THE ROLE OF RADICAL NECK DISSECTION IN HEAD AND NECK MALIGNANCIES

Dissertation submitted in partial fulfillment of regulation for the award of M.S. Degree in General Surgery

(Branch I)

The Tamilnadu
Dr. M.G.R. Medical University
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Coimbatore - 641 014

CERTIFICATE

Certified that this is the bonafide dissertation done by **Dr. T. GUNALA SURESH** and submitted in partial fulfillment of the requirements for the Degree of M.S., General Surgery, Branch I of The Tamilnadu Dr. M.G.R. Medical University, Chennai

Date : **Unit Chief**

Date : **Professor & Head**
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DECLARATION

I solemnly declare that the dissertation titled **"The Role of Radical Neck Dissection in Head and Neck Malignancies"** was done by me from 2006 onwards under the guidance and supervision of Professor **Dr. N. JAYARAMACHANDRAN, M.S.**

This dissertation is submitted to the Tamilnadu Dr. MGR Medical University towards the partial fulfillment of the requirement for the award of MS Degree in General Surgery (Branch I).

Place : **Dr. T. GUNALA SURESH**

Date :

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CONTENTS

INTRODUCTION

Head and neck malignancies include malignant tumours of the upper aerodigestive tract, paranasal sinuses and the major and minor salivary glands. In addition, tumours of the skin, soft tissue, bone and neurovascular structures in the head and neck and tumours of parapharyngeal space and thyroid and parathyroid glands are considered as head and neck malignancies.

The single most important factor affecting the prognosis for squamous cell carcinoma of the head and neck, the 6th most common cancer world wide, is the status of the cervical lymph nodes.

Metastasis to the regional lymph nodes reduces the 5 year survival rate by 50% compared with that of patients with early stage disease.

Therefore, management of the cervical lymph nodes is an important component in the overall treatment plan for patients with carcinomas of the head and neck.

AIM OF STUDY

To study the various types of head and neck malignancies with special reference to Radical neck dissection as a modality in the management regimen in the department of surgery at Coimbatore medical college hospital, Coimbatore.

REVIEW OF LITERATURE

The first systematic approach to the treatment of cancer in the neck was described by Dr. George Crile from the Cleveland clinic, in the journal of the American Medical Association in 1906 [(1)]. Crile's primary goal was excision of all lymphatic tissues in the lateral neck from levels I to V are systematically removed in conjunction with the sternocleidomastoid muscle, internal jugular vein, the spinal accessory nerve and the sub mandibular salivary gland.

This operation was popularized by Hayes Martin who described the stepwise procedure of Radical neck dissection in his classic article in 1951[(2)]. They performed neck dissections only on the N-positive neck were using the concept of "watchful waiting" or observation" for the N-o neck and salvage surgery in those patients who later developed a mass in the neck. However , this operation is not without morbidity, as it results in a cosmetic deformity and dysfunction of shoulder movement.

This led to the development of Modified or Functional neck dissection. Oswaldo Suarez from Argentina was the first to describe Functional neck dissection, now called Modified radical neck dissection, in 1963[(3)]. He described the removal of all five lymph node levels in the neck while preserving the spinal accessory nerve, sternocleido mastoid

muscle and internal jugular vein to limit any functional disability in the shoulder.

This operation was popularized by Bocca and Pignataro who learned the technique from Suarez, published in the English literature in 1967[4].

In 1980, Molinari et al [5] indicated a low regional recurrence rate in patients with cancer of the larynx who underwent Modified radical neck dissection.

High metastatic rates of early oral cavity cancer had also been published in multiple studies.

Mc Guirt et al [6], did a retrospective study of 129 patients with squamous cell carcinomas of the floor of the mouth with an $N-_0$ neck, occult disease was detected in 23% of the patients who underwent Modified radical neck dissection. Recurrence in the neck occurred in 36% of 103 patients who did not undergo Modified radical neck dissection. Whereas the determinant survival at 3 years was 100% for patients with occult disease who underwent Modified radical neck dissection.

Based on numerous studies, head and neck surgeons began performing Modified radical neck dissection for patients with an occult metastasis rate of 20% or higher for any squamous cell carcinoma of head and neck cancers.

Another reason that Radical neck dissection continued to be the treatment of choice was concern over the poor prognosis associated with Extra Capsular Spread (ECS) in cervical lymph nodes.

In 1979[7], Dr. Gordon Snow presented the findings that Extra capsular spread in cervical lymph node metastasis carried a very poor prognosis based on regional recurrence and distant metastasis.

Snow et al [8] indicated that Extra Capsular Spread could be found in lymph nodes smaller than 1 cm.

Dr. Yves Cachin et al [9], indicates that patients with carcinoma limited to the lymph nodes had a 33% survivorship while patients with Extra Capsular Spread experienced a 15% survivorship.

Selective removal of regional lymph node groups based predictable patterns of lymph node spread were later popularized by Ballantyne from M.D. Anderson cancer centre[10] In 1985 , Bayers from M.D.Anderson cancer center used the term 'Supraomohyoid' neck dissection to describe the selective neck dissection procedure for cancers of the oral cavity and pharynx.

