

***Selective neck dissection (IIA, III) : A Rational replacement for
extended supraomohyoid neck dissection in patients with N0
Supraglottic and glottic squamous cell carcinoma***

protocol
submitted for partial fulfillment of
MD degree in Otorhinolaryngology

Presented by
MO'MEN ALI AMEEN HAMELA
(M.B., B.Ch / M.Sc. E.N.T. Cairo University)

Supervised by
Prof. Ismail Zohdi Mostafa
Professor of E.N.T.
Faculty of Medicine
Cairo University

Prof. Loai Mahmud Al-Sharkawy
Professor of E.N.T.
Faculty of Medicine
Cairo University

Prof. Mahmoud Fawzi Al- Bestar
Professor of E.N.T.
Faculty of Medicine
Cairo University

Dr.Amal Ahmed Hareedy
Lecturer of Pathology
Faculty of Medicine
Cairo University

2014

Abstract

In this study, 25 patients with clinically N0 nodal stage laryngeal carcinoma who were presented to the ENT outpatient clinic or emergency room in Kasr El Aini hospital during the period from May 2012 to February 2014. The current study is a cross sectional analytic study that deals with histopathological analysis of neck nodes in patients with laryngeal carcinoma and clinically N0 nodal stage who received unilateral or bilateral lateral type of selective neck dissection. In treating cancer of the head and neck, there is great concern for the patient's quality of life, and offering valid oncological results in terms of disease-free survival, and the articles mentioned in this study support the claim that it is unnecessary to dissect sublevel IIb in laryngeal cancer patients with clinically N0 necks.

Keywords:

Supraomohyoid- glottic squamous- HNSCC- RND- SND

Index

<i>Aknowledgement</i>	I
<i>List of figures</i>	II
<i>List of tables</i>	V
<i>List of abbreviations</i>	VI
<i>Introduction</i>	1
<i>Aim of work</i>	3
<i>Review of literature</i>	4
<i>Antomy of neck lymph nodes</i>	4
<i>Lymphatic system of larynx</i>	13
<i>Biology of lymphatic metastasis</i>	16
<i>Histopathology of metastatic lymph nodes</i>	19
<i>Assessment of nodal metastasis in laryngeal carcinoma</i>	29
<i>Definitive therapy</i>	38
<i>Patients and methods</i>	61
<i>Results</i>	69
<i>Discussion</i>	77
<i>Conclusion</i>	83
<i>Summary</i>	84
<i>References</i>	86
<i>Arabic summary</i>	97

Acknowledgement

After finishing this research which takes a lot of time and work I want to thank persons I think this work can't be accomplished without them and their support .

I want to thank my supervisors My father in this research Prof. Ismail Zohdi, My teacher Prof. Loai Al-Sharkawy, My inspiring and ideal person Prof. Mahmoud Fawzi and the person who tired with me in this work who I consider my sister in this work Dr. Amal Haridy.

I want also not to forget my brother Dr. Hazem Abd Al-Tawab who help me in doing most of cases of this study.

I also want to present my greetings to my great wife who was with me all days & nights and my little daughter Rodina.

I also present some flowers to my father and mother who took my hands through this long road.

List of Figures

Figure 1. Level system of cervical lymph node classification.

Figure 2. Direct communication of the system of the upper aerodigestive tract, view from behind. The mapped arrows show the drainage, and “o” points out drainage directed into the depth.

Figure 3: Drainage of the larynx, view from behind. The mapped arrows show the drainage.

Figure 4: Cascade of events leading up to lymphatic metastases.

Figure 5: Two nodes containing eosinophilic deposits of metastatic SCC. About two thirds of the larger node is involved by metastatic SCC and tumour has almost overrun the smaller node. The linear segments indicate the profile diameter of the metastases.

Figure 6: Conventional nodal metastasis of keratinizing SCC with keratin pearls and prominent desmoplastic stroma.

Figure 7: Microscopic squamous cell carcinoma. (A) Metastatic tumor cells not detected with H&E stain. (B) Corresponding section stained for cytokeratin.

Figure 8: Isolated tumor cells (ITCs).

Figure 9: Metastatic focus outside lymph node.

Figure 10: A-C Illustration of the morphological variety and difficulties in assessment of ITCs. Photomicrographs from nodes from one patient, with a T1 squamous cell carcinoma in the tongue and two SLNs, one demonstrating variation from a small viable tumour deposit (100 mm), seen on AE1/AE3 IHC (A) and H&E (B), and scattered ITCs in another node (C). There were no other metastases in the neck dissection specimen.

Figure 11: Contrast- enhanced coronal reformatted CT shows 3 metastatic nodes with necrotic foci at level IIA.

Figure 12: 50-Year-old man with maxillary cancer. (A) Direct coronal STIR image shows metastatic node with nodal necrosis at neck level IIA (arrow). (B) Reconstructed coronal DWIBS image shows the same metastatic node (arrow) as in (A). Nodal necrosis is not evident on this MIP image. Arrowhead indicates primary SCC in the upper gingival.

