



Revista Colombiana de Anestesiología

Colombian Journal of Anesthesiology

www.revcolanest.com.co



Scientific and Technological Research

Estimation of the optimum length of endotracheal tube insertion in adults[☆]



Juan Camilo Gómez^{a,*}, Lina Paola Melo^b, Yuliana Orozco^b, Gustavo Adolfo Chicangana^c, Diana Carolina Osorio^c

^a Anesthesiologist, Director of Anesthesiology, Universidad de Caldas, Manizales, Colombia

^b Anesthesiologist, Universidad de Caldas, Manizales, Colombia

^c Third Year Anesthesiology Resident, Universidad de Caldas, Manizales, Colombia

ARTICLE INFO

Article history:

Received 9 February 2016

Accepted 1 May 2016

Available online 11 June 2016

Keywords:

Bronchoscopy

Intubation

Airway management

Adult

Intraoperative complications

ABSTRACT

Introduction: An accurate estimation of the optimal length of endotracheal tube insertion can prevent complications such as endobronchial intubation, airway trauma and accidental extubation, all of which have a negative impact on patient safety and are associated with an increase in both morbidity and mortality.

Objective: To determine the optimal insertion length of endotracheal tubes in female and male adults according to their height.

Materials and Methods: A cross-sectional analytical study conducted with 516 adult ASA I-II female and male patients who had different surgical procedures requiring endotracheal intubation. The mouth-carina distance was obtained using a flexible fiberoptic bronchoscope. The data analysis was performed using the SPSS 15.0 software.

Results: Height and mouth-carina distance showed a direct and statistically significant correlation. Two equations for estimating optimal endotracheal insertion length were obtained, according to sex: men = $11.413 + (0.072 \times \text{height in cm}) - 3$; and women = $13.555 + (0.056 \times \text{height in cm}) - 3$.

Conclusion: The traditional method of determining the insertion length of the endotracheal tube, 21 cm for women and 23 cm for men, shows a high incidence of endobronchial intubations in the analyzed population. The optimal insertion depth of the endotracheal tube can be reliably estimated through the use of prediction equations based on patient height, as proposed in this study.

© 2016 Published by Elsevier España, S.L.U. on behalf of Sociedad Colombiana de Anestesiología y Reanimación.

[☆] Please cite this article as: Gómez JC, Melo LP, Orozco Y, Chicangana GA, Osorio DC. Estimación de la longitud óptima de inserción del tubo orotraqueal en adultos. Rev Colomb Anestesiolog. 2016;44:228-234.

* Corresponding author at: calle 68^a N° 9-100, casa 23, conjunto residencial Rincón de la Palma, Manizales, Colombia.

E-mail address: juan.gomez@ucaldas.edu.co (J.C. Gómez).

2256-2087/© 2016 Published by Elsevier España, S.L.U. on behalf of Sociedad Colombiana de Anestesiología y Reanimación.

Estimación de la longitud óptima de inserción del tubo orotraqueal en adultos

R E S U M E N

Palabras clave:

Broncoscopía
Intubación
Manejo de la vía aérea
Adulto
Complicaciones intraoperatorias

Introducción: Una correcta estimación de la longitud óptima de inserción del tubo orotraqueal puede prevenir complicaciones como: intubación endobronquial, trauma de la vía aérea y extubación accidental, las cuales inciden de manera negativa en la seguridad del paciente y se asocian con aumento en la morbimortalidad.

Objetivo: Determinar la longitud de inserción óptima del tubo orotraqueal a partir de la talla en pacientes adultos de ambos sexos.

Materiales y métodos: Estudio analítico de corte transversal en 516 pacientes adultos de ambos sexos, ASA I o II, intervenidos quirúrgicamente, quienes requirieron intubación orotraqueal durante su procedimiento. La distancia boca-carina fue obtenida con la ayuda de un fibrobroncoscopio. El análisis de datos se efectuó con el software SPSS 15.0.

Resultados: La talla y la distancia boca-carina mostraron una correlación directa y estadísticamente significativa. Se obtuvieron dos ecuaciones para estimar la longitud de inserción óptima del tubo orotraqueal discriminadas según el sexo: hombres = $11,413 + (0,072 \times \text{talla en cm}) - 3$; mujeres = $13,555 + (0,056 \times \text{talla en cm}) - 3$.

Conclusión: El método tradicional para establecer la longitud de inserción del tubo orotraqueal de 21 cm para mujeres y de 23 cm para hombres, muestra una alta incidencia de intubaciones endobronquiales en la población estudiada. La longitud de inserción óptima del tubo orotraqueal se puede determinar de forma segura a partir de las ecuaciones de predicción, basadas en la talla, propuestas en este estudio.

© 2016 Publicado por Elsevier España, S.L.U. en nombre de Sociedad Colombiana de Anestesiología y Reanimación.

Introduction

The incorrect placement of an endotracheal tube can lead to serious complications including endobronchial intubation, vocal cord paralysis, accidental extubation, collapsed lung, hypoxemia, and pulmonary barotrauma, among others.^{1,2} Endobronchial intubation is the most common critical incident that can cause arterial desaturation during orotracheal intubation. According to the ASA Closed Claims Project, selective intubation accounts for 2% of adverse respiratory events in adults,³ and considering the more serious or fatal consequences of these events, including cerebral damage in up to 85% of patients,⁴ the correct placement of the tip of the endotracheal tube is a vital element in the practice of anesthesiology and emergency and critical care medicine.

There are many methods to check the placement of the endotracheal tube, including the clinical method (auscultation of respiratory sounds, observation of the symmetry of chest expansion), palpation techniques (palpation of the endotracheal cuff in the suprasternal notch), imaging methods, capnography, direct visualization of the tip of the tube in relation to the carina using a fiberoptic bronchoscope¹ and ultrasound,⁵ by either visualizing the tube directly in the airway or corroborating bilateral pleural sliding using a linear probe. However, these methods are not always based on evidence, nor are they always cost effective or applicable to every scenario of a given situation.¹

Some authors have found that in 28% of patients with cardiac arrest, intubated by staff trained in advanced life support,

the tip of the tube was endobronchial.^{6,7} Using the traditional insertion method of the endotracheal tube of 21 and 23 cm in women and men respectively as proposed in the literature several years ago,⁸ some publications show figures of more than 33.4% of endotracheal tubes incorrectly placed,^{9,10} this being a more frequent adverse event in women than in men (61.9% vs 38.1%).² This gap is not considered ideal and is a big unknown when referring to populations with different anatomical proportions to those used in the initial study.

These considerations then raise the question: in adult patients requiring orotracheal intubation for whatever reason, what is the optimal distance for endotracheal tube insertion?

After an exhaustive search of all available electronic databases (Medline, Embase and Virtual Health Library), no literature was found that dealt with Latin American or Colombian populations.

Based on this, the objective of this study was to determine the length of optimum insertion of the endotracheal tube based on height for patients undergoing surgical procedures using intubation in two local tertiary hospitals.

Materials and methods

A cross-sectional study was conducted with a total population of 516 adults of both sexes, between the ages of 18 and 90, undergoing surgery in the Santa Sofía and SES Hospitals in

Download English Version:

<https://daneshyari.com/en/article/2755747>

Download Persian Version:

<https://daneshyari.com/article/2755747>

[Daneshyari.com](https://daneshyari.com)