These neck dissections were described for use in patients with clinically negative neck cancer and were based on the philosophy

that nodal spread of cancer preceded in an orderly and predictable fashion.

Unfortunately, the terms, 'Modified radical neck dissection', 'Functional neck dissection' and 'Selective neck dissection' led to considerable confusion. Therefore, in 1991 the American Academy of Otolaryngology [(11)] Head and neck surgery published an article classifying neck dissection into comprehensive and selective.

This was later updated in 2001[(12)] which dealt with the application of various types of selective neck dissection procedures for oral cavity cancer, pharyngeal and laryngeal cancer, thyroid cancer and cutaneous cancers. In addition, 2 new neck sublevels, Va and Vb where added, for a total of 6 neck levels and 6 neck sublevels.(The 1991 version of the report listed only 4 neck sublevel). With the exception of the 2 added neck sublevels, the terminology in the updated report is the same as that of the 1991 version. This nomenclature is widely used today.

Modification to the Radical Neck Dissection include the following.

- Type I - The spinal accessory nerve is preserved.
- Type II - The Spinal accessory nerve and the sternocleido mastoid muscle are preserved.
- Type III - The spinal accessory nerve, internal jugular vein and the sternocleido mastoid muscle are preserved.

Extended Radical neck dissection:

When the modification involves removal of additional lymph node groups or nonlymphatic structures relative to the radical neck dissection, the procedure is termed an extended radical neck dissection.

Selective neck dissection

Selective neck dissection generally carried out for the neck with clinically negative disease ($N\text{-}_O$) where there is at least a 15% to 20% risk of occult metastaic disease. Additional indications may be situations in which surgical access to the primary extends to lymph node groups as risk of metastasis more controversially, it may be used for nodal metastasis confined to the first-echelon nodes (usually N_1) when the primary is being treated by surgery. However, it is important to point out that neck regimens post-operative radiotherapy in this settings, as reported by Byers, Pellitteri et al and spiro et al.

ANATOMY OF THE NECK

Triangles of the neck (Fig : 1)

To assist the description of the topographical anatomy of the neck and the location of pathological lesions each side is divided into anterior and posterior triangles by the obliquely placed sternocleidomastoid muscle. The anterior triangle can be subdivided into submental, digastric, carotid and muscular triangles.

Anterior triangle of neck :

The boundaries of the triangle are :

Medially	-	The anterior median plane of the neck sternocleidomastoid muscle.
Laterally	-	Sternocleidomastoid muscle
Superiorly	-	Base of the mandible and a line joining the angle of the mandible to the mastoid process.

Sub divisions

Submental triangle

This is a median triangle. It is bounded as follows

On each side	-	Anterior belly of the corresponding digastric muscles.
Base	-	Body of hyoid bone
Apex	-	Lies at the chin
Floor	-	Right and left mylohyoid muscles and the median raphe uniting them.

Contents

Anterior jugular veins and 2-4 lymph nodes.

Digastric triangle

Boundaries :

Anteroinferiorly	-	Anterior belly of digastric
Posteroinferiorly	-	Posterior belly of digastric and stylohyoid
Superiorly or base	-	Base of the mandible and a line joining the angle of the mandible to the mastoid process.
Roof	-	Skin, superficial fascia and deep fascia which splits to enclose the submandibular salivary gland.
Floor	-	Right and left mylohyoid muscles and the median raphe uniting them.

Contents

Submandibular gland and lymph nodes; fascial , submental and mylohyoid vessels; hypogolossal and mylohyoid nerves.

Carotid triangle

Boundaries

Anterosuperiorly	-	Posterior belly of the digastric muscle and the stylohyoid
Anteroinferiorly	-	Superior belly of the omohyoid
Posteriorly	-	Anterior border of the sternocleidomastoid muscle.
Roof	-	Skin, superficial layer and investing layer of deep cervical fascia
Floor	-	Thyroid muscle, hyoglossus muscle are the middle and inferior constrictor of the pharynx.

Contents

Bifurcation of common carotid artery and branches of external carotid (except posterior auricular) ; lingual , facial and superior thyroid veins ; hypoglossal, internal and external laryngeal nerves and superior root of ansacervicalis; lymph nodes.

Muscular triangle

Boundaries

Anteriorly	-	Anterior median line of the neck, from the hyoid bone to the sternum.
Posterosuperiorily	-	Superior belly of the omohyoid muscle.
Posteroinferiorily	-	Anterior border of the sternocleido Mastoid muscle.

Contents :

Part of larynx, trachea, pharynx, oesophagus, thyroid and parathyroid glands their vessels and nerves; lymph nodes.

Posterior triangle

It lies between the posterior border of sternocleidomastoid , the anterior border of trapezius and the clavicle.

Apex :

Lies high up at the back of the skull on the superior nuchal line, where there in a small gap between the attachments of the two muscles.

Base:

Middle third of the clavicle of the side of the root of the neck.

Roof :

The investing layer of deep cervical fascia.

Floor:

It consists of the layer prevertabral fascia lying on, from above downwards, splenius , levator scapulae and scalenus medius.

Contents:

Cutaneous branches of cervical plexus, accessory nerve, inferior belly of omohyoid, transverse cervical and suprascapular vessels and lymph nodes.

