Ultrasound Guided Airway Block In Patients With Difficult Intubation

An Essay

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Presented by

Omnia Sobhy Mousa Abd Elmaksoud
M.B., B.Ch
Faculty of Medicine, Ain Shams University

Supervised by

Prof. Dr. Amir Ibrahim Mohamed Salah

Professor of Anesthesiology, Intensive Care & Pain Management
Faculty of Medicine, Ain Shams University

Prof. Dr. Waleed Abd ElMaged Mohamed ElTaher

Professor of Anesthesiology, Intensive Care & Pain Management
Faculty of Medicine, Ain Shams University

Dr. Sabah Naguib Barsoom

Lecturer of Anesthesiology, Intensive Care & Pain Management
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University

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التخدير الموضعى لمجرى الهواء الصعب استرشادا بالموجات الفوق صوتية

رسالة

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كلية الطب . جامعة عين شمس

تحت إشراف

أ.د/ أمير ابراهيم محمد صلاح

أستاذ التخدير والرعاية المركزة وعلاج الألم

كلية الطب- جامعة عين شمس

أ.د/ وليد عبد المجيد محمد الطاهر

أستاذ التخدير والرعاية المركزة وعلاج الألم

كلية الطب- جامعة عين شمس

د/ صباح نجيب برسوم

مدرس التخدير والرعاية المركزة وعلاج الألم

كلية الطب- جامعة عين شمس

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بسم الله الرحمن الرحيم

قالوا

سبحانك لا علم لنا

إلا ما علمتنا إنك أنت

العليم الحكيم

صدق الله العظيم

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List of Abbreviations

AAG	:	Alpha-1-acid glycoprotein
ASA	:	The American Society of Anesthesiologists
BJA	:	Biritsh journal of anathesia
BMI	:	Body Mass Index
CCA	:	Common Carotid Artery
CT	:	Computed Tomography
DAS	:	Difficult Airway Society
DI	:	Difficult intubation
DMV	:	Difficult mask ventilation
ETT	:	Endotracheal tube
G6PD	:	Glucose-6-phosphate dehydrogenase deficiency
GABA	:	Gamma Aminobutyric Acid
GPN	:	Glossopharyngeal Nerve
LAs	:	Local Anesthetics
LAX	:	Long axis
MRI	:	Magnetic resonance imaging
OR	:	Operation Room
PABA	:	Para Amino Benzoic Acid
PPW	:	Posterior pharyngeal wall
RA	:	Regional Anesthesia
SAD	:	Supraglottic airway device
SARI	:	The simplified airway risk index
SAX	:	Short axis
SGA	:	Supraglottic airway
SLA	:	Superior laryngeal artery
SLN	:	Superior laryngeal nerve
STA	:	Superior thyroid artery
THM	:	Thyrohyoid membrane
TMJ	:	Temporo-mandibular joint
US	:	Ultrasound.

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Abstract

Providing anesthetic care to the patient with a difficult airway keenly interests anesthesiologists and is a situation that often provokes much anxiety and trepidation. However, dealing effectively and safely with these patients is a skill that all anesthesiologists should be familiar with and are expected to perform with competency. While there are many methods that may be used to provide anesthesia to the airway, descriptions of these methods tend to be widely scattered throughout various textbooks and journals, and the choice of which method to use is often based on limited information, such as institutional tradition and personal experience. Therefore, we will cover the neuroanatomy of the upper airway and then describe several techniques that can be used to provide airway anesthesia.

As airway assessment, investigation and management becomes increasingly refined, the search for a single, reliable predictor of the difficult airway continues. A number of bedside tests are available to the anesthetists wishing to make an assessment for features which might predict potential airway difficulties.

Key word: LAX: Long axis, SAD: Supraglottic airway device, BMI: Body Mass Index, AAG: Alpha-1-acid glycoprotein

Introduction

Anesthesiologist must be prepared to deal with problems in management of difficult airway at any time. Difficult intubation can either be anticipated or unanticipated, An anesthesiologist must be aware of the possibility of both situations to arise and preparations must be taken to deal with such cases and improve the safety of our patients. Practice guidelines are systematically developed recommendations that help anesthesiologists in the management of difficult airway ***(Novak., 2012).***

A difficult airway is defined as the clinical situation in which a conventionally trained anesthesiologist experiences difficulty with face mask ventilation and/or difficulty with tracheal intubation. Difficult mask ventilation is defined as the inability of a trained anesthesiologist to maintain oxygen saturation >90%, using a face mask, 100% oxygen and positive pressure ventilation. Difficult intubation is defined as the need for more than three attempts for intubation of the trachea to achieve it. The incidence of difficult mask ventilation is estimated to be 0. 9%-5%, and the incidence of difficult intubation is 0. 13%-13%. The major complications associated with the difficult airway include death, hypoxic brain injury, cardiopulmonary arrest, unnecessary tracheotomy, airway trauma including aspiration of gastric contents, and damage of soft tissues and teeth ***(Kheterpa., 2006).***

