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Airway management by the general practitioner in trauma patients. Technical and non-technical skills

*Manejo de la vía aérea por el médico general en paciente traumatizado.**Habilidades técnicas y no técnicas*

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| Abstract |

General practitioners must constantly face challenges imposed by their profession when performing interventions that are necessary for their patients. Many of these interventions not only require proper use of theoretical knowledge, but also putting into practice non-technical and psychomotor skills developed through professional training. Given the specific characteristics of each patient, the clinical setting in the which procedure takes place and the limited skills of the professional, the management of the airway of a patient with trauma injuries in the emergency room represents a major challenge for physicians.

Keywords: Physician; Trauma; Primary Health Care; Learning; Complications (MeSH).

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| Resumen |

El médico general con frecuencia debe enfrentarse a los retos impuestos por su profesión realizando de manera efectiva intervenciones vitales para los pacientes. Muchas de estas intervenciones requieren no solo del uso de conocimientos teóricos sino también de la puesta en práctica de habilidades psicomotoras y no técnicas desarrolladas a lo largo de la formación profesional. Debido a las características particulares de cada caso, al escenario clínico en el cual se debe realizar el procedimiento y a las habilidades limitadas del profesional, el manejo de la vía aérea en el paciente en urgencias (traumatizado) representa un gran reto para los médicos.

Palabras clave: Trauma; Atención primaria; Aprendizaje (DeCS).

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Introduction

A general practitioner must be able to perform complex procedures in critical situations, since this is crucial for saving the lives of patients in chronic state. A timely and effective intervention in these situations increases patient survival rates, reduces the consequences and represents a profit on the economic burden to the health system (1).

Given its importance in the initial approach to the trauma patient, management of the airway is presented as one of the critical challenges for both pre-hospital care and primary emergency care. Management of airways corresponds to letters A and B of the initial assessment and treatment approach (ABCDE) to a politraumatized patient.

Permeabilizing and securing the airway allows protection and control of ventilation assistance, which becomes the main issue in most trauma patients (2,3). Thus, the physician should not be an inexperienced professional and, instead, must have the relevant knowledge and skills required to perform a complete, faster, timely and appropriate management of the airway in these patients.

Airway management

Managing the airway became highly important in the clinical practice in the early twentieth century, when the American Society of Anesthesiologists (ASA) showed that adverse events associated with its mishandling were the main cause of morbidity and mortality during anesthesia (4). Surprisingly, it was established that most adverse events and complications (75%) were caused by poor procedures and that a large number of them (70%) were considered preventable (5).

Practices in the major in Medicine

The skills required for good management of the airway are based on the acquisition of declarative (knowing why) and procedural knowledge or training knowledge (knowing how) and on familiarity with different devices, techniques and algorithms for the

procedure; psychomotor skills can be acquired in simulation labs and the competences in hospitals directly with patients.

Students must carry out clinical practice in the hospital context, where their integration with the medical team is tested and have to gradually show a proper and comprehensive performance (6). The type of training received in the academy and the progressive delegation under close monitoring of these clinical activities are crucial for quality and sufficient clinical performance, while they contribute to reduce complications of cases by more than 50% (1,5,7,8).

Importance of airway management in critically ill patients

Securing the airway and monitoring ventilatory patterns in critically ill patients are determining factors for patient recovery and for the decrease of inpatient stay time in critical care units. During this procedure, tracheal intubation is the Gold Standard, which is why knowing how to do it and previous experience in simulation laboratories and hospital environment is essential for the professional, so that he has enough competence to practice it. There is evidence that multiple attempts or failures when performing this procedure lead to extended periods of apnea, making the patient undergo hypoxia, hypoventilation and trauma of the pharyngo-laryngeal tissues, which can further compromise survival (8).

The NAP (National Audit Project) report by the Royal College of Anesthetists and the Difficult Airway Society from the United Kingdom 2011 (9) showed that 23% of deaths are related to failure in recognizing esophageal intubation in the emergency room and in the intensive care unit (ICU), and also that physicians with limited experience in managing the airway are involved.

The study by Mort (10), with more than 10 000 emergency intubations outside the operating room performed by doctors who were not anesthesiologists, found multiple intubation attempts associated with morbidity and mortality; the following figures were obtained when such attempts were compared against successful intubations: high rates of hypoxemia (70% vs. 11.8%), regurgitation of gastric contents (22% vs. 1.9%), aspiration (13% vs. 0.8%), bradycardia (21% vs. 1.6%) and cardiac arrest (11% vs. 0.7%). These data led to conclude that airway management requires not only knowledge, but also appropriate devices and alternative techniques, which include plans and handling algorithms, and a health team with optimal non-technical skills.

The difficulties and complications (Figure 1) occur more frequently with emergency intubation, which occurs in 20% of interventions performed. In addition, patients with severe trauma have a higher incidence of adverse events and more severe complications. The conditions that can aggravate these probabilities include environmental factors (context), intrinsic patient factors, lack of instrumentation (devices) proper materials and difficulties for monitoring (8).