ANATOMY OF CERVICAL LYMPH NODES

The cervical lymph nodes are divided into superficial and deep chains.

Superficial lymph nodes are involved in a late stage of cancer, therefore, they have less oncologic importance.

Deep cervical lymph nodes receive drainage from areas of the oral cavity, pharynx, larynx, salivary glands, thyroid, and the skin of the head and neck. These deep cervical (superior, middle, inferior) lymph nodes accompany the internal jugular vein and its branches.

Cervical lymph nodes are classified according to the system developed at memorial Sloan- Kettering Cancer Centre in the 1930s. This system divides the lymph nodes in the lateral aspect of the neck into five nodal levels, I through V. In addition, lymph nodes in the central compartment are categorized into level VI and those in the superior mediastinum as level VII.

Recently, level I, II, and V nodes were sub classified into levels IA and IB, 11A and 11B and V A and VB.

This subdivision is based on patterns of lymph node spread from various primaries.

Memorial Sloan – Kettering Cancer Center Current Leveling System of Cervical Lymph Nodes

(Fig : 2)

Level I - Submental and submandibular lymph nodes

1A - Submental lymph nodes

1B - Submandibular lymph nodes

Level II - Upper jugular group lymph nodes

IIA - Lymph nodes below the accessory nerve

IIB - Lymph nodes above the accessory nerve

Level III - Middle jugular group lymph nodes

Level IV - Lower jugular group lymph nodes.

Level V - Posterior triangle group lymph nodes

The posterior triangle has been subdivided into levels VA and VB with the dividing line being the accessory nerve in the Posterior triangle.

Level VI - Central anterior group lymph nodes

Level VII - Superior mediastinum group lymph nodes

TNM Staging

T Stage

T	-	Primary tumor
T_X	-	No evidence of primary tumour
T_{1s}	-	Carcinoma in situ
T_1	-	Tumour less than 2 cm
T_2	-	Tumour more than 2 cm but less than 4 cm
T_3	-	Tumour more than 4 cm
T_4	-	Tumour more than 4 cm with invasion of deeper structures (bones, muscles etc).

N Stage **(Fig : 3)**

N	-	Regional lymph nodes
N_x	-	Regional lymph nodes cannot be assessed.
N_o	-	No regional lymph node metastasis.
N_1	-	Metastasis in single ipsilateral node 3 cm or less in greatest dimension.
N_2	-	Metastasis in a single ipsilateral lymph node more than 3 cm but less than 6 cm or multiple
N_{2a}	-	Metastasis in single ipsilateral node greater than 3 cm but less than 6 cm
N_{2b}	-	Metastasis in multiple ipsilateral nodes none more than 6 cm.
N_{2c}	-	Metastasis in bilateral or contra lateral lymph nodes none more than 6 cm
N_3	-	Metastasis in a lymph node more than 6 cm in greatest dimension.

M Stage

M	-	Distant metastasis.
M_X	-	Presence of distant metastasis could not be assessed.
M_o	-	No distant metastasis.
M_1	-	Distant metastasis like lung, liver, bone adrenals,

STAGING SYSTEM OF REGIONAL LYMPH NODES

(N STAGE) FOR THYROID CARCINOMA

N_X Regional lymph nodes cannot be assessed

N-o No regional lymph node metastasis

N_1 Regional lymph node metastasis

N_{1a} Metastasis in central compartment lymph nodes

N_{1b} Metastasis in unilateral, bilateral, contra lateral cervical or superior mediastinal lymph nodes **.**

RADICAL NECK DISSECTION

INDICATIONS

- Multiple positive neck nodes that are clinically present in an untreated patient or in patient treated with surgery, irradiation, chemotherapy or a combination thereof.
- One or more positive neck nodes that are clinically present and extra capsular extension with involvement of the spinal accessory nerve and internal jugular vein.
- Indications (usually an intra operative assessment) for a **Modified Radical Neck Dissection** include the following

MRND Type I - A clinically positive lymph node metastasis that does not include spinal accessory nerve.

MRND Type II - Metastatic tumour mass that involves the internal jugular vein but not the sternocleidomastoid muscle and spinal accessory nerve.

MRND Type III - * Indicated to remove clinically positive lymph node metastasis that does not infiltrate the non lymphatic structures.

* Palpable metastasis caused by differentiated carcinomas of thyroid.

CLASSIFICATION OF DIFFERENT TYPES OF NECK DISSECTION WITH CLINICAL INDICATIONS.

Comprehensive	Nodal Levels Removed	Structures Preserved	Indications
Radical neck dissection	Level **I - V**	None	N+ neck for SCC where SAN involved
Modified radical neck dissection type I	Level **I - V**	SAN	N+ neck for SCC where SAN free of disease.
Modified radical neck dissection type II	Level **I - V**	SAN, SCM	N+ neck for SCC where IJV involved but SAN free of disease
Modified radical neck dissection type III	Level **I - V**	SAN,SCM,IJV	Metastatic differentiated thyroid carcinoma
Selective			
Supraomohyoid neck dissection	Level **I - III**	SAN,SCM, IJV	N_0 neck for SCC of oral cavity and oropharynx (include level - 4) N_0 neck maliganant melanoma where primary Site is anterior ear (include parotidectomy for face and scalp)
Extended Supraomohyoid Neck dissection	Level I - IV	SAN, SCM, IJV	N_0 neck for SCC of lateral tongue.
Lateral neck dissection	Level II - IV	SAN, SCM, IJV	N_0 neck for SCC of larynx and hypopharynx
Posterolateral neck dissection	Level II - V suboccipital retroauricular node	SAN, SCM, IJV	N_0 neck malignant melanoma where primary site as posterior to ear.