Figure 13: 62-Year-old man with cancer in buccal mucosa. (A) Coronal PET image shows high uptake area in the neck. (B) Coronal PET/CT fusion image shows metastatic node at level IIA.

Figure 14: Gluck incision for unilateral and bilateral neck dissection.

Figure 15: The fascia has been incised along the upper boundary of the surgical field and retracted inferiorly (right side).

Figure 16: Marginal mandibular branch of the facial nerve on the right side of the neck.

Figure 17: Incision of the fascia over the sternocleidomastoid muscle on the right side.

Figure 18: The fascia of the sternocleidomastoid muscle is dissected medially. The external jugular vein is included in the fascia (right side).

Figure 19: The dissection of the medial face of the sternocleidomastoid muscle has been completed (right side).

Figure 20: The spinal accessory nerve is completely exposed in the upper part of the field on the right side of the neck.

Figure 21 A: Spinal accessory maneuver on the right side of the neck. The nerve is exposed between the sternocleidomastoid muscle and the internal jugular vein.

Figure 21 B: Spinal accessory maneuver on the right side of the neck. The fibrofatty tissue lying posterior and superior to the nerve is passed beneath the nerve.

Figure 22: Dissection of the remaining fascia of the sternocleidomastoid muscle at the supraclavicular fossa (right side).

Figure 23: Lateral view of the deep branches of the cervical plexus that have been preserved on the right side.

Figure 24: Dissection of the carotid sheath on the right side.

Figure 25: Dissection of the internal jugular vein within the carotid sheath (right side).

Figure 26: Dissection of the strap muscles on the right side.

Figure 27: The neck after a right functional neck dissection for supraglottic cancer of the larynx.

Fig.M1: Total laryngectomy Specimen.

Fig.M2:Supraglottic Laryngectomy Specimen. a; intraoperative picture after removal of supraglottic part. b;shows lingual surface. c;shows laryngeal surface and the ulcerative cancer.

Fig.M3: Neck dissection Specimen. a; lateral neck dissection. b; supraomohyoid neck dissection.

Fig.M4: show the specimen and how it was labeled.

Fig.M5: Images of slides showing normal lymph nodes.

Fig.M6: a figure showing CK positive(a) and negative nodes(b).

Fig.M7: suspicious lymph node with hematoxylin & eosin shows thick fibrous capsule.

Fig.M8: Lymph node with positive metastasis stained with hematoxylin & eosin.

Fig.M9: positive cervical lymph nodes with cytokeratin.

Chart 1: Incidence of macrometastasis According to site of 1ry.

Chart 2: Incidence of macrometastasis according to stage.

Chart 3: Number of +ve Macrometastasis with H&E According to lymph node level.

Chart 4: Incidence of micrometastasis According to site of 1ry.

Chart 5: Incidence of micrometastasis According to stage of tumor.

Chart 6: Incidence of micrometastasis According to Lymph node level.

List of Tables

Table 1: Nodal Groups at Greatest Risk of Developing Metastases According to the Location of the Primary Tumor.

Table 2: Anatomical Structures Defining the Boundaries of the Neck Levels and Sublevels Boundary.

Table 3: Definitions used to describe the stage and size of metastatic deposits.

Table 4: classification of neck dissections.

Table R1: Shows primary tumor site, laterality, stage.

Table R2: Shows macrometastasis results according to primary tumor site, stage and level of lymph nodes with +ve deposits.

Table R3: Shows micrometastasis results according to primary tumor site, stage and level of lymph nodes with +ve deposits.

List of abbreviations

SCC =squamous cell carcinoma

CT = computed topography

MRI = magnetic resonance imaging

PET = positron emission topography

HNSCC = head and neck squamous cell carcinoma

SCM = sternocliedomastoid

H&E = hematoxylin & eosin

CK = cytokeratin

ITC = isolated tumor cells

SLN = sentinel lymph node

RND = radical neck dissection

SND = selective neck dissection

Introduction

The head and neck encompasses perhaps some of the most anatomically complicated regions of the body. Knowledge of the lymphatic system is essential in order to understand the pattern of spread of cancer in the neck. **(Ferlito et al; 2006)**

Most squamous cell carcinomas of the head and neck are at least potentially curable. Primary cancer arising in most sites in the head and neck ultimately metastasizes regionally to the cervical lymph nodes. As the status of these lymph nodes is the most significant independent prognostic factor in head and neck cancer, appropriate management of the cervical lymph nodes is essential for control of disease. Neck dissection is the standard surgical treatment for resecting cancer in the regional lymph nodes of the neck. The purpose of a neck dissection is to remove those lymph nodes involved by or at risk for involvement by metastatic cancer. The significance of metastatic disease in the lymph nodes of the neck has long been appreciated. **(Ferlito et al; 2006)**

For several centuries the nature and anatomy of the lymphatic system and the lymphatic drainage of the various mucosal regions of the upper aerodigestive tract have been studied, and methods for surgical extirpation of surgical lymph nodes have been developed. These attempts were crude and ineffective at first, but in time the systematic regional lymph node dissection has become fundamental to the surgical management of malignant disease in the head and neck. **(Ferlito et al; 2006)**

