Use of the Airtraq® with a Fiberoptic Bronchoscope in a Difficult Intubation: Case Report

Zor Entübasyon Olgusunda Airtraq® ile Birlikte Fiberoptik Bronkoskopun Kullanımı

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ABSTRACT Fiberoptic bronchoscopes have emerged as the gold standard for endotracheal intubation of patients with suspected or known difficult airways. The Airtraq® is a new intubation device that has been developed for the management of the normal and difficult airways. Optical stylet-assisted intubation, retrograde intubation, blind nasal intubation, fiberoptic intubation or usage of any other type of laryngoscopes with support of fiberoptics are often secondary choices in the event of an anatomical or technical obstacle for direct laryngoscopic intubation. Here we present a case report in which a patient could not be intubated by standard laryngoscopy because of a major larynx anatomical variance, using an Airtraq® laryngoscope for a fiberoptic intubation. We performed a successful intubation with ease using the increased view advantages of Airtraq® and a fiberoptic bronchoscope in a patient with a difficult airway.

Key Words: Bronchoscopes; ıntubation; laryngoscopes

ÖZET Fiberoptik bronkoskop, şüphelenilen veya bilinen zor hava yolu olan hastalarda endotrakeal entübasyon için altın standart olarak ortaya çıkmıştır. Airtraq® normal ve zor hava yollarının yönetimi için geliştirilmiş olan yeni bir entübasyon cihazıdır. Anatomik veya teknik nedenlerden dolayı direkt laringoskopi ve entübasyon ile hava yolu kontrolünün sağlanamadığı durumlarda optik stile ile entübasyon, retrograt entübasyon, kör nazal entübasyon, fiberoptik entübasyon veya farklı tipte laringoskopların fiberoptik yardımıyla kullanılması yöntemlerine başvurulur. Burada daha önce entübe edilemeyen majör larinks patolojisi olan olguda Airtraq® laringoskop aracılığı ile fiberoptik bronkoskopla entübasyon deneyimimiz bildirilmiştir. Biz zor hava yolu olan bir hastada Airtraq® ve fiberoptik bronkoskopun birlikte kullanımı ile artan görüş alanın sağladığı avantajla kolaylıkla başarılı bir entübasyon yaptık.

Anahtar Kelimeler: Bronkoskoplar; entübasyon; laringoskoplar

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Unsuccessful tracheal intubation is currently the major reason of increased morbidity and mortality during anaesthesia.[1] The main responsibility of an anesthetist is securing an airway and the continuity of sufficient gas exchange during surgical operations. Direct laryngoscope and endotracheal intubation is the safest and preferred method for securing an airway. Optical stylet-assisted intubation, retrograde intubation, blind nasal intubation, fiberoptic intubation or usage of any other type of laryngoscopes with support of fiberoptics may be secondary choices when there is anatomical or technical obstacle for direct

laryngoscopic intubation. Development of fiberoptic intubation technique is accepted as a major touchstone for anesthesiology as it is very important for securing patients airway.[2] Fiberoptic intubation could be performed in sleeping and myorelaxated patients usually without any complications.[3] The Airtraq® laryngoscope is a new intubation device that has been developed for the management of normal and difficult airways which enables to see vocal cords that are not aligned to the oral-pharyngeal-tracheal axis.[4]

Here we report our experience in a case in which a patient with a major laryngeal anatomical variance could not be intubated by standard laryngoscopy procedures but by using an Airtraq® laryngoscope for a fiberoptic intubation. We performed a successful intubation by combining the increased view advantages of Airtraq® and fiberoptic bronchoscopes (FOB) in a patient with a difficult airway.

CASE REPORT

Our subject was a 40-year-old male patient undergoing an operation for a mass in the right piriform sinus. The patient had a history of ulcerative lesions in the pharyngeal area for the last 7 years. Four years ago, the patient visited another outpatient otolaryngology clinic with the complaints of throat pain and hoarseness. Physical examination revealed an aphthos lesion on the hypopharyngeal area. Using an upper gastrointestinal endoscopy, a 1 cm diameter deep ulcerative lesion adjacent to right vocal cord with pharyngeal involvement was detected. In the following year, a new ulcerative lesion with a diameter of 3 centimeters was detected on the posterior pharyngeal wall. He received corticosteroids for these lesions but had no favorable response. In the last two years, the patient began to have difficulty while swallowing. Two months ago he presented at our hospital with complaints of hardness in swallowing, hoarseness, aspiration, shortness of breath and weight loss. A focal soft tissue lesion which did not spread to the adjacent tissue was detected by magnetic resonance imaging. There were no pathological lesions on the patient's vocal cords, and thyroid gland dimensions were normal. However, the patient's cervical CT revealed multiple osteophytes between C2-C6 adding pressure to pharynx and esophagus from posterior, which were especially prominent on frontal side. On C3-4 and C5-6 minimal central disc prolapsus was observed, and on C4-5 and C6-7 minimal left parasantral disc protrusions were also detected. A video laryngoscopic (VLS) examination revealed left vocal cord edema and minimal mucosal vascularization in the right vocal cord. Vocal cord movements were natural and glottic space was normal. In his history, a suspension laryngoscopic examination was terminated because of intubation failure, so a surgical exploration was planned. During preoperative physical examination, the patient had limited cervical movement and a large tounge, the thyromental distance was 5 cm, sternomental distance was 8 cm, mouth opening was 40 mm; the Mallampati class was II. VLS evaluation with otolaryngology team was performed for detecting any difficult intubation conditions before anaesthesia and a rudimentary epiglottis was