SAN - spinal accessory nerve, **SCM** - sternocleidomastoid muscle, **IJV** - Internal jugular vein.

CONTRA INDICATIONS

- Primary tumour that cannot be controlled
- Distant metastasis
- Fixed neck nodes in the deep cervical fascia
- Circumferential or near circumferential involvement and invasion of the carotid vessels

TECHNIQUE

Patient is placed in the supine position with a shoulder roll extending the neck. The upper half of the operating table is elevated to a 30^{o} angle. The patient's neck and upper chest are prepared and draped in a sterile fashion for the proposed surgery. Sutures are used to delineate the field.

The MacFee incision is generally preferred. (**Fig.4**) The neck incision changes depending on the location of the primary tumor and whether one or both sides of the neck. (**Fig.5**) Vertical incisions and three point junctions in the central area is avoided especially in post radiotherapy status of the neck.

To assist in the alignment of the flaps at the end of the operation scratch marks are made.

The skin flaps are elevated to include the platysma. In the submandibular area, in order to preserve the marginal mandibular branch of the facial nerve, the nerve is formally identified. This plane is on the body of the submandibular gland and the fascia over the gland is included in the flap.

Inferiorly the sternal and clavicular heads of sternocleido mastoid are divided to expose the carotid sheath. **(Fig. 6A, 6B & 6C)** The internal jugular vein is isolated be dissection around it, and the vagus nerve, lying in a deep plane between the vein and the common carotid artery, is identified and preserved. The vein is then divided between ligatures. On the left, the thoracic duct is commonly divided at this point and will require over sewing to prevent leakage. The dissection is continued laterally, above the prevertebral fascia, to the anterior border of trapezius, elevating the fat pad overlying the scalene muscles and dividing the inferior belly of the omohyoid muscle which is included in the specimen. The external jugular vein and supraclavicular cutaneous nerves are divided. The transverse cervical vessels lie between the fat pad and the prevertebral fascia are preserved. Underneath the prevertebral fascia the phrenic nerve runs medially and downwards on scalenus anterior. It is identified and preserved. The trunks of the brachial plexus are also beneath this fascia.

The transverse cervical artery gives a vertical branch which runs up the anterior border of trapezius and it is ligated and divided. The accessory nerve is divided in the classical radical dissection as it enters the muscle, but is preserved in all modified neck dissections. The upper third of the trapezius approaches the posterior border of the

sternocleidomastoid muscle, the fibers of which are divided close to their mastoid insertion.

Anteriorly the superior belly of the omohyoid muscle forms the boundary of the dissection and is followed to its insertion into the hyoid bone and divided. The submental fat pad is dissected off until the anterior bellies of both digastric muscles are identified.

The deep dissection is commenced be reflecting forwards the posterior margin of the dissection and releasing the fat pad, with the nodes, off the prevertebral fascia and the underlying muscles, the levator scapulae and the scalenus. It is tethered down by the three cutaneous branches of the cervical plexus, namely the anterior cutaneous nerve of the neck, the great auricular nerve and the lesser occipital nerve. These nerves are identified and divided well away from the phrenic nerve. The internal jugular vein is dissected out of the carotid sheath up to the jugular foramen. The transverse process of the atlas is palpated and, just above this, the posterior belly of digastric will be found. This is retracted upwards, and the upper end of the jugular vein exposed where it is again divided between ligatures, with care being taken to preserve the vagus nerve. The hypoglossal nerve can be seen crossing lateral to the external carotid artery, and is in turn crossed by there small veins draining from the tissues are excised. The remaining sternocleidomastoid fibers are

divided at the level of a line extending from the tip of the mastoid process to the angle of the jaw. A higher division places the facial nerve at risk, as it lies deep to the anterior border of the muscle.

Superiorly the submental fat pad, and the anterior edge of the submandibular gland, is dissected off the lateral surface of the mylohyoid muscle. The posterior edge of mylohyoid is then retracted forwards, and the gland retracted inferiorly, to expose the lingual nerve which is freed and preserved. The submandibular duct is ligated. The facial vessels are ligated at the upper border of the gland, and the facial artery again at the inferior border.

Irrigation of the wound done with isotonic sodium chloride. Perfect haemostasis obtained. Drains are placed usually one for each side of the neck . The wound is closed in layers with 3-0 vicryl for the platysmal flaps and staples or 4-0 nylon for the skin.

The neck dissection specimen is divided in theatre by surgeons into the appropriate levels and the separate pieces are placed in labeled bottles containing 10% buffered formalin and sent to the pathology department.

