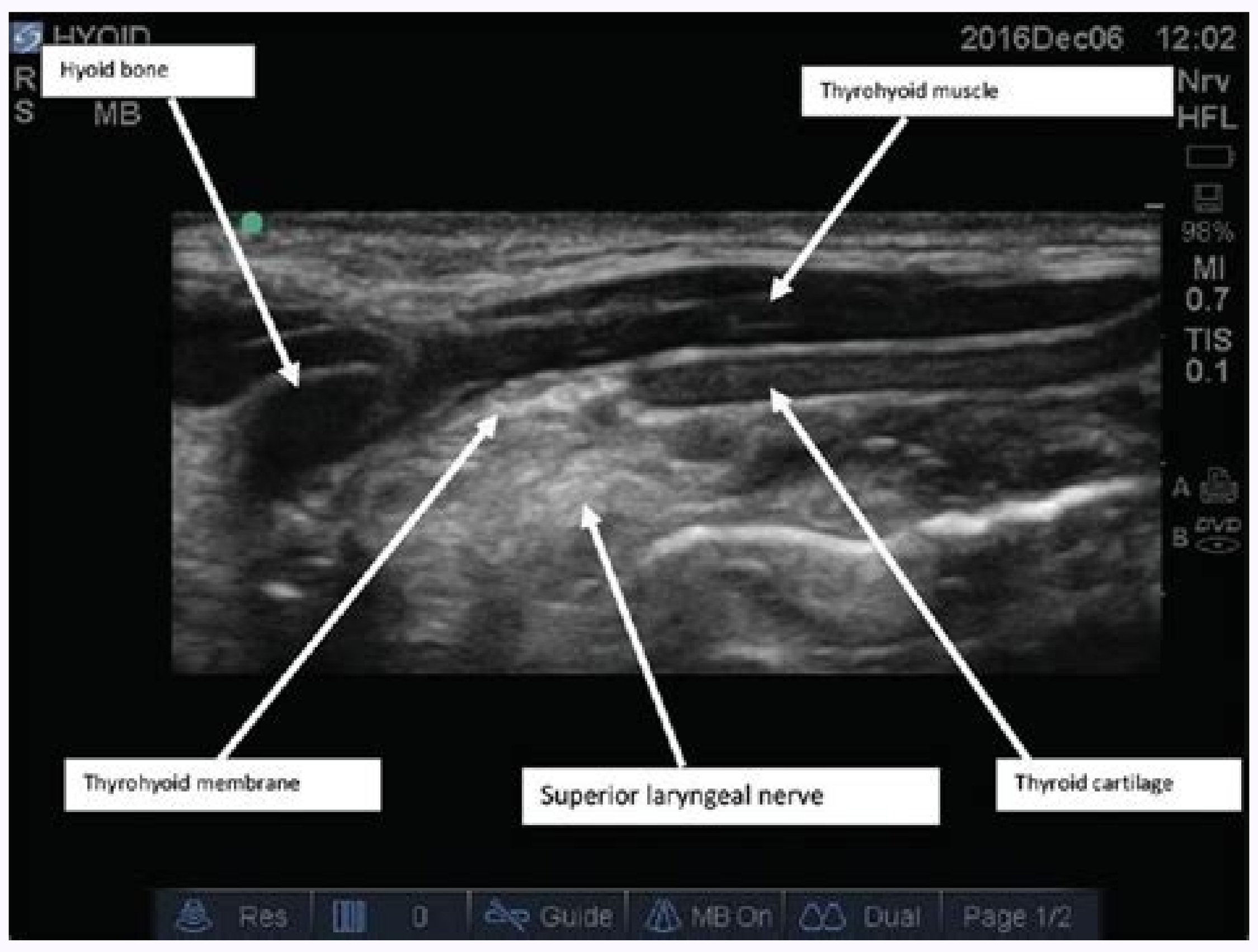
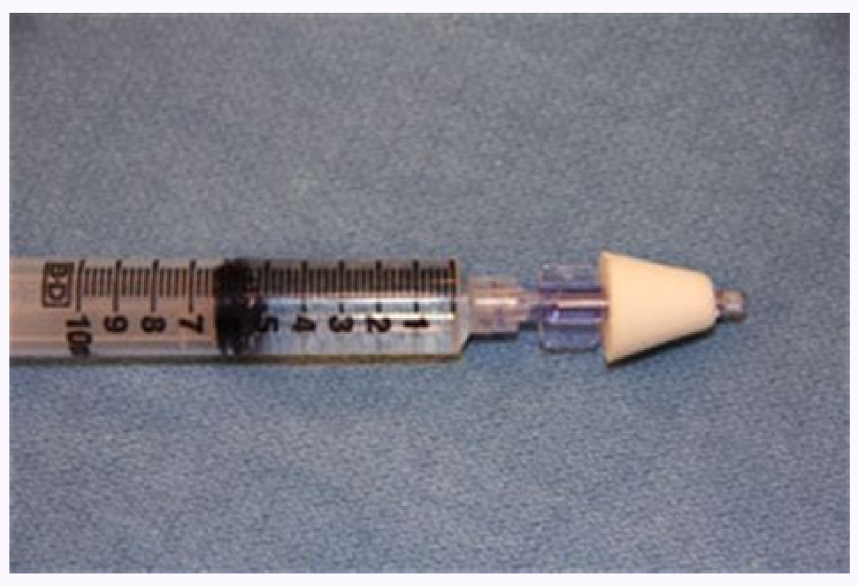
Learning fiberoptic intubation for awake nasotracheal intubation
Hyuk Kim, Eunsun So, Myong-Hwan Karm, Hyun Jeong Kim, Kwang-Suk Seo
INTRODUCTION







Awake fiberoptic intubation steps. Awake fiberoptic intubation indications. Awake fiberoptic intubation cpt.

