

Airway Management in Trauma Cases in Emergency Department

Acil Serviste Travma Hastalarında Havayolu Yönetimi

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ABSTRACT

Trauma patients constitute a significant proportion of emergency department admissions. It is vital to have sufficient knowledge and experience in airway management of these patients. Choosing the most appropriate method for each patient may be the most challenging step for the practitioner. In particular, the fact that some generalizations are not supported by sufficient literature information makes this choice difficult. In this article, the options that can be used in airway management of trauma patients will be discussed.

Keywords: Airway, trauma, emergency department

ÖZ

Travma hastaları acil servis başvurularının önemli bir kısmını oluşturmaktadır. Bu hastaların havayolu yönetiminde yeterli bilgi ve tecrübeye sahip olmak hayati önem taşımaktadır. Her hasta için en uygun yöntemin seçilmesi uygulayıcıyı en çok zorlayacak basamak olabilir. Özellikle de bazı genel kanıların yeterli literatür bilgisi ile desteklenmiyor olması bu seçimi zorlaştırmaktadır. Bu yazıda travma hastalarının havayolu yönetiminde kullanılacak seçenekler tartışılacaktır.

Anahtar Kelimeler: Havayolu, travma, acil servis

Introduction

Trauma patients constitute a significant proportion of emergency department admissions. Trauma is still the most common cause of death under the age of 45 worldwide (1). In the United States of America, there are 37 million annual emergency department visits due to trauma. Approximately 2.6 million of these patients require hospitalization (2).

Airway has a special importance in the management of trauma patients. Airway management is the first step of classical trauma intervention in order to ensure airway patency and to continue breathing (1, 3). In airway management of trauma patients, as in other patients, there is a spectrum ranging from a simple airway opening maneuver to endotracheal intubation and even surgical airway techniques(4-9). Bhoi et al. showed that 13.25% of the patients intubated in the emergency department were trauma patients (10). Levitan et al. stated that 1800 major trauma patients were evaluated in a center where approximately 50000 patients were seen annually and 658 patients needed intubation during a 3-year study (11).

All trauma patients may reasonably be classified as having a potentially difficult airway due to their injury profiles. This creates the need for emergency physicians to keep their knowledge of airway management in this patient group constantly updated. This article will attempt to summarize airway management in trauma patients.

Airway Opening Maneuvers

The conventional wisdom is that the head-tilt chin-lift maneuver can not be used in cervical trauma, but there is insufficient evidence in the literature to support this. Due to concerns that it may mobilize cervical vertebrae and exacerbate existing injury, especially in patients with trauma affecting the spinal canal, only the jaw thrust maneuver is recommended in this patient group. However, it is not possible to show how much of the spinal damage in patients with cervical trauma is due to the initial trauma and how much is secondary to airway opening maneuvers. Therefore, there is insufficient evidence to show that the head-tilt chin-lift maneuver causes secondary damage. Nevertheless, the maneuver recommended for trauma patients at the level of expert opinion is the jaw thrust maneuver. Of course, it should be kept in mind that the cervical vertebrae may be mobilized during jaw thrust and caution should be exercised (12-17).

Face Mask/ Preoxygenation

The use of a face mask can be problematic, especially in maxillofacial injuries. Alternative methods of oxygenation should also be considered. The possibility that the mask may not fit the face properly and/or the mask may cause secondary damage due to trauma should be considered. Another respiratory support method that may pose a problem due to mask use is non-invasive ventilation. If it is thought that the patient needs non-invasive mechanical

ventilation support, it is necessary to choose the appropriate type of mask (8, 18-20).

If it is decided to intubate the patient, the preoxygenation stage should be decided by considering maxillofacial trauma and skull base fractures. Especially in skull base fractures, using high-flow oxygen during the preoxygenation phase is not recommended because it may cause/increase pneumocephalus. It is controversial whether apneic oxygenation can be used in these patients (5, 6, 13, 19-21).

Supraglottic Devices

Supraglottic devices are important tools used in airway management. Although they are seen as a part of rescue oxygenation in emergency services, they provide important advantages before hospitalization. As it is known, recent publications recommend the use of supraglottic devices instead of endotracheal intubation, especially during intervention in the field. This situation seems logical as it will save time for the limited health personnel to direct their efforts to other tasks. Although there is no different recommendation for trauma patients, it should be remembered that the mouth opening should be sufficient and there should be no upper airway obstruction for the insertion of supraglottic devices. However, there are no publications showing the superiority of any supraglottic device over another. Therefore, practitioners can use the supraglottic device available to them (19, 22-24).

Endotracheal Intubation

Endotracheal intubation can be considered as the most preferred method in airway management. At least it would not be wrong to say that it is the most popular. It is a difficult process to manage and requires experience for all patients. The success of intubation is measured by advancing the tube through the vocal cords with the minimum number of attempts as well as the absence of complications. Current literature suggests that even when an endotracheal tube is placed correctly in a single attempt, if complications develop, the procedure may be considered a failure. Considering that patient management is a whole and that the general condition of the patient may deteriorate further due to intubation-related complications, this perspective aligns with the holistic goals of patient management. It should not be forgotten that our goal is not only the placement of the tube. Our aim is to improve the clinical condition of the patient (3, 4, 8, 9, 12, 13, 16, 19, 25).

In various studies, hypotension is the most common complication of endotracheal intubation. Especially the high likelihood of multiple trauma patients being in hypovolemic shock forces the practitioner to be even more careful in this regard. The current state of hypovolemia puts all trauma patients in the physiologic difficulty class in terms of intubation. Therefore, if a trauma patient is to be intubated,

appropriate fluid and/or transfusion therapy should be provided for peri-intubation optimization (3, 4, 19, 23).

