Updates for Anesthetic Management of the Shared Airway

An Essay
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DEDICATION

This work is dedicated to ***my great mother, my father*** *and* ***rest of my family*** *who stood beside me through my entire life and gave me all the support.*

Dear parents *nothing deserves to be back for your great deed.*

Thank ***you*** *for everything.*

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Abstract

Anesthesia for shared airway surgeries provides an extensive range of challenges for the anesthesiologist and the surgeon, as the complicated nature of these procedures demands nothing less than complete cooperation between these two specialties.

Surgical procedures vary from routine endoscopic examination to complex microsurgery and laser surgery of the larynx, maxillofacial and dental surgery, craniofacial abnormalities and some E.N.T. procedures. The patient population varies from neonates to the elderly.

The anesthesiologist will provide mask anesthetics, spontaneous or jet ventilation, controlled hypotension, and extubations during light levels of anesthesia to avoid postoperative pulmonary complications.

The anesthetic considerations include: dealing with the difficult airway; the risk of obstruction, transaction, disconnection or removal of the airway intra-operatively; the risk of soiling of the airway due to bleeding and surgical debris and the potential for airway compromise post-operatively.

Key word: E.N.T – COX- DMV- NHZ- Polysomnography

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List of Abbreviations

AHI	Apnea Hypoxia Index
ANSI	American National Standards Institute
ASA	American Society of Anesthesiology
BMI	Body Mass Index
CAD	Coronary Artery Disease
CDs	Compact Disks
CNS	Central Nervous System
CO_2	Carbon dioxide
COPD	Chronic Obstructive Pulmonary Disease
COX	Cyclo-oxygenase
CPAP	Continuous Positive Airway Pressure
CSF	Cerebro Spinal Fluid
CT	Computed Tomography
DDAVP	1-deamino-8-D-argininevasopressin
DI	Difficult Intubation
DMV	Difficult Mask Ventilation
DVDs	Digital Video disks
ECG	Electrocardiogram
ENT	Ear, Nose, and Throat
FESS	Fiber-optic Endoscopic Sinus Surgery
FEV_1	Forced Expiratory Volume in one second.
Kg	Kilogram

LASER	Light Amplification by Stimulated Emission of Radiation
LMA	Laryngeal Mask Airway
MAC	Minimal Alveolar Concentration
mg	Milligram
mL	Milliliter
MRI	Magnetic Resonance Imaging
N_2O	Nitrous oxide
Nd: YAG	Neodymium- yttrium- aluminum-garnet
NHZ	Nominal hazard zone
NIM	Nerve Integrity Monitor
nm	Nanometer
NSAID	Non steroidal anti-inflammatory drugs
O_2	Oxygen
OSAS	Obstructive Sleep Apnea Syndrome
PEEP	positive end-expiratory pressure
PONV	Postoperative nausea and vomiting
PSG	Polysomnography
Psi	Pound per square inch
PTH	parathyroid hormone
PVC	polyvinyl chloride
RAE	Right Angle endotracheal tube
RDI	Respiratory Distress Index
REM	Rapid Eye Movement sleep
RPS	Retropharyngeal Space
RTI	Respiratory Tract Infection

RUB	Right Upper lobe Bronchus
$t^1/_2$	Plasma half life
TIVA	Total Intravenous Anesthesia
UPPP	Uvulopalatopharyngoplasty
URI	Upper Respiratory Infection
μg	Microgram

Introduction

Anesthesia for the shared airway requires close co-operation and communication between the anesthetist and the surgeon for the safety of the patient, a safe airway and an adequate surgical access. The anesthetist needs to maintain a patent airway, ensure adequate oxygenation, carbon dioxide removal and prevent soiling of the bronchial tree, while the surgeon requires adequate access, and -for certain endoscopic procedures- a clear view of a motionless field.[1]

Surgical procedures vary from routine endoscopic examination to complex microsurgery and laser surgery of the larynx, maxillofacial and dental surgery have developed with anesthesia, because of the mutual understanding that is necessary for safe and successful surgery on the "shared airway". Laser airway surgery requires special safety considerations for both operating theatre staff and patients due to the danger of deflected laser radiation and the risk of airway fire.[2]

Airway management with craniofacial abnormalities is a challenge with many variables. Anesthetist should be familiar with the anatomic and physiologic abnormalities of various craniofacial pathologies, such as cleft palate .[3]

No ideal universally accepted anesthetic technique exists to cover this wide range of shared airway cases. Anesthetic techniques can be divided into three main groups: First ; intubation techniques requiring the presence of either a small or large cuffed tracheal tube, second; non-intubation techniques include use of the laryngeal mask airway, apnoeic techniques and insufflation techniques and third ; jet ventilation techniques via a supraglottic, subglottic or transtracheal routes.[4]

The anesthetic considerations include: dealing with the difficult airway; the risk of obstruction, transection, disconnection or removal of the airway intra-operatively; the risk of soiling of the airway due to bleeding and surgical debris such as a tooth or bone fragment; and the potential for airway compromise post-operatively. Expired carbon dioxide monitoring ”Capnogram“ is the best in this situation, as it should indicate disconnection or obstruction whether or not the patient is breathing spontaneously.[5]

The choice of airway management technique is influenced by patient factors, surgical requirements and anesthetic preferences; a cuffed tracheal tube with a throat pack provides the highest level of airway protection in shared airway surgery. Nasal intubation is often used in certain procedures as in surgery on the jaws, teeth, oral cavity and neck, intermaxillary fixation (wiring of the jaws) and assessment of dental occlusion.[6]

The laryngeal mask airway (LMA) has an important role intra-operatively and provides smooth emergence from anesthesia. An elective tracheostomy should be considered if significant post-operative airway compromise is anticipated and may occasionally be necessary under local anesthesia before induction, [7] also using of flexible fiberoptic bronchoscopy is one of important tools for difficult airway.[8]

A new device was developed to deliver high-frequency jet ventilation via a laryngeal mask airway (LMA) during flexible fiberoptic bronchoscopy in anesthetized patients.[8]

- ***Aim of the work :***

This essay aimed to:

1. Review the anatomy of the airway.

2. Discuss the surgical procedures of the shared airway nature.

3. Discuss the anesthetic management of the shared airway.