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Review

Airway anatomy for the bronchoscopist: An anesthesia approach[☆]



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ABSTRACT

Introduction: Knowledge and the development of skills in airway management is one of the core competencies in the training of the anesthesiologist. “Know how” and “Knowing to do well and fast” are decisive under certain critical situations that may arise in the management of anesthesia. Bronchoscopy is a useful diagnostic and therapeutic procedure. Knowledge of the technique and airway anatomy is the cornerstone of bronchoscopy; however, there are anatomical variations and different airway classifications.

Objective: To describe the airway anatomy by means of schematic representations, to assess anatomical variations and to learn about the characteristics of the procedure.

Methodology: A non-systematic review of databases (PUBMED/MEDLINE, Science Direct, OVID, SciElo) was undertaken using the following.

Results and conclusions: Bronchoscopy is a useful surgical and diagnostic procedure for different applications. The anatomical variations of the airway are only present in a small percentage of the population. Anatomical classifications are both anatomically and numerically diverse; however, what is really relevant is to develop a spatial relationship. Bronchoscopy is a technique that evolves simultaneously with other technical biomedical breakthroughs and is a procedure that the anesthesiologist must explore further in order to accomplish better outcomes in anesthesia.

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Anatomía de la vía aérea para el broncoscopista. Una aproximación a la anestesia

R E S U M E N

Palabras clave:

Broncoscopia
Anatomía
Manejo de la vía aérea
Anestesia
Neumología

Introducción: El conocimiento y desarrollo de habilidades en el manejo de la vía aérea es una de las competencias importantes en la formación del anestesiólogo; el “saber” y el “saber hacer bien y rápido” son determinantes en algunas situaciones críticas a las que se puede enfrentar durante el manejo anestésico. La broncoscopia es un procedimiento útil tanto diagnóstico como terapéutico. El conocimiento de la técnica y de la anatomía de la vía aérea constituye el pilar de la broncoscopia, encontrando diferentes variaciones anatómicas y clasificaciones de la vía aérea.

Objetivo: Describir la anatomía de la vía aérea a través de esquemas, evaluar variaciones anatómicas y conocer características propias del procedimiento.

Metodología: Con las palabras clave “Bronchoscopy”, “Anatomy”, “Airway” y “Anesthesia” se realizó una revisión no sistemática en bases de datos (PUBMED/MEDLINE, Science Direct, OVID, SciElo).

Resultados y conclusiones: La broncoscopia es un procedimiento útil en el plano quirúrgico y diagnóstico, siendo utilizado en distintos procedimientos. Las variaciones anatómicas de la vía aérea se presentan en un porcentaje pequeño de la población. Las clasificaciones anatómicas son diversas tanto anatómica como numéricamente; sin embargo, lo relevante es desarrollar una relación espacial. La broncoscopia es una técnica que va en desarrollo paralelo a otros avances de la tecnología biomédica, es un procedimiento del cual el anestesiólogo debe investigar más con el fin de generar mejores efectos en el campo de la anestesiología.

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Introduction

Bronchoscopy is a diagnostic and therapeutic procedure to visualize the airway and its pathological alterations. In the last few decades bronchoscopy has enabled complementary procedures such as biopsies that have been adopted into management protocols for specific groups of patients. Advances in this area have been led by pulmonologists, but fortunately this knowledge has been disseminated and is now part of the training of other specialties like anesthesiology and intensive care,^{1,2} resulting in a valuable contribution to diagnostic and therapeutic procedures. Several training programs for residents have been forced to include bronchoscopy training into their syllabus as a must-have skill. Currently, fibro-bronchoscopy in anesthesia is key for difficult airway management algorithms, as well as for pulmonary support techniques endorsed by different publications.

Methodology

Non-systematic literature review both in English and Spanish, with no time restrictions, using PUBMED/MEDLINE, Science Direct, OVID and SciElo databases, complemented with articles referenced in the above search. The following words were used in English: Bronchoscopy, Anatomy, Airway, and Anesthesia, while in Spanish the terms used were: Broncoscopia, anatomía, vía aérea and anestesia. Both the search and the

selection of articles were done independently, with no restrictions as to the type of publication.

Characteristics of the procedure and anesthesia considerations

Knowledge of the upper and lower airway structures, including any anatomical alterations, is critical for a sound diagnostic or therapeutic practice. Particularly when pulmonary insulation is required, proper positioning of the device has to be ensured; otherwise, the surgeon may be challenged with hypoxemia, mechanical complications and surgical technique difficulties.^{3,4}

Bronchoscopy is useful as part of the training in these disciplines and is indicated under different situations (Table 1).

In order to undertake bronchoscopy procedures, a complete work team and instrumentation are needed, including as a minimum monitoring devices and crash cart with all the pharmacological tools. The bronchoscope must be carefully operated to prevent breakage of the optical fiber. The recommendation is to lubricate with distilled water and avoid using any gels.

Bronchoscopy may be done orally or nasally⁵; however, the decision to use a nasal approach depends on the associated comorbidities and any potential structural alterations the patient may have. It is critical to identify upper airway hemoptysis to determine the right approach. Several work groups are

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