The development of metabolic acidosis in trauma patients is another condition that makes the intubation process physiologically difficult. After intubation, ventilator adjustment should be made considering the patient's compensatory respiratory effort. Rapid disruption of this compensation by the physician may lead to serious problems.

Another condition that makes intubation of trauma patients difficult is cervical movement limitation. This condition, which can be listed under the heading of anatomical difficulties, exists spontaneously in all trauma patients. In the current literature, there is insufficient evidence of secondary injury caused by endotracheal intubation. Nevertheless, the classical approach advocates that neck movements should be avoided during the procedure. In some cadaveric studies, the cervical canal distance was measured by direct radiography and it was questioned whether there was any change in this distance with neck movements. Although some change was noted in some studies, it is not known whether this change is sufficient to cause damage. In a study of patients requiring cervical stabilization due to trauma, there was no evidence of increased damage secondary to intubation. Of course, due to the technical difficulty of investigating the subject, it is unlikely that the discussion will be concluded in the near future (12, 14, 16, 17).

Intubation Aids (Stylet, Bougie)

Intubation assist devices include the stylet and the bougie. The stylet shapes the intubation tube, making it easier to guide. There have been numerous studies on the benefits of both. Both the stylet and the bougie have been separately compared with direct laryngoscopy and have been shown to improve first pass success. It may be advisable to use one of these two assist devices, especially in trauma patients. However, there are not enough studies comparing these two devices with each other. Which one is preferred should be decided based on the technical equipment available to the practitioner and the algorithm determined by the clinic (4, 10, 13, 19, 23-25).

Videolaryngoscope

Videolaryngoscopy has taken its place in our lives with an increasing rate of use. In various publications, videolaryngoscopy is compared with direct laryngoscopy. In trauma patients, it is said that the use of videolaryngoscopy significantly increases the first pass success. While the patient was intubated in an average of 1;1 attempts with videolaryngoscope, it is stated that this number increases to 3.2 when direct laryngoscopy is used in trauma patients. In another study, it was observed that the first pass success

rate was 1/16 when direct laryngoscopy was used in intubation of trauma patients, while this rate increased to almost 100% when videolaryngoscopy was used. The increase in the number of intubation attempts seems to be directly proportional to the increase in complication rates. Therefore, if adequate technical equipment is available, videolaryngoscope should be the first choice for intubation of trauma patients (3-5, 9, 17, 19, 26).

Except for the first pass success, it has been commented that videolaryngoscope will reduce cervical mobilization and accordingly reduce the possibility of secondary injury. Although there are not enough studies for this, it would not be wrong to interpret that there will be less cervical mobilization due to easier visualization of the vocal cords (5, 8, 19, 20, 26).

Unfortunately, there is no answer to the question of which videolaryngoscope we should prefer. The practitioner can use any device provided in line with the preferences of the clinic (19).

Manual In-Line Stabilization

Although the cervical collar worn in trauma patients is a recommended aid for cervical vertebra stabilization, it is seen as a tool that complicates airway management. In order to continue cervical stabilization and to get rid of the negative effects of the cervical collar, a technique called "manual in line stabilization (MILS)", which can be translated as manual fixation, is used in trauma patients. However, there are reports that this technique also has negative effects on intubation success. It is argued that the first pass success decreases in patients using the MILS technique. In addition, some publications state that the use of a cervical collar also decreases the first pass success and argue that the collar should be removed. On the other hand, removal of the cervical collar is thought to affect cervical stabilization badly (15, 27, 28).

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It is known that the need for a surgical airway is a very common situation in emergency practice. However, every emergency physician must master this practice. Although it is rare, this intervention is life-saving when there is no other option. Surgical airway may be required in trauma patients, especially in maxillofacial trauma. In the study by Levitan et al. only 2 trauma patients needed surgical airway in 3 years (11).

It should be kept in mind that this procedure may become somewhat more difficult in trauma patients. Trauma-related deformities or problems such as bleeding/hematoma around the trachea may make localization of the cricothyroid membrane difficult. Therefore, the practitioner who will approach the anterior neck in trauma patients must be trained and experienced in this field. The easiest way to

provide adequate training for this rare condition is model and/or cadaver practice. As with all other interventional procedures, practice is essential for surgical airway (6, 7, 19, 20, 29).

In cases where the cricothyroid membrane may be difficult due to problems in trauma patients, it may be appropriate to use ultrasonography to solve this difficulty. With ultrasonography, the cricothyroid membrane can be localized noninvasively and the procedure can be continued. It would not be wrong to include ultrasonography device in the surgical airway materials in trauma patients because it will both speed up and reduce possible complications (19).

Awake Intubation

Unfortunately, flexible intubation is not a widely used technique in emergency clinics. Both the cost of the device and the time-consuming application of the technique and the fact that other alternatives, which are often applied more rapidly than this procedure, are preferred in intubations performed in emergency departments seem to explain this situation.

In trauma patients, there are not enough studies on this technique known as awake intubation or flexible intubation. Therefore, it is not possible to objectively evaluate the possible pros and cons of the method (9, 13, 15, 19, 24).

Awake intubation also requires practitioner practice. If it is among the airway management preferences of the clinic, it is obvious that practical trainings should be organized at appropriate intervals.

Conclusion

Although there are various studies addressing airway management in trauma patients, there is no definitive recommendation in the literature. The inadequate level of evidence of the existing recommendations is evidence of the need for more studies in this field.

Nevertheless, it would not be wrong to suggest that the choice should be made in line with the injury mechanisms and clinical condition of trauma patients, the experience of the practitioner and the technical facilities of the clinic. Of course, repeating theoretical and practical trainings at regular intervals and increasing the practitioner experience can be presented as another recommendation.

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