Role of vascularized tissue flap in reducing the incidence of pharyngocutaneous fistula following salvage total laryngectomy: a meta-analysis study

A meta- analysis study
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Dedication

Thank's for God for fulfillment of this work

To:

My sweet family

My father, My mother,
My sister & my brother

To:

Every one who gave me help and encouragement to complete this work

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*First of all, all gratitude is due to **Allah** almighty for blessing this work, until it has reached its end, as a part of his generous help, throughout my life.*

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Last but not least, I dedicate this work to my family, whom without their sincere emotional support, pushing me forward this work would not have ever been completed.

Margo Morcos Diab Morcos

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List of Abbreviations

CRT	Chemoradiotherapy
COPD	Chromic obstructive pulmonary disease
MACH-NC	Meta-analysis of chemotherapy in head and neck cancer
PCF	Pharyngocutaneous fistula
PF	Propyl- fluorouracil
RTOG	Radiation therapy oncology group
RT	Radiotherapy
SCM	Sternocleidomastoid
SCL	Supracricoid laryngectomy
SGL	Supraglottic laryngectomy
TEP	Tracheo-esophageal prothesis
TORS	Trans-oral robotic surgery

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Introduction

The two major modalities for treating cancer larynx are surgery and radiotherapy, the selection of treatment depends on the location of the tumour and the stage of the disease **(Jones et al., 2004).**

Patients with early lesions (Tis, T1, and T2) should be treated with a single modality. Options include radiotherapy, transoral laser excision, and open partial laryngectomy. Patients with high volume T3 and T4 tumors are better treated with total laryngectomy or surgery with combined radiotherapy and chemotherapy **(Mendenhall & Amdu, 2001)**.

The physical incapacity and social stigmatization of laryngectomized patients resulted in significant impairment in their quality of life. Swallowing and speech are the two major problems post operatively **(Strojan et al., 2013)**.

Concurrent chemoradiation therapy is accepted as the treatment of choice for most advanced laryngeal cancers. In this era of organ preservation, total laryngectomy is most often a salvage solution for persistent or recurrent disease or for iatrogenic incompetence of the larynx **(Gendreau-Lefèvre et al., 2015)**.

There appears to be a reduced likelihood of local control by chemoradiotherapy for patients with T4 tumors with gross cartilage destruction or extralaryngeal extension. local recurrence rate is also seen commonly in those

chemoradiotherapy treated patients treated patients **(Sheahan 2014).**

The salvage laryngectomy (SL) is very often the only curative option in recurrent laryngeal cancer or failed chemoradiotherapy **(Rothmeier et al., 2015)**.

Pharyngeocutaneous fistula (PCF) is markedly increased among salvage laryngectomy patients compared to primary laryngectomy, with rates commonly reported up to 50% in this population **(Patel & Keni, 2009).**

There is a clear advantage in using vascularized tissue from outside the radiation field in the laryngectomy defect. It was found that this tissue as a flap reduces the PCF rates from 30.8% to 21.9% with a statistically significant p value <0.5. **(Paleri et al., 2014)**.

The use of flaps in salvage laryngeal surgery is of great help in high-risk patients to minimize incidence of PCF and to allow primary skin wound healing. This flap will give the patient the advantage of early oral feeding and short hospital stay(average 3 weeks), good tracheostomy care, short hospital stay and protection against catastrophic vascular blow outs **(Riad et al., 2015)**.

Accepted reconstructive modalities include pectoralis muscle flap, anterolateral thigh flap, radial forearm flaps, jejunal flap and gastro-omental flap. The choice of flap depends on individual surgeon’s expertise and preference **(Kao et al., 2015)**.

Aim of the work

The Aim of this work is to do a meta-analysis of studies to know if primary flap reconstruction of salvage laryngectomy defects after organ preservation therapy for cancer larynx lowers the incidence of pharyngocutaneous fistula or not.

