Is modified radical neck dissection better than radical neck dissection in the treatment of metastatic neck disease?

Metanalysis

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Abbreviations

cN0	**:**	**Negative Neck**
SqCC	**:**	**Squamous Cell Carcinomas**
HNSqCCs	**:**	**Head and Neck Squamous Cell Carcinomas**
END	**:**	**Elective Neck Dissection**
ENI	**:**	**Elective Neck Irradiation**
FND	**:**	**Functional Neck Dissection**
RND	**:**	**Radical Neck Dissection**
MRND	**:**	**Modified Radical Neck Dissection**
SND	**:**	**Selective Neck Dissection**
LNDs	**:**	**Lateral Neck Dissection**
SOH	**:**	**Supra-omohyoid Neck Dissection**
US-FNAC	**:**	**Ultrasound Guided Aspiration Cytology**
PET	**:**	**Positron Emission Tomography**
XRT	**:**	**External Radiotherapy**
IJV	**:**	**Internal Jugular Vein**
JND	**:**	**Jugular Node Dissection (removing Level II, III and IV)**
L.Ns	**:**	**Lymph nodes**
DSS	**:**	**Disease Specific Survival**
CDSS	**:**	**Cumulative Disease Specific Survival**
cGy	**:**	**Centigray**

Introduction

One of the most important prognostic factors in head and neck cancer is the presence or absence, level and size of metastatic neck disease **(Watkinson et al, 1991).**

In spite of advancement in science, molecular medicine and target therapies, surgical treatment of metastases using different techniques, from selective neck dissection to extended radical neck dissections, form a major part in the management of neck metastases. This is due to the fact that, so far, there is no treatment more effective for resectable neck metastases **(Subramanian et al, 2007).**

Modified radical neck dissection (MRND) is associated with less cosmetic and functional morbidity than RND but, used alone, MRND is only appropriate when clinical neck disease is absent or minimal **(O'Brien et al, 1987).**

Radical neck dissection (RND) removes the lymph node (L.Ns) containing levels in neck (I-V), and all the three non lymphatic structures (spinal accessory nerve, sternomastoid muscle and the internal jugular vein). Modified radical neck dissection (MRND) removes all lymph node groups (levels I-V) with preservation of one or more non lymphatic structures.

Modified radical neck dissection **Type 1** – preserves spinal accessory nerve.

Modified radical neck dissection **Type 2** – Preserves not only the spinal accessory nerve but also the internal jugular vein (IJV).

Modified radical neck dissection **Type 3** –preserves spinal accessory nerve, the internal jugular vein (IJV) and sternomastoid muscle **(Watkinson et al, 1991).**

In head and neck cancer, spread of disease to regional lymph nodes is one of the most important prognostic factors. **(Gavilan et al, 1992)**.

The prognostic significance of nodal metastasis and its optimal management have been topics of considerable controversy **(Noguchi et al, 1998).**

Aim of the Work

This study will be a systematic review to know if modified radical neck dissection is better in controlling the loco-regional recurrence than radical neck dissection in the treatment of metastatic neck disease.

Anatomy of cervical lymph nodes

Neck Lymph Nodes

Neck nodes are divided into seven different levels. There are 5 levels in the lateral compartment and 2 in the central compartment.