Airway anesthesia is pivotal for successful awake intubation provided either topically or by blocks. Airway blocks are considered technically more difficult to perform and carry a higher risk of complications. However, in experienced hands, they can be useful as they provide excellent intubating conditions. For complete upper airway anesthesia, bilateral glossopharyngeal and superior laryngeal nerve blocks with translaryngeal injection are required. Superior laryngeal nerve block and translaryngeal injection can be performed easily, safely and with a high success rate in patients with normal anatomy In those with difficult landmarks, ultrasound can be of assistance ***(Pintarič, 2015).***

Ultrasound can offer several advantages when used to guide placement of the needle for nerve blocks. It is noninvasive, safe, simple to use, can be performed expeditiously, provides real-time images, is devoid from adverse effects, and it may be beneficial in patients with abnormal or variant anatomy ***(Chen et al., 2010)***.

Aim of the work

The aim of the work is to highlight:

1. Assessment of difficult airway.
2. Algorithms of management of difficult airway.
3. Techniques of airway block
4. Ultrasound uses for separate nerve block of the airway.

Prediction of Difficult intubation

Anatomy of the upper airway:

The human airway could be divided by an imaginary line passing through the larynx at the level of the vocal cords into upper airway including "oral and nasal cavities, pharynx and supra-glottic part of the larynx" and lower airway including "sub-glottic part of the larynx, trachea, right and left main bronchi and bronchopulmonary segments ***(Hutton, 2002).***

I. The Nose

Each nasal fossa is convoluted and provides about 60cm² surface areas per side for warming and humidifying the inspired air. The nose is also able to prewarm inspired air to a temperature of 32°C to 34°C, over a wide range of ambient temperatures from 8°C to 40°C. The nasal fossa is bounded laterally by inferior, middle, and superior turbinate bones (conchae) which divide the fossa into scroll-like spaces called the inferior, middle, and superior meatuses. The arterial supply to the nasal cavity is mainly from the ethmoid branches of the ophthalmic artery, the sphenopalatine and greater palatine branches of the maxillary artery, and the superior labial and lateral nasal branches of the facial artery ***(Thomas et al., 2009).***

Kiesselbach's plexus, which lies in Kiesselbach's triangle, or Little's area, is a region in the anteroinferior part of the nasal septum where four arteries (anterior ethmoidal artery, sphenopalatine artery, greater palatine artery, septal branch of superior labial artery) anastomose to form a vascular plexus Fig. (1). The nerve supply is through trigeminal nerve for general sensations and olfactory nerve for sense of smell ***(Thomas et al., 2009).***

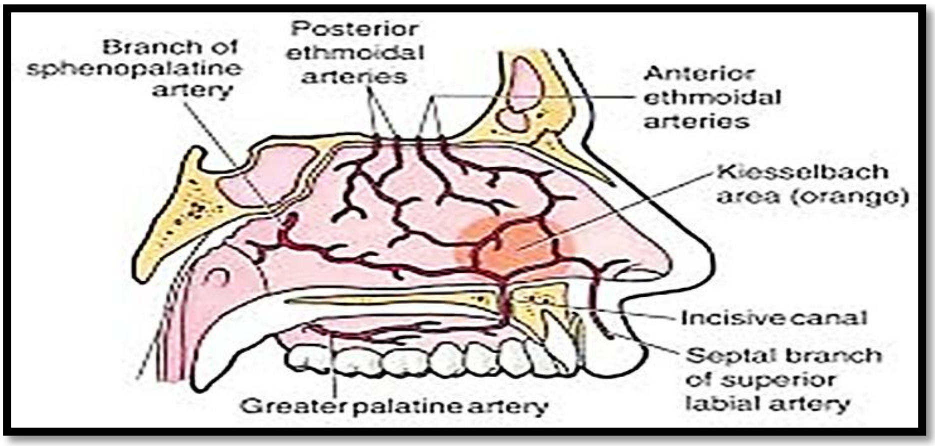

Figure (1): Kiesselbach's plexus ***(Murphy, 2012).***

Septal deviation occurs commonly, and can impede passage of a nasal endotracheal tube (ETT), as can a hypertrophied inferior turbinate. The space between the inferior turbinate and the floor of the nasal cavity, termed the "major nasal airway", is oriented slightly downward. During an attempted nasal intubation, the ET tube should therefore be directed straight back and slightly inferiorly. This will help traverse the widest aspect of the nasal airway, beneath the inferior turbinate, while avoiding the thin bone of the more superiorly located cribriform plate.