TREATMENT OF PRIMARY LARYNGEAL CARCINOMA

Cancer larynx represents 20% of all cases of head and neck malignancies. The most common histological type of cancer larynx is squamous cell carcinoma, as More than 95% of all laryngeal malignancies are squamous cell carcinomas. It is unfortunately diagnosed mostly in its late stages, approximately 40% of cases will have stage III or IV disease when first diagnosed **(Marioni et al., 2006).**

Although cancer larynx represents only 2 -5 % of all malignancies worldwide, these cancers have special importance because of their significant effect on voice, breathing, swallowing and quality of life **(Stephen et al., 2006).**

In 2009 nearly 12,290 new laryngeal cancers were diagnosed in the united states with men being affected four times as frequently as were women. With progress in curative and palliative treatment the death rate from laryngeal cancer in men dropped from 2.97 (per 100,00) to 2,24 (per 100,000) in 2005 **(Cooper , 2006)**.

Cancer larynx affects men 4 times more than women in the United States of America. In other countries men are affected up to 10 times more than women. It is also noticed that male: female ratio is higher for glottic tumors than for supraglottic tumors **(Snyder et al., 2006).**

In a study done in Egypt, SCC of larynx was found in 96.6% of patients with laryngeal tumour. The mean age of patients with cancer larynx was 57.6, the male to female ratio is 15:1. The majority of patients are smokers with a percentage of 86.1% of patients. Most common tumors were glottic–supraglottic (62.4%), transglottis (20.7%), glottic (10.8%), supraglottic (5.1%), and finally subglottic (1.0%), which is a rare subsite for cancer larynx **(Twab et al., 2014).**

There is an 80-90% possibility of cure for early stage (Tis, T1 and T2) laryngeal Carcinomas. The probability of cure decreased to 60% for more advanced carcinomas. The emerging of transoral endoscopic laser surgery in the new era besides the radiotherapy (RT), chemotherapy, partial laryngectomy and ability to combine those strategies for treatment achieved results comparable to conventional total laryngectomy ***(Holsinger et al., 2008).***

The physiological disability resulted from total laryngectomies opened the field for the organ preservating surgical approaches **(Braz et al., 2005).**

A-Conservational Laryngeal Strategies :

The negative physical and psychosocial impact of a permanent tracheostomy and loss of natural voice are powerful drivers for patients to want and to choose a treatment that will preserve their larynx.Hence, the availability of alternatives to performing a total

laryngectomy represents an enormous achievement in head and neck oncology **(Frostiere et al., 2015).**

I-Surgical:

Conservational laryngeal surgery is a procedure which preserve a functioning airway. This entity ranges from removal of only small fragments of vocal cord to 2/3 of larynx **(Hartle et al., 2015).**

Preservation of the cricoid cartilage is necessary for maintaining integrity of the airway. Failure to preserve the cricoid cartilage will result in narrowing of the subglottic airway and can result in subsequent tracheostomy dependence. To create a safe airway at least a single cricoarytenoid complex must be preserved. The cricoarytenoid complex is made up of a single arytenoid, an intact cricoid, and the full complement of muscles and innervation (recurrent laryngeal nerve) to maintain function **(Steuer et al., 2016).**

Endoscopic surgery and open partial laryngectomy (supraglottic laryngectomy (SGL) supracricoid laryngectomy (SCL) and vertical laryngectomy) are considered as a conservative laryngeal surgeries. Those are a very good options for treatment of T1 No and T2 No cancer larynx. Satisfying oncological control and excellent functional outcome are documented as the main advantages of conservative surgeries for these stages of tumour **(Brasnu et al., 2003).**

Conservational surgeries are the treatment of choice to only some selected cases of advanced laryngeal cancer which are small size T3 cancer with absence of artenoid fixation, minor para glottic invasion, minor pre epiglottic space invasion or minor inner lamina of thyroid cartilage erosion in patient with good pulmonary function reserve and accepted performance status **(Brasnu et al., 2003).**

T1 or T2 cancer with a cervical metastasis also is for conservational surgeries. However the neck dissection and the post-operative neck radiation in those cases lowers the functional outcome **(Fiorini et al., 2014).**

1-Endoscopic:

a-Microlaryngeal surgery (MLS):

Endoscopic resection of early glottic carcinoma (T1) is an alternative to radiation therapy With a 5-year local control rate between 92% to 94%. However, as an initial treatment, both lose their efficiency in terms of oncological and postoperative functional outcomes for tumors extending beyond the vocal cords into the supraglottis and/or infiltrating the anterior commissure (T1b vs T4) **(Bron et al., 2001)**.

Subepithelial cordectomy is the resection of the vocal fold epithelium, Subepithelial cordectomy is performed for cases of vocal fold lesions suspected of premalignant or malignant transformations and tumours in