Study of Effects of Soaking Oro-Pharyngeal Pack with Triamcinolone Acetonide in Ora-Base form on Postoperative Throat Discomfort in Patients undergoing Functional Endoscopic Sinus Surgeries

Thesis

Submitted for Partial Fulfillment
of Master Degree in ***Anesthesia***

By

Nouran Mohsen Ahmed Fahmy
M.B., B.Ch., Faculty of Medicine, AinShams University

Under Supervision of

Prof. Dr.Sherif Sayed Ali Sultan
Professor of Anesthesia, Intensive Care and Pain Management
Faculty of Medicine, Ain Shams University

Dr. Dalia Fahmy Emam
Lecturer of Anesthesia, Intensive Care and Pain Management
Faculty of Medicine, Ain Shams University

Dr. Mohamed Ibrahim Hasan
Lecturer of Anesthesia, Intensive Care and Pain Management
Faculty of Medicine, Ain Shams University

Faculty of Medicine, Ain Shams University
2019

سورة البقرة الآية: ٣٢

Acknowledgments

First and foremost, I feel always indebted to ***Allah*** *the Most Beneficent and Merciful.*

I wish to express my deepest thanks, gratitude and appreciation to ***Prof. Dr. Sherif Sayed Ali Sultan****, Professor of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, for his meticulous supervision, kind guidance, valuable instructions and generous help.*

Special thanks are due to ***Dr. Dalia Fahmy Emam****, Lecturer of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, for her sincere efforts, fruitful encouragement.*

I am deeply thankful to ***Dr. Mohamed Ibrahim Hasan****, Lecturer of Anesthesia, Intensive Care and Pain Management, Faculty of Medicine, Ain Shams University, for his great help, outstanding support, active participation and guidance.*

I would like to express my hearty thanks to all my family for their support till this work was completed.

Nouran Mohsen Ahmed Fahmy

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Abb.	Full term
ASA	*American Society of Anesthesiologists*
COX I	*Cyclooxygenase I*
COX II	*Cyclooxygenase II*
ECG	*Electrocardiography*
EtCO2	*End-tidal carbon dioxide*
ETT	*Endo-Tracheal tubes*
FESS	*Functional endoscopic sinus surgery*
GA	*General anaesthesia*
IL-1	*Interleukin 1*
IL-6	*Interleukin 6*
IQR	*Inter quartile range*
NIBP	*Non-invasive blood pressure*
NSAIDs	*Non steroidal anti-inflammatory drugs*
PONV	*Postoperative nausea and vomiting*
POST	*post-operative sore throat*
SpO_2	*Peripheral capillary oxygen saturation*
SPSS	*Statistical Package for Social Science*
TNF	*Tumor necrosis factor*
UK	*United Kingdom*
WRHA	*Winnipeg regional health authority*

INTRODUCTION

Post-operative throat complaints frequently arise after general anesthesia (GA) in the first 2 postoperative days, but they are of limited intensity and duration and often regard it as a relatively minor complication ***(El-Boghdadly et al., 2016).***

The main symptom reported after general anesthesia is post-operative sore throat (POST), but patients also report hoarseness of voice, and difficulty in swallowing (dysphagia)***(Tay et al., 2002).***

Etiological factors playing a significant role in this minor anesthetic complication are: size of the endotracheal tube, design and pressure of endotracheal tube cuff, the use of nasogastric tubes, lubricants, muscle relaxants, duration of surgery, surgery in and around the oral cavity, trauma arising from laryngoscopy, and use of pharyngeal packs***(Tay et al., 2002).***

Pharyngeal packs are commonly used during oral, nose, and throat surgeries to prevent aspiration, tracheal contamination and passage of blood into the stomach. They are disputed to increase the incidence of POST,but are important as surgery in and around the oral cavity necessitates them to suck blood and debris that result as consequence of surgery itself as well as to clear the surgical field ***(Rizvi et al., 2018).***

Aim of the Work

The aim of this study was to determine the effect of adding triamcinolone acetonide to Oro-pharyngeal packs on decreasing the postoperative throat discomfort.

Chapter 1

ANATOMY OF AIRWAY

Theupper airway consists of the pharynx, nose, mouth, larynx, trachea, and main-stem bronchi. The mouth and pharynx are also a part of the upper gastrointestinal tract. The laryngeal structures in part serve to prevent aspiration into the trachea ***(Butterworth et al., 2013).***

There are two openings to the human airway: the nose, which leads to the nasopharynx, and the mouth, which leads to the oropharynx. These passages are separated anteriorly by the palate, but they join posteriorly in the pharynx (Figure 1). The pharynx is a U-shaped fibromuscular structure that extends from the base of the skull to the cricoid cartilage at the entrance to the esophagus. It opens anteriorly into the nasal cavity, the mouth, the larynx, which divides into the nasopharynx, oropharynx, and laryngopharynx, respectively.The nasopharynx is separated from the oropharynx by the soft palate that extends posteriorly. At the base of the tongue, the epiglottis functionally separates the oropharynx from the laryngopharynx (or hypopharynx) ***(Ayappa et al., 2003).***

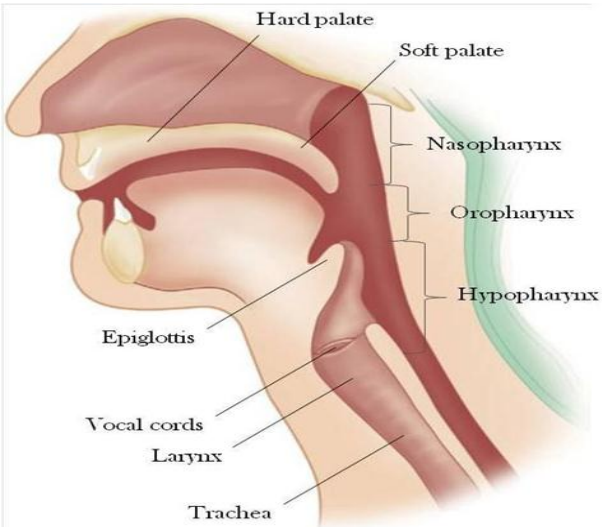

Figure 1: Anatomy of the airway ***(Morgan & Mikhail, 2013).***

The epiglottis prevents aspiration by covering the glottis (the opening of the larynx) during swallowing. The larynx is a cartilaginous skeleton held together by ligaments and muscle. The larynx is composed of nine cartilages (Figure 2): thyroid, cricoid, epiglottic, and (in pairs) arytenoid, corniculate, and cuneiform***(Butterworth et al., 2013).***

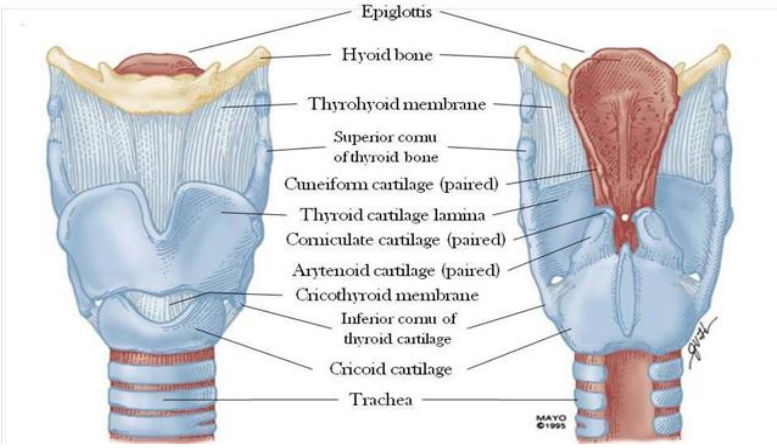

Figure 2: Cartilaginous structures comprising the larynx ***(Morgan & Mikhail, 2013).***

The sensory supply to the upper airway is derived from the cranial nerves (Figure 3). The mucous membranes of the nose are innervated by the ophthalmic division (V 1) of the trigeminal nerve anteriorly (anterior ethmoidal nerve) and by the maxillary division (V 2) posteriorly (sphenopalatine nerves). The palatine nerves provide sensory fibers from the trigeminal nerve (V) to the superior and inferior surfaces of the hard and soft palate ***(Ayappaet al., 2003).***

The olfactory nerve (cranial nerve I) innervates the nasal mucosa to provide the sense of smell. The lingual nerve (a branch of the mandibular division [V 3] of the trigeminal nerve) and the glossopharyngeal nerve (the ninth cranial nerve) provide general sensation to the anterior two-thirds and posterior one-third of the tongue, respectively. Branches of the facial nerve (VII) and glossopharyngeal nerve provide the sensation of taste to those areas, respectively. The glossopharyngeal nerve also innervates the roof of the pharynx, the tonsils, and the undersurface of the soft palate. The vagus nerve (the tenth cranial nerve) provides sensation to the airway below the epiglottis. The superior laryngeal branch of the vagus divides into an external (motor) nerve and an internal (sensory) laryngeal nerve that provide sensory supply to the larynx between the epiglottis and the vocal cords. Another branch of the vagus, the recurrent laryngeal nerve, innervates the larynx below the vocal cords and the trachea. The muscles of the larynx are innervated by the recurrent laryngeal nerve, with the exception of the cricothyroid muscle, which is innervated by the external

(motor) laryngeal nerve, a branch of the superior laryngeal nerve. The posterior cricoarytenoid muscles abduct the vocal cords, whereas the lateral cricoarytenoid muscles are the principal adductors ***(Butterworth et al., 2013).*** Table (1) showing the innervation of the laryngotracheal airway ***(Moore et al., 2013).***

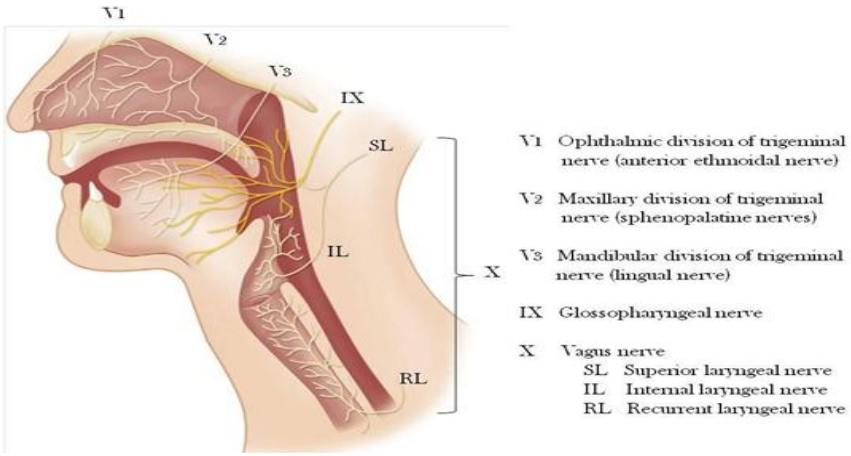

Figure 3: Sensory nerve supply of the airway ***(Morgan & Mikhail, 2013).***

Table 1: Innervation of the Laryngotracheal Airway ***(Moore et al., 2013)***

Nerve	Motor[a]	Sensory[a]
Glossopharyngeal nerve (cranial nerve IX)	None	Posterior 1/3 of tongue Epiglottis (rostral) Pharynx
Vagus nerve—recurrent laryngeal nerve (cranial nerve X)	Larynx (except cricothyroid)	Larynx: mucosal surface Trachea: mucosal surface
Vagus nerve—internal branch of the Supersior Laryngeal Nerve (cranial nerve X)	None	Epiglottis (dorsal) Vocal cords
Vagus nerve—external branch of the Supersior Laryngeal Nerve (cranial nerve X)	Cricothyroid	None

[a]Predominant action.

Table 2: Muscles of the Larynx (Innervation and Action) ***(Moore et al., 2013)***

Muscle	Innervation	Main Action(s)
Cricothyroid	External laryngeal nerve (from CN X)	Stretches and tenses vocal ligament
Thyro-arytenoid[a]	Recurrent laryngeal nerve (from CN X)	Relaxes vocal ligament
Posterior crico-arytenoid	Recurrent laryngeal nerve (from CN X)	Abducts vocal folds
Lateral crico-arytenoid	Recurrent laryngeal nerve (from CN X)	Adducts vocal folds (interligamentous portion)
Transverse and oblique arytenoids[b]	Recurrent laryngeal nerve (from CN X)	Adduct arytenoid cartilages (adducting intercartilaginous portion of vocal folds, closing posterior rima glottidis)
Vocails[c]	Recurrent laryngeal nerve (from CN X)	Relaxes posterior vocal ligament while maintaining (or increasing) tension of anterior part

From Moore KL, Agur AMR, Dalley AF. *Clinically Oriented Anatomy.* 7th ed. Philadelphia: Wolters Kluwer Health; 2013:Table 8-5, with permission.

Phonation involves complex simultaneous actions by several laryngeal muscles. Table (2) showing muscles of the larynx (innervation and action) Damage to the motor nerves innervating the larynx leads to a spectrum of speech disorders. Unilateral denervation of a cricothyroid muscle causes very subtle clinical findings. Bilateral palsy of the superior laryngeal nerve may result in hoarseness or easy tiring of the voice, but airway control is not jeopardized. Unilateral paralysis of a recurrent laryngeal nerve results in paralysis of the ipsilateral vocal cord, causing deterioration in voice quality.Assuming intact superior laryngeal nerves, acute bilateral recurrent laryngeal nerve palsy can result in

stridor and respiratory distress because of the remaining unopposed tension of the cricothyroid muscles ***(Toshiyaet al., 2005).***

Airway problems are less frequent in chronic bilateral recurrent laryngeal nerve loss because of the development of various compensatory mechanisms (eg, atrophy of the laryngeal musculature). Bilateral injury to the vagus nerve affects both the superior and the recurrent laryngeal nerves. Thus, bilateral vagal denervation produces flaccid, mid-positioned vocal cords similar to those seen after administration of succinylcholine. Table (3) showing the effect of laryngeal nerves injury on the voice. Although phonation is severely impaired in these patients, airway control is rarely a problem ***(Toshiyaet al., 2005).***

Table 3: The effect of laryngeal nerves injury on the voice ***(Toshiyaet al., 2005).***

Nerve	Effect of nerve injury
Superior laryngeal nerve	
▪ Unilateral	Minimal effects
▪ Bilateral	Hoarsness, tiring of voice
Recurrent laryngeal nerve	
▪ Unilateral	Hoarsness
▪ Bilateral	
o Acute	Stridor, respiratory distress
o Chronic	Aphonia