In laryngeal as in all upper aerodigestive tract cancer, lymph node metastasis is an important prognostic factor, and

adapted treatment is critical to management and prognosis. Achieving earlier diagnosis of the laryngeal tumor increases the frequency of patients presenting stage N0 lymph node involvement. Optimal management of N0 cases is controversial. Functional neck dissection entails a non-negligible risk of nervous and lymphatic morbidity, especially when applied to levels IIb and IV. As these are the least frequently affected levels, the advisability of dissection is questionable, given advances in various diagnostic strategies.**(Mnejja et al; 2010)**

The presence of neck metastasis is known to reduce survival by 50%, and the frequency of such spread is greater than 20% for most squamous cell carcinomas (SCCAs). The presence of extra capsular spread further halves the chances of cure. The survival rate is less than 5% in patients who previously underwent surgery and have a recurrent metastasis in the neck. Therefore, control of the neck is one of the most important aspects in the successful management of these particular tumors.**(March et al; 2010).**

Because clinical palpation is not sufficiently sensitive to detect cervical nodal metastasis, C.T, MRI, and positron emission tomography imaging are useful, however, they have a limited power for detection of metastasis less than 1cm in diameter. Histopathology remains the gold standard method for detection of metastatic lymph nodes.**(Barrera et al;2003).**

Aim of work

To evaluate the effectiveness of selective neck dissection of sublevel IIa and level III in cases of glottis supraglottic laryngeal carcinoma in absence of lymph node metastasis and to show if there is value of dissection of sub level IIb or IV in this cases.

Anatomy of neck lymph nodes:

It has been estimated that about 300 of the 800 lymph nodes in the human body are located in the head and neck region. **(Robbins, 2001)**

The level system is used to delineate the location of lymph node disease in the neck. The level system is well known and easy to remember and serves as the basis for describing various selective neck dissections. **(Shah et al, 1981)**

It was believed that the 6 levels currently used encompassed the complete topographic anatomy of the neck. Lymph nodes involving regions not located within this region would be referred to by the name of their specific nodal group. In addition to the superior mediastinum, other examples include the retropharyngeal lymph nodes, the periparotid lymph nodes, the buccinator nodes, and the postauricular and suboccipital nodes. **(Robbins et al, 2002)**

The 2001 report of the American Head and Neck Society's Neck Dissection Committee recommended the use of 6 neck levels and 6 sublevels, which added 2 extra sublevels at level V. The 6 sublevels are Ia (submental nodes), Ib (submandibular nodes), IIa and IIb (upper jugular nodes), Va (spinal accessory nodes), and Vb (transverse cervical and supraclavicular nodes) **(Robbins, 2001)**

According to **Robbins, 2001** these levels are divided as follow (Fig. 1);

Level I

This level is bound by the body of the mandible superiorly, stylohyoid muscle posteriorly, and the anterior belly of the digastric muscle on the contralateral side anteriorly.

This level may be divided into level Ia, which refers to the nodes in the submental triangle (bound by the anterior bellies of the digastric muscles and the hyoid bone), and Ib, which refers to the submandibular triangle nodes (Table 1).

The nodes of level Ia are at greatest risk of harboring metastasis from cancers that arise from the floor of mouth, anterior tongue, anterior mandibular alveolar ridge, and lower lip, while the nodes of level Ib often receive metastasis from cancers of the oral cavity, anterior nasal cavity, soft tissue structures of the mid face, and submandibular gland.

Closely related, although not strictly a part of the level I group of nodes, are the perifacial nodes, related to the facial vessels above the mandibular margin, and the buccinator nodes, which may become involved with metastasis from tumors in the buccal mucosa, nose, and soft tissues of the cheek and lips (Table 2).

Level II

Level II lymph nodes are related to the upper third of the jugular vein, extending from the skull base to the inferior border of the hyoid bone. The anterior border of level II is the stylohyoid muscle, and the posterior border is the posterior border of the sternocleidomastoid muscle. This level found surgically below the

tendon of the digastric muscle. The spinal accessory nerve, which travels obliquely across this area, is used as a landmark to subdivide this group into IIb, the portion above and behind the nerve, and IIa, the part that lies anteroinferiorly and closer to the internal jugular vein (Table 1).

The nodes in level II are at greatest risk of harboring metastasis from cancers that arise from the oral cavity, nasal cavity, nasopharynx, oropharynx, hypopharynx, larynx, and parotid gland (Table 2).

Level III

Level III nodes are located between the hyoid superiorly and a horizontal plane defined by the inferior border of the cricoid cartilage. The sternohyoid muscle marks the anterior limit of level III, and the posterior border of the sternocleidomastoid muscle is the posterior border (Table 1).

Level III most commonly receives metastasis from cancers that originate in the oral cavity, nasopharynx, oropharynx, hypopharynx, and larynx (Table 2).

Level IV

This refers to the group of nodes related to the lower third of the jugular vein. These nodes are located between the inferior border of the cricoid cartilage and the clavicle, and, like level III, the anterior boundary is the sternohyoid muscle, and the posterior border is the posterior border of the sternocleidomastoid muscle (Table 1).