MODIFIED RADICAL NECK DISSECTION

If the spinal accessory nerve is to be preserved, the nerve is identified in the posterior triangle and dissected from the anterior border of the trapezius to the stermocleidomastoid muscle until it is free. If the internal jugular vein is to be preserved, it is identified posteriorly after the cervical nerve branches are divided. Then, the vein is separated from the surrounding tissues until it is free. If the stermocleidomastoid is to be preserved, the procedure is performed by splitting the fascia from the muscle.

Modification to the Radical Neck Dissection include the following.

- Type I - The spinal accessory nerve is preserved.
- Type II - The Spinal accessory nerve and the sternocleido mastoid muscle are preserved.
- Type III - The spinal accessory nerve, internal jugular vein and the sternocleido mastoid muscle are preserved. **(Fig : 7)**

COMPLICATIONS

Complications can in most cases be identified as resulting from technical errors at the time of surgery or patient related factors such as poor surgical healing or reduced immunity. Such compromising factors as poor nutritional status, which is reflected in weight loss, low serum albumin level, immunosuppression, or alcoholism, and anemia will significantly compromise the outcome. [13]

Intraoperative Complications

Peripheral nerve injury

Although not strictly speaking a complication when the nerve is intentionally divided, the shoulder syndrome associated with division of the spinal accessory nerve continues to be the most common form of morbidity following radical neck dissection. The resultant denervation robs the shoulder girdle of its most powerful adductors, the trapezius muscle, and leads to the recognized syndrome of weakness, pain, deformity, and an inability to abduct the arm above the horizontal. The impact of nerve sparing procedures on shoulder function is at best controversial.

Phrenic nerve injury :

This injury is probably under diagnosed in many cases, although some studies have noted an incidence of 8%.[14] Inadvertent entry

deep to the prevertebral fascia due to distortion, fibrosis, or tumor involvement, blind diathermy of sub fascial bleeding points, or division of the cervical plexus roots too proximally contributes to this complication. The effects of hemi diaphragmatic palsy may range from harmless to considerable degree in patients with poor underlying pulmonary reserve or aspiration.

Injury to other nerves :

Brachial plexus palsy is an uncommon though feared complication of radical neck dissection. In patients with extensive supraclavicular tumor involvement, resection of some branches may be planned.

The marginal branch of the facial nerve may be damaged during the submandibular component of the dissection. Ligation and elevation of the common facial vein may aid in protecting this nerve; however, it risks allowing inadequate clearance of the prevascular and retro vascular nodes.

The lingual nerve is identified during the submandibular component of the neck dissection. The nerve may be divided or incorporated in ligature for the submandibular ganglion. Anesthesia of the hemitongue is the result, although the subjective severity of this signs may vary.

Hypoglossal nerve paralysis may occur at the level of the carotid bifurcation (typically because of tumor involvement) of more distally, inferior and deep to the submandibular gland. Careless ligation of the venae comitants nerve hypoglossi may also place the nerve at risk.

Vagal nerve injury is relatively uncommon, but this nerve may be intentionally divided when the surgeon is resecting tumours involving the carotid sheath. Inadvertent injury can be avoided by ensuring that the nerve is excluded from the internal jugular vein before it is divided and ligated during neck dissection. Division of this nerve below the skull base causes vocal cord paralysis, and palatine weakness leading to difficulties in swallowing and aspiration.

POSTOPERATIVE COMPLICATIONS

HAEMATOMA

Haematoma is a relatively common postoperative complication that is usually due to inadequate haemostasis, slippage of a ligature, blockage of suction drains, or dilutional coagulopathy following overzealous crysytalloid replacement during surgery. Accumulation of haematoma demands evacuation and exploration of the wound to protect flap viability.

FISTULA

Composite resections with breach of the pharynx increase the risk of wound contamination and fistula. Preoperative radiotherapy, postoperative haematoma, and malnutrition are additional causative factors.

WOUND INFECTION AND FLAP LOSS

Flap loss is due predominantly to poor flap design or elevation. Flaps should be irrigated frequently and draped to prevent ischemia during the course of the operation. Previous irradiation influences the rate of local flap complications, as does poor nutrition and injudicious tissue handling techniques. Radical neck dissection alone, in which there is no opening into the pharynx, has a much lower rate of wound infection than cases in which the pharynx is breached. The role of antibiotic is controversial, but several recent papers have reported that preoperative antibiotic cover is advantageous in reducing wound sepsis. The incidence of wound infection in patients with clean, noncontaminated radical neck dissection not opening into the pharynx and with no adjuvant antibiotics was 10%, whereas it was 3.3% in those who had received preoperative antibiotics in a recent paper by Blair and others.[15] They assumed that the high incidence of wound infection was related to the duration of the surgical procedure.

Carotid exposure

Associated with the complications of fistula and flap loss or necrosis are carotid exposure and blowout of this vessel. Recurrent neck disease may also become manifest by carotid rupture. Carotid exposure in the neck usually precedes rupture except in the unusual event of an internal haemorrhage, and as such, this complication can be anticipated. In procedures in which a risk of carotid exposure and blowout is anticipated, surgical maneuvers such as dermal graft draping or pedicled muscle cover (levator scapula or pectoralis major) **(Fig. 8A & 8B)** may prevent this, as will careful design and placement of neck flap incisions. Incipient haemorrhage requires immediate arrangements to ligate the vessel.