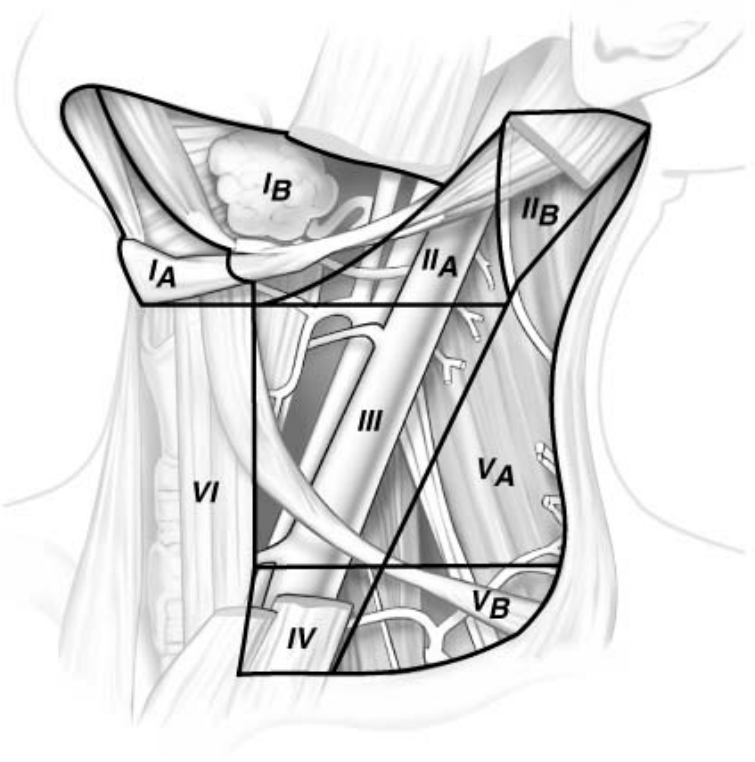

Figure (1): The levels of the neck for describing the location of lymph nodes in the neck. Level I, submental and submandibular group; level II, upper jugular group; level III, middle jugular group; level IV, lower jugular group; levelV, posterior triangle group; and level VI, anterior compartment group **Robbins (2002).**

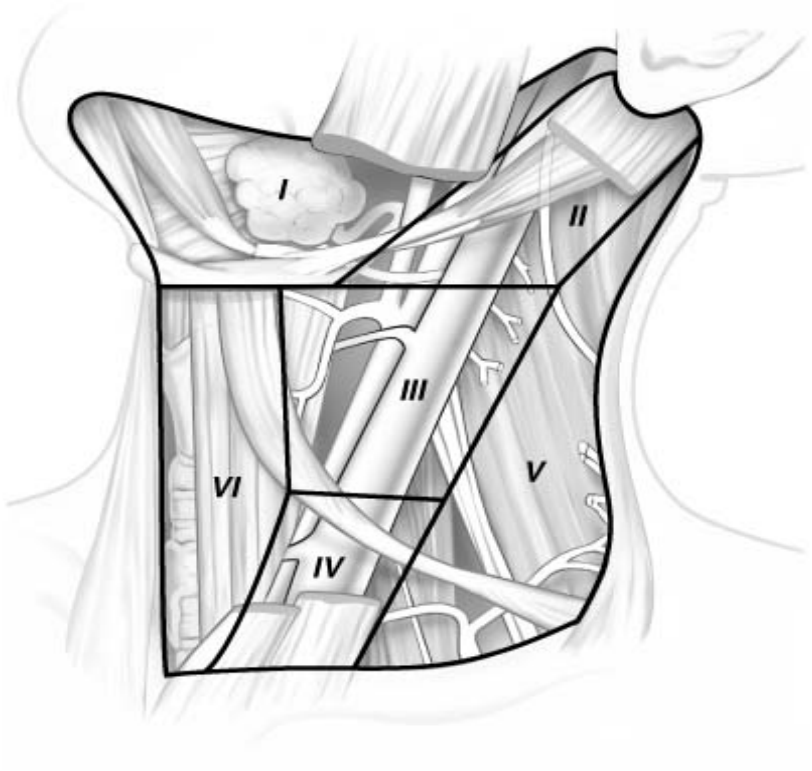

Figure (2): The sublevels of the neck for describing the location of lymph nodes within levels I, II, and V. Level IA, submental group; level IB, submandibular group; level IIA, upper jugular nodes along the carotid sheath, includingthe subdigastric group; level IIB, upper jugular nodes in the submuscular recess; level VA, spinal accessory nodes; and level VB, the supraclavicular and transverse cervical nodes **Robbins (2002)**

Lateral neck compartment lymph nodes:

The nodal groups at risk for involvement are widespread throughout the neck, extending from the mandible and skull base superiorly to the clavicle inferiorly and from the posterior triangle of the neck laterally to the midline viscera and to the contralateral side of the neck. **(Shah 1981)**
They are divided into levels and sublevels.

Neck levels and sublevels:

The American Head and Neck Society's Neck Dissection Committee recommended the use of sublevels for defining selected lymph node (L.Ns) groups within levels I, II, and V on the basis of the biologic significance, independent of the larger zone in which they lay**. (Robbins 2002)**

Submental (sublevel IA)

L.Ns within the triangular boundary of the anterior belly of the digastric muscles and the hyoid bone; these nodes are at the greatest risk of harboring metastases from cancers arising from mouth floor, the anterior oral tongue, the anterior mandibular alveolar ridge, and the lower lip.