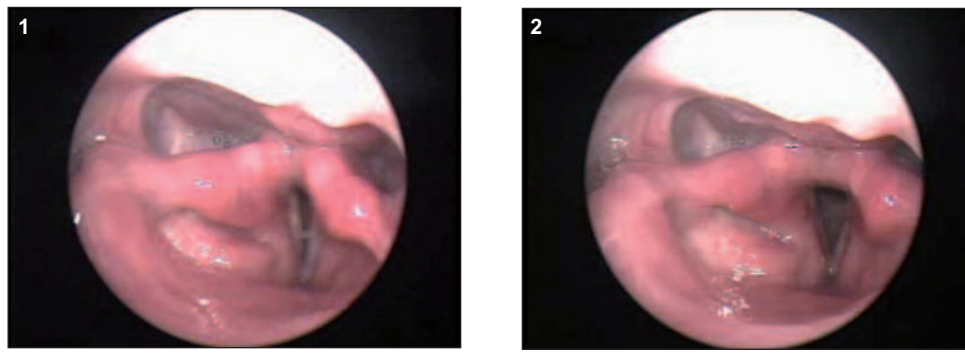

FIGURE 1-2: Patient's pre-operative video laryngoscopic photos.
(See color figure at http://anestezi.turkiyeklinikleri.com/)

observed. Larynx was also deviated obliquely, however vocal cords and arytenoids were visualized during VLS (Figure 1, 2).

Because of the previous failed intubation history, an intubation set containing masks for noninvasive ventilation, a McCoy laryngoscope, a FOB, an Airtraq® laryngoscope, classical laryngeal mask (LMA-Classic™), intubation laryngeal mask (ILMA), retrograde intubation set for securing an invasive airway, and the necessary equipment for an emergency cricothyroidotomy/tracheatomy was prepared before anaesthesia induction. All possible necessary procedures were explained to the patient and a signed patient consent was received before procedure. Patient refused to have awake fiberoptic intubation but consented to the operation to be performed after induction of anaesthesia. Patient's body weight was 60 kg so sedation was induced with 2 mg midazolam, after 4 minutes of pre-oxygenation period with oxygen 100%, and anaesthesia was induced with 100 mg propofol. After being able to respirate by mask, 45 mg rocuronium and 50 mcg fentanyl were applied to patient to avoid any side effects of succinycholine. Infusion of propofol by 4 mg/kg/hour dose was continued during all remaining proceure. The epiglottis could not be observed during direct laryngoscopy with a Macintosh blade. Cormack-Lehane score was rated as grade 3. An intubation attempt using number 5 suspension laryngoscope endotracheal tube (MLT); (microlaryngeal/tracheal tube, Portex) was also unsuccessful. However intubation was successful on the first trial using a FOB through Airtraq® (size 2) with 7,5 mm size MLT (Figures 3). Patient's laryngoscopy score with Airtraq® and FOB was 2. Tracheal intubation was confirmed by the detection of expired carbon dioxide by capnography. At this stage, anaesthesia was maintained with propofol infusion. There was no significant changes in hemodynamic parameters of patient during intubation procedure and lowest O_2 saturation level was 94%. Duration of intubation procedure with combination of Airtraq and FOB lasted only 40 seconds while all intubation procedure duration took only 7 minutes. Post-intubation fiberoptic visuals were as shown in following Figures 4-7.

FIGURE 3: The fiberoptic bronchoscope advanced through the endotracheal tube housed in the Airtraq® channel.
(See color figure at http://anestezi.turkiyeklinikleri.com/)

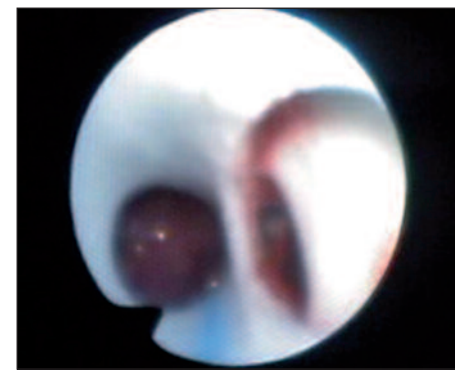

FIGURE 4: Insertion of fiberoptic bronchoscope through the intubation tube.
(See color figure at http://anestezi.turkiyeklinikleri.com/)