Chylous fistula

Injury to the thoracic duct on the left side and the lymphatic duct on the right causes a subcutaneous accumulation of chyle, flap erythema and fistula, or more seriously, chylothorax and associated metabolic problems. Accidental division in the left side of neck is more common than division in the right side of neck owing to the higher volume of chyle on this side and its greater risk of exposure. This complication said to occur in about 2.5% of patients undergoing left neck dissection.[16] In the fasting state, chyle is essentially colorless and is difficult to note unless it is specifically sought.

Initial management includes use of free drainage and a pressure dressing. Suction drainage may encourage an ongoing chyle leak. Further dietary manipulation namely, medium-chain fatty acids or total parenteral nutrition in severe recalcitrant cases may be required.[17] Rarely, the neck will require reexploration. This entails identification and oversewing of the duct stump.[18]

MATERIALS AND METHODS

During the period of 2006 to 2008 data were collected from patients who attended the general surgical wards of Coimbatore medical college hospital with suspected metastatic nodes with known primary. Unknown primary with neck secondaries and N-o neck nodes were not included in this study.

A detailed history was elicited about age, sex, occupation, mode of onset of neck mass, duration, rate of growth, pain and associated symptoms such as dysphagia, loss of weight, hoarsness of voice. A history of exposure to alcohol and tobacco, previous radiation to head and neck also elicited.

In patients who presented with known primary and a metastatic node, the primary was thoroughly examined at its size, shape, gross appearance, consistency were all noted. Then the neck nodes were examined and its site, size, shape, consistency, number, mobility, fixity to skin and deeper structures like carotid artery, muscle and cranial nerve involvement.

A lymph node was taken as significant if it was in the drainage area of the primary, hard and above 1 cm in size.

Likewise contra lateral neck nodes were also examined and findings noted. Nodes were classified according to the 5 levels to assess the prognosis of the patients.

Routine investigations- complete haemogram, chest X-Ray PA view, ECG, Ultrasonogram of the abdomen were done for all patients.

FNAC [Fine Needle Aspiration Cytology] was done in all patients to find histological nature of metastatis. Likewise the primary was also biopsied (open biopsy). If FNAC was found to be inconclusive an open biopsy either excision of node if small or wedge biopsy in case of large nodes.

In patients admitted as secondaries neck with unknown primary, first thorough clinical examination was undertaken to rule out any oropharyngeal malignancies especially posterior 1/3 of tongue. Then an indirect laryngoscopy was done for hypopharyngeal malignancies with attention on vallecula, nasopharynx and pyriform sinus. If still primary could not be found the bronchoscopy, oesophagoscopy were done to find out the primary.

CT scan was taken in all patients to find out extend and infiltration of neck nodes into the surrounding structures.

The choice of treatment modality varied according to the stage of the disease. The patient subjected to surgery either Radical neck dissection or Modified radical neck dissection, also received post operative adjunctive therapy in the form of chemotherapy or radiotherapy or both.

The patient were followed up over a two year period and were evaluated for loco regional recurrence, systemic metastasis and quality of life.

DISCUSSION AND RESULTS

Forty six patients included in this study were analysed and results are detailed below.

Sex distribution

Sex	Number of Patients	Percentage
Male	32	70%
Female	14	30%

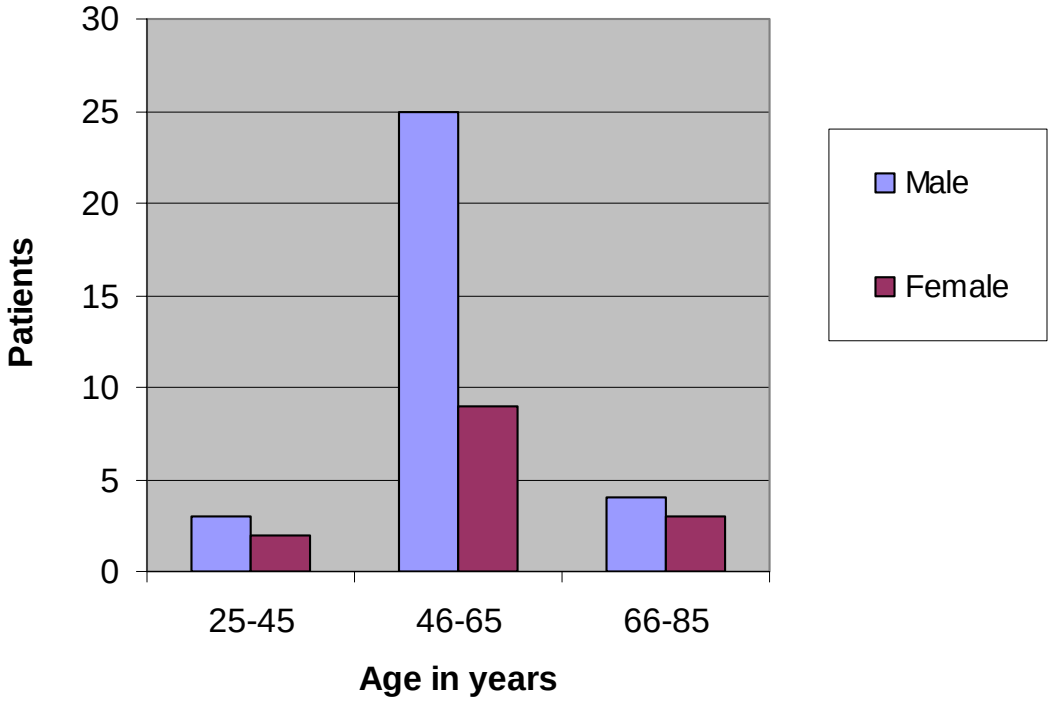
Among 46 patients who presented to the surgical clinics with known primaries with neck secondaries, there were 32 male patients accounting for 70% and 14 female patients accounting for 30%. The male female ratio was **2.3:1**. This is in accordance with the reports of journal of cranio maxillo facial surgery. [19]