Submandibular (sublevel IB)

L.Ns within the boundaries of the anterior belly of the digastric muscle, the stylohyoid muscle and the body of the mandible, including the pre and postglandular nodes and the pre and postvascular nodes. The submandibular gland is included in

the specimen when the lymph nodes within this triangle are removed. These nodes are at greatest risk for harboring metastases from cancers arising from the oral cavity, the anterior nasal cavity, and the soft-tissue structures of the midface and the submandibular gland**.**

Upper jugular (includes sublevels IIA and IIB)

L.Ns located around the upper third of the (IJV) and the adjacent spinal accessory nerve, extending from the level of the skull base above to the level of the inferior border of the hyoid bone below. The anterior (medial) boundary is the stylohyoid muscle (the radiologic correlate is the vertical plane defined by the posterior surface of the submandibular gland), and the posterior (lateral) boundary is the posterior border of the sternomastoid muscle. Sublevel IIA nodes are located anterior (medial) to the vertical plane defined by the spinal accessory nerve. Sublevel IIB nodes are located posterior (lateral) to the vertical plane defined by the spinal accessory nerve. The upper jugular nodes are at greatest risk for harboring metastases from cancer arising from the oral cavity, the nasal cavity, the nasopharynx, the oropharynx, the hypopharynx, the larynx, and the parotid gland**.**

Middle jugular (level III)

L.Ns located around the middle third of the internal jugular vein, extending from the inferior border of the hyoid bone above to the inferior border of the cricoid cartilage below. The anterior (medial) boundary is the lateral border of the sternohyoid muscle, and the posterior (lateral) boundary is the posterior border of the sternomastoid muscle. These nodes are at greatest risk for harboring metastases from cancers arising from the oral cavity, the nasopharynx, the oropharynx, and and the larynx**.**

Lower jugular (level IV)

L.Ns located around the lower third of the internal jugular vein, extending from the inferior border of the cricoid cartilage above to the clavicle below. The anterior (medial) boundary is the lateral border of the sternohyoid muscle, and the posterior (lateral) boundary is the posterior border of the sternocleidomastoid muscle. These nodes are at greatest risk of harboring metastases from cancers arising from the hypopharynx, the thyroid, the cervical esophagus, and the larynx.

Posterior triangle group (includes sublevels VA and VB)

This group is composed predominantly of the L.Ns located along the lower half of the spinal accessory nerve and the transverse cervical artery. The supraclavicular nodes are also included in the posterior triangle group. The superior boundary is the apex formed by the convergence of the sternocleidomastoid and trapezius muscles; the inferior boundary is the clavicle, the anterior (medial) boundary is the posterior border of the sternocleidomastoid muscle, and the posterior (lateral) boundary is the anterior border of the trapezius muscle. Sublevel VA is separated from sublevel VB by a horizontal plane marking the inferior border of the anterior cricoid arch. Thus, sublevel VA includes the spinal accessory nodes, whereas sublevel VB includes the nodes that follow the transverse cervical vessels and the supraclavicular nodes (with the exception of Virchow's node, which is located in level IV). The posterior triangle nodes are at greatest risk for harboring metastases from cancers arising from the nasopharynx, the oropharynx, and cutaneous structures of the posterior scalp and neck

Central Neck Compartment Lymph Nodes

These nodes are of particular importance with respect to thyroid surgery.

Level 6 nodes are those immediately adjacent to the thyroid, while level 7 nodes are those below the thyroid behind the sternum.

Anterior compartment group (level VI)

L.Ns in this compartment include the pre and paratracheal nodes, the precricoid (Delphian) node, and the perithyroidal nodes, including the L.Ns along the recurrent laryngeal nerves. The superior boundary is the hyoid bone, the inferior boundary is the suprasternal notch, and the lateral boundaries are the common carotid arteries. These nodes are at greatest risk for harboring metastases from cancers arising from the thyroid gland, the glottic and subglottic larynx, the apex of the pyriform sinus, and the cervical esophagus **(Robbins et al, 2005).**

The risk of nodal disease in sublevel IIB is greater for tumors arising in the oropharynx as compared with the oral cavity and larynx. Thus, in the absence of clinical nodal disease in sublevel IIA, it is likely not necessary to include sublevel IIB for tumors arising in these latter sites. The dissection of the node-bearing tissue of sublevel IIB (submuscular recess) creates a risk of morbidity. Adequate exposure necessitates significant manipulation of the spinal accessory nerve and may account for trapezius muscle dysfunction observed in a significant minority