The incidence and survival of patients with head-and-neck cancer have been on the increase for decades. Following surgery or radiation therapy, complications such as difficult airways may evolve. These difficult airways may be unique and not manageable with conventional intubation methods as well as video laryngoscopes. Acute awake fiberoptic intubation may be a feasible option also for urgent emergency airway management of known difficult airways. The “cannot intubate–cannot oxygenate” (CI–CO) situation has to be avoided at all costs, since emergency cricothyrotomy has a fail ratio of more than 50% when performed by an anesthesiologist.1. IntroductionIn Denmark, the incidence of head-and-neck cancer (HNC) has more than doubled since 1980 and the relative 5-year survival has risen from 49% to 72% [1]. Previous HNC surgery or radiation therapy is a strong predictor of a future difficult airway [2]. Of all patients undergoing an emergency cricothyrotomy due to a “cannot intubate–cannot oxygenate” (CI–CO) scenario, 75% went through HNC surgery at some point prior to the event [2]. Hence, it is likely that the proportion of patients with potentially difficult airways will increase in hospitals without ear-nose-throat (ENT) expertise, with acute symptoms requiring immediate treatment. Our hypothesis is that all hospitals managing patients in acute respiratory failure should not only have backup plans for unexpected difficult airways but also for the expected ones [3]. This optimally includes skills in awake fiberoptic intubation (FOI), which preserves spontaneous breathing and thus can prevent the risk of critical desaturation or a CI–CO situation [4].2. Case PresentationWritten informed patient consent for publication was obtained. Approval from The Central Denmark Region Committee on Health Research Ethics was unwarranted.A 71-year-old man (height 166 cm, weight 60 kg) with previous HNC, presented in the emergency room due to fever and increasing dyspnea during the last 4 days.On arrival, the patient was fully alert and oriented. Respiratory rate was 40 breaths/min, peripheral saturation was 80% with 10 L/min oxygen delivered on a Hudson mask, blood pressure was 91/64 mmHg, heart rate was 110 beats/min, and temperature was 38.5°C. The Hudson mask was replaced with a reservoir mask with an oxygen flow of 15 L/min. A computed tomography scan including intravenous contrast was performed, which showed bilateral pneumonia and excluded pulmonary embolism (Figure 1). The patient was transferred to the intensive care unit (ICU), where high-flow nasal oxygen (HFNO) was administered with a flow of 60 L/min and a fraction of inspired oxygen (FiO2) of 100%. However, this was quickly amended to noninvasive ventilation (NIV) with a positive end expiratory pressure of 12 cm H2O and a FiO2 of 100%. Oxygenation remained unacceptably low (Table 1). Accordingly, the decision to intubate was made.(a)(b)(a)(b)Reservoir-mask (ER)HFNO (ICU)NIV (ICU)pH (7.35-7.45)7.297.337.34Base excess (−3–3 mmol/L)−10.0−8.1−8.3pO2 (11.1–14.4 kPa)8.65.87.8Saturation (%)887488pCO2 (4.7–6.4 kPa)4.34.34.0Lactate (0.5–1.6 mmol/L)5.76.15.9Abbreviations: ER, emergency room; HFNO, high-flow nasal oxygen; ICU, intensive care unit; NIV, noninvasive ventilation.In 1999, the patient’s tonsil cancer had been treated with radiation therapy. Unfortunately, this caused mandibular osteoradionecrosis, which had necessitated hemi-mandibulectomy and comprehensive reconstruction surgery (free fibula flap combined with a pedicled pectoralis major myocutaneous flap) on the right side in 2003 and on the left side in 2015. The surgeries were performed following awake FOI and surgical tracheostomy. In 2014, at another hospital, a laparoscopic cholecystectomy necessitated intubation, which was attempted after the induction of anesthesia. A nasal approach utilizing a video laryngoscope (VL) with a hyper angulated blade (McGrath™ MAC X-Blade™, Medtronic, MN) failed, and the esophagus was intubated twice. This was attributed to the extreme limited mouth opening, which made visualization of the relevant structures impossible. Further nasal attempts were stopped due to bleeding, and intubation finally succeeded orally with a fiberscope. Since this episode, only awake FOI attempts had been performed.Other comorbidities included arterial hypertension (treated with an Angiotensin-II-receptor-blocker), chronic jaw pain (treated with oral morphine 40 mg/day) and a history of smoking for 28 years (½ pack of pipe tobacco/week). Despite his comorbidities, he was physically active and played golf on a weekly basis.His airway examination revealed a mouth opening of 10 mm and neck movement 25 mm and VL intubation > 20 mm [8, 12, 13]. Nevertheless, successful use of these devices in patients with less mouth opening has been reported [14].Experts disagree as to whether awake FOI skills should be mastered by every anesthesiologist or only restricted to practitioners who deal with these difficult airways on a daily basis [15]. A survey among US anesthesiologists in 2003 found that only 59% reported to have skills in FOI [16]. Opportunities to acquire FOI skills in the operating room have decreased since the introduction of the VL in clinical practice in 2002. An acceptable level of technical skills may be acquired after performing 10 FOI’s in general anesthesia and 15–20 on awake patients [8, 17], but true expertise probably requires more training. This necessitates heavy weighting of trainees performing supervised FOI’s, optimally as part of a routine institutional practice [4]. New airway simulators consisting of components including replica video bronchoscopes, and desktop sensors can create virtual patients with difficult airways. This possibly may accelerate obtaining FOI skills, even though transferability of these skills to performance in real life patients with difficult airways has not yet been shown.In a recent review on elective awake FOI protocols in the operating room, no specific strategy regarding premedication, local anesthesia, or sedation could be declared superior to the others [5]. In the critically ill patient, with minimal physiological reserves, airway obstruction (due to over-sedation) and respiratory or circulatory collapse would be dangerous. Sedation should thus be kept to a minimum (or no sedation at all) and nonopioid medication including ketamine may be the safest choice. In the end, familiarity of the anesthesiologist performing the FOI with their drug of choice is probably the most important point [5].The disadvantage of FOI is that blood and secretions in the airway or at the tip of the fiberscope may obscure the vision. A thin suctioning catheter can be placed nasally in the pharynx for continuous suctioning and cautious low-flow oxygen through the working channel of the fiberscope can be administered to continuously flush the tip. Both of these techniques were prepared for, but not needed since visibility was obtained immediately. Some argue that FOI is extremely time consuming. However, with the right preparations undertaken simultaneously, this may not be true [8, 11].Other theoretical options would have been classical blind techniques used for decades, such as blind nasal [18], retrograde [19] or light wand intubation [20]. Nevertheless, these are increasingly becoming a lost art and even if local expertise exists, success rates are not necessarily acceptable [21]. It is possible that an oral retromolar approach with a rigid intubating stylet (e.g., Bonfils™ [22]) or a nasal approach with the newer rigid video-intubating stylet (Trachway™ [23]) may have worked, but equipment and expertise are not available in all departments. Placing the patient on extracorporeal membrane oxygenation (ECMO) before performing a surgical tracheostomy has been reported in extreme circumstances [24]. However, besides potential risk of major hemorrhaging, highly specialized equipment and expertise in thoracic and ENT surgery are required.The airway plan was an awake oral FOI. It was preferable to avoid the nasal route, since it was probably necessary to decrease the tube size and since nasal bleeding would have been disastrous. Accordingly, an awake nasal FOI was the second choice. As backup plan in hospitals with ENT surgical expertise an awake surgical tracheostomy would have been a viable option or could have represented the primary choice instead of the awake FOI. In hospitals without ENT surgical expertise (as in this case), an awake percutaneous dilatational tracheostomy (if experienced intensivists are present) or an awake cricothyrotomy could have been the potential backup plan, keeping in mind that these procedures may be technically very challenging, when performed in local anesthesia in the critically ill patient on spontaneous breathing. The last option in either case would have been an emergency cricothyrotomy performed under adequate anesthesia and full relaxation.Once the transcricothyroidal local anesthetic was given, using an adequately sized plastic cannula instead of the small-bore needle and leaving it on site as a backup for cricothyrotomy would have been a possibility, providing access for temporary emergency jet oxygenation or for placement of a guidewire in the trachea in connection with Seldinger based cricothyrotomy sets.4. ConclusionThis case illustrates that patients with difficult airways may present at hospitals without ENT expertise, requiring urgent intubation, which is not manageable with conventional methods as well as VL. Optimal skills for performing an awake FOI should be present around the clock. As backup, an awake tracheal access can be considered: awake surgical tracheostomy (if ENT surgical expertise is present), awake percutaneous dilatational tracheostomy (if specially experienced intensivists are present) or awake cricothyrotomy (if neither ENT surgeons or intensivists are present). These methods may be the only options to avoid emergency cricothyrotomy, which has an unacceptable high failure rate when performed by an anesthesiologist in a CI–CO scenario.Conflicts of InterestThe authors declare that they have no conflicts of interest.

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