Age distribution

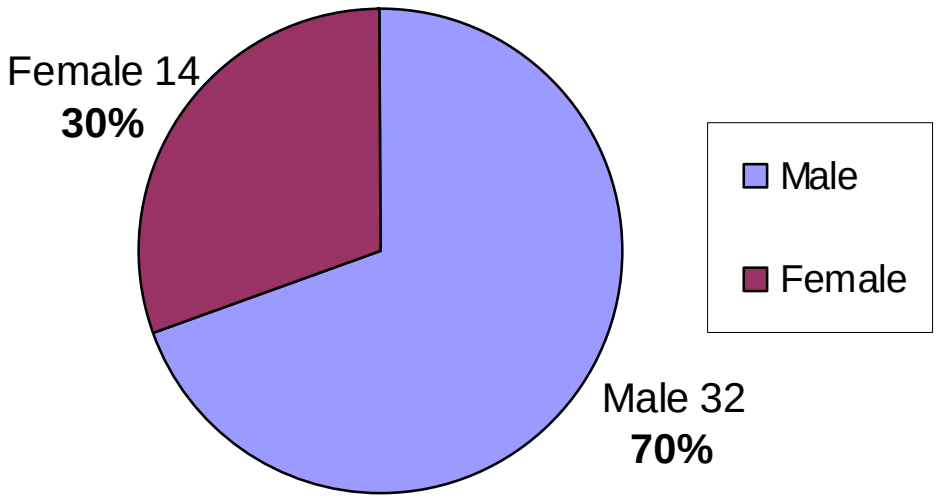
Sex	Age in years		
	25-45	46-65	66-85
Male	3	25	4
Female	2	9	3

Maximum age incidence was observed to be in the 46 to 65 years age group both in males and females. The same age distribution was observed in the department of ORIHNS, Kasturba medical college, Mangalore, India.[20]

AGE DISTRIBUTION



SEX DISTRIBUTION



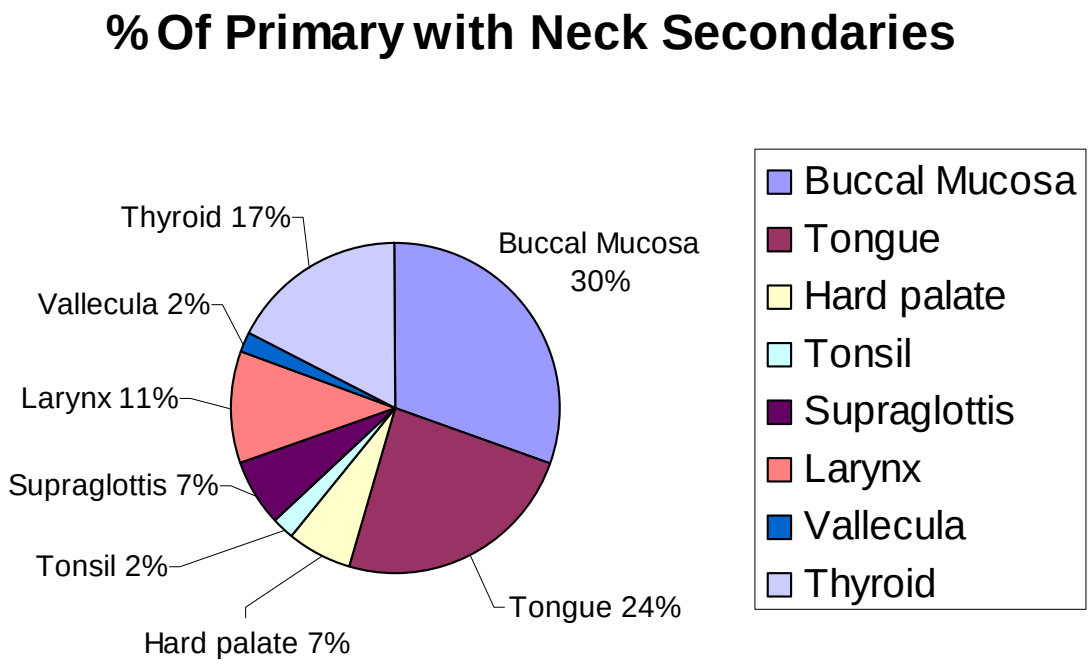
Site of origin of primary

Site of primary	Numbers	Percentage
Buccal Mucosa	14	30 %
Tongue	11	24 %
Hard palate	3	7 %
Tonsil	1	2 %
Supraglottis	3	7 %
Larynx	5	11 %
Vallecula	1	2 %
Thyroid	8	17 %

In our study, the most common site of primary in head and neck was oral cavity. The higher incidence of oral cavity cancers could be attributed to the habit of tobacco chewing and alcohol intake.