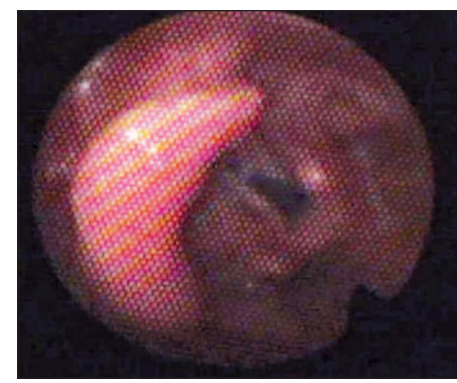

FIGURE 5: View of epiglottis.
(See color figure at http://anestezi.turkiyeklinikleri.com/)

Despite the successful intubation, a sufficient view for acquiring a punch biopsy from the laryngeal lesion was not possible because of cervical and laryngeal anatomical deformities of the patient. After unsuccessful trials with both flat and truview layngoscopes to elevate base of tongue, using a Macintoch larygoscope accompanied by a

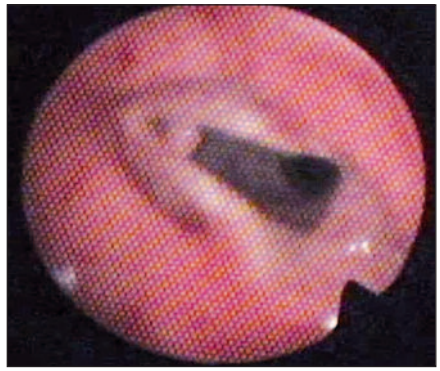

FIGURE 6: View of vocal cords.
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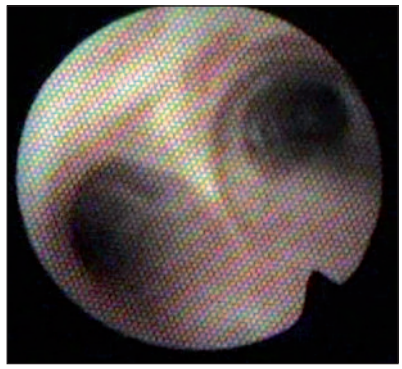

FIGURE 7: View of carina.
(See color figure at http://anestezi.turkiyeklinikleri.com/)

rigid endoscope, otolaryngologists were able to gain a proper view of the soft tissue lesion, a mucosal thickening spreading to piriform sinus. The operation was completed after acquiring a punch biopsy from the lesion. After procedure patient was awakened and extubated with spontaneous respiration without any complications.

DISCUSSION

Despite many other possible techniques, we preferred combining two different methods for intubation of this patient. We provided a better view of lesion by passing a fiberoptic endoscopy device through an Airtraq® laryngoscope. The patient not only had difficult intubation criteria preoperatively [cervical restriction (< 35º), short mandibula-hyoid distance (< 7 cm), short sternomental distance while full cervical extension (< 12.5 cm), but also mouth opening of 40 mm and a large tongue].[5] In addition the patient had a history of unsuccessful intubation attempts previously. His VLS examination revealed a rudimentary epiglottis and an obliquely deviated larynx. Thus, we aimed to obtain a better view by combining two different techniques in our patient. Nishikava et al. reported that the use of both Airtraq and fiberoptic endoscopy together in manikin models with difficult intubation criteria increases the success rate and shortens the intubation time.[6] We also attempted to intubate the patient by combining these two techniques and obtained a better laryngeal view without any complications with an intubation time of 40 seconds.

The Airtraq® laryngoscope is a new generation intubation device and used for normal or difficult intubations by helping to visualize vocal cords that are not aligned to the oral-pharyngeal-tracheal axis. An Airtraq® blade consists of two canals, one for intubation tube and the other that ends by a distal lens with a light source at the tip area. The image is transferred by a proximal telescope that uses a lens-prism combination. The lens provides an accurate view of the glottis and surrounding tissue and facilitates an easy pass of the tracheal tube through this area. Airtraq® has been designed as an anatomically suitable device and enables the use of any sized standard tracheal tube. Increased popularity of this specially designed intubation device depends on high success rates of difficult intubation with minimal traumatic damage.[7-9]

Reviewing studies that report high success rates of intubation by using FOB reveals that experience of anesthesist has a central role. Success rates at third try might fall down to 50% levels especially in Grade IV laryngoscopic evaluation, patients due to low experience and insufficient FOB properties.[10] Popularity of these new, inexpensive, modified supraglottik ventilation and intubation devices increase as they require less experience and let anesthesists to perform intubation with high success and minimal trauma.[8,9] In this reported case we also had a successful intubation in a difficult airyway patient within a very short intubation duration by

combining Airtrag® laryngoscope and a FOB device. In our case while the Airtraq® placed the tip of the endotracheal tube in the immediate vicinity of the glottis. The FOB carried it off the sharp angle between the tip of the endotracheal tube and the glottis.[11]

In conclusion, the combined technique of FOB intubation through Airtraq® is an effective technique for difficult intubation with a high success rate. This combination is also suitable and effective in the management of secure airway after the induction of general anaesthesia in patients with difficult airway.

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