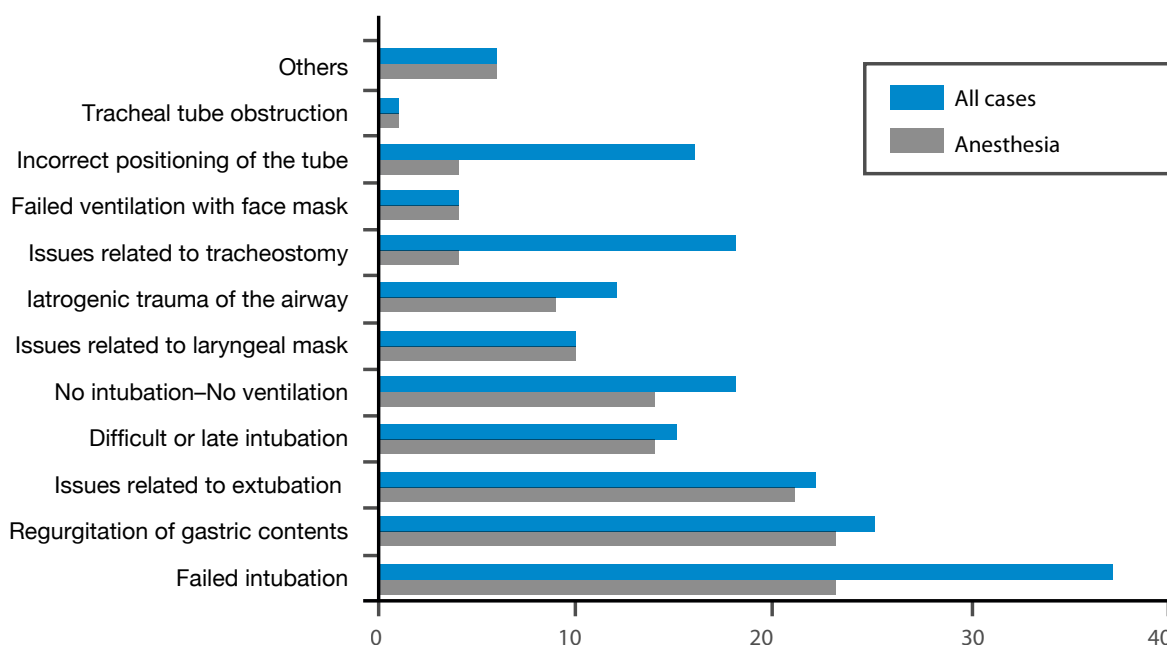


Figure 1. Main problems found when managing airway reported in the NAP4 2011 study. Source: Own elaboration based on Cook *et al.* (11).

Human errors (including misjudgment, lack of use of the check list, technical failures, negligence, rush, inexperience, and communication and equipment problems) were determined as the cause of more than 80% of critical incidents. It is relevant to highlight that miscommunication and poor performance in teamwork (11) are skills that are not considered technical but cognitive, social and personal resources that complement the technical skills and contribute to the correct execution of a task safely and efficiently; these skills are not taught or reinforced in the educational environment (12).

In the NAP5 report, Tim and Pandit attributed adverse events during anesthesia practice to preventable errors (75-90% of cases) due to problems of education and lack of training (13).

It has been observed that, when handling the airway, serious complications have been judged in retrospect as suboptimal or poor quality in over 75% of cases; similarly, poor communication and the difficulty of teamwork contribute greatly to the poor results obtained (11).

Training in technical and non-technical skills

Current workshops on airway management have focused on theoretical knowledge and technical skills, with few hours of practice, ignoring non-technical skills which are key for the organization, leadership, successful team behavior, handling of

stressful situations, among others. These non-technical skills allow integrating medical knowledge with what is currently known as acquisition of skills; therefore, performing additional procedures and having an appropriate interaction with the environment and other actors who are in the environment can be achieved (5,14).

Enough practice time should be scheduled for acquiring the necessary skills for airway management. On average, more than 50 interventions or practices are required to achieve a success rate of 90% (15), of which 18% requires expert assistance after 80 intubations; this depends on the difficulty that securing the airway represents due to the characteristics of the patient (obesity, micrognathia, scars on the neck, limited mouth opening, difficult head extension, etc.) (15).

The learning process should consider all available resources throughout medical training, so that the student can obtain knowledge and technical and non-technical skills. Kennedy *et al.* (16) analyzed education based on the use of simulators for learning technical skills to manage the airway, finding that the simulation, as a learning method, was superior to “no intervention” to acquire skills and knowledge, and greater than “no intervention simulation” to learn skills but not to gain a comprehensive understanding. However, despite improvements and continuous studies like this, intended to optimize simulation-based training, no consistent results have been obtained so far (15,17).

Given these findings, new models of medical education should be developed to allow students to acquire, from their early stages of training, technical and non-technical knowledge through case discussions (clinical reasoning) or actual situations in which they must face, not only the clinical problem, but also the environment and teamwork (18,19). This practice-based model (demonstrative interventions) can also help achieve and maintain in force the objective of managing the airway efficiently by the health care professional (6,20).

In conclusion, medical schools must rethink the role of doctors when providing training on primary care of patients requiring critical interventions. Safe approach to the airway and tracheal intubation (gold pattern) are situations for which the future professional must be trained, not only for acquiring technical skills but also non-technical skills, since this theoretical and practical knowledge allows interventions, first, in a simulation lab and then in a clinical setting, to acquire skills and achieve optimal clinical performance with patients.

Conflict of interests

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