T Stage of tumor at presentation

Out of 46 patients with known primary, 10 patients (22%) were in stage T_1 and T_2, 30patients (65%) at stage T_3 and 6 patients (13%) at stage T_4.


% Of Primary with Neck Secondaries
Thyroid 17%
Buccal Mucosa 30%
Vallecula 2%
Larynx 11%
Supraglottis 7%
Tonsil 2%
Hard palate 7%
Tongue 24%
Buccal Mucosa
Tongue
Hard palate
Tonsil
Supraglottis
Larynx
Vallecula
Thyroid

Site of nodal metastasis

The commonest site of nodal metastasis was in the upper deep cervical group in 42% (Level II and III) (Fig : 4,5) followed by submandibular group in 27% (Level I), lower deep cervical group in 25% (Level IV) and posterior triangle group in 6% (Level V)

Stage of nodes at presentation

Out of 46 patients with known primary with neck secondaries 10 Patients were in N_1 (22%), 21 patients in N_2 (45%) and 15 patients in N_3 (33%).

Nodal Histology

In 46 patients, 38 cases were squamous cell carcinoma from head and neck malignancies, 8 were deposits from papillary carcinoma of thyroid.

Squamous cell carcinoma is the most common malignancy in head and neck region, according to various study.[21, 22]

Metastasis

No distant Metastasis was found in any of the forty six patients.

Radical Neck Dissection

In 46 patients who presented with neck secondaries 34 Patients were not subjected to surgery because of unwillingness, systemic complications and advanced disease. Hence, 12 patients were taken up for Radical neck dissection.

8 Patients with papillary carcinoma of thyroid [2 patients (T_2 N_1b M_o), 3 patients (T_3 N_1a M_o) and 3 patients (T_3 N_1b M_o)] underwent total thyroidectomy with Modified radical neck dissection Type III unilaterally.

2 patients with carcinoma Anterior 2/3 of Tongue stage (T_2 N_2b M_o) underwent hemiglossectomy and Radical neck dissection unilaterally with post operative radiotherapy and chemotherapy.

1 patient with carcinoma Anterior 2/3 of Tongue stage (T_2 N_1 M_o) underwent hemiglossectomy and Modified radical neck dissection Type I unilaterally with post operative radiotherapy and chemotherapy.

1 patient with carcinoma vallecula stage (T_2 N_2b M_o) had pre-operative radiotherapy for primary and was taken up for Radical neck dissection.

Complications

In our study, even though Radical neck dissection was performed with caution, chyle leak developed in 1 patient in papillary carcinoma of thyroid and managed conservatively by dietary manipulation. This complication is said to occur in about 2.5% of patients undergoing left neck dissection.[23]

Intentional division of spinal accessory nerve producing shoulder syndrome continues to be the most common form of morbidity following Radical neck dissection [24] In our study all 3 patients who underwent Radical neck dissection developed weakness, pain and deformity. **(Fig. 9)**

The impact of nerve sparing procedures on shoulder function is at best controversial.[25]

Blair observed previous irradiation increases the rate of local flap complications.[15] In our study wound infection and flap necrosis occurred in 1 patient in post radiation Radical neck dissection. **(Fig. 10)**

Follow up

Monthly follow up was made in the first year after surgery and bimonthly follow up in the second year.

SUMMARY AND CONCLUSION

- The commonest presenting age of the patient was between 46 years and 65 years.
- A definite male preponderance was noted.
- The commonest primary was from buccal mucosa.
- Modified Radical Neck Dissection Type III was performed in all papillary carcinoma of thyroid with neck secondaries.
- The combination of Radical neck dissection or Modified radical neck dissection with pre or post operative radiotherapy given for patients with squamous cell carcinoma.
- Shoulder dysfunction was the commonest complication of Radical neck dissection.
- No recurrence was found in a mean follow up period of 1 year.

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CASE STUDY PROFORMA

Name

Age

Sex

Occupation

Income

Postal address

IP NO

Ward/unit

DOA

DOS

Primary

Site

Size

Shape

Consistency

Number

Mobility

Nodal involvement

Site

Size

Shape

Consistency

Number

Mobility

Fixity to skin

Fixity to deeper structure like carotid artery / Muscle / Cranial nerve involvement

Mode of onset of neck mass

Duration

Rate of growth

Pain

Dysphagia

Loss of weight

Hoarsness of voice

H/O exposure to alcohol

H/O tobacco chewing

H/O exposure to radiation to the neck

Investigations

Complete haemogram

Chest X-Ray PA view

ECG

USG abdomen

Biopsy/FNAC of primary

Biopsy/FNAC of node

Indirect laryngoscope

Bronchoscope

Oesophagoscope

CT scan neck

Staging

Type of surgery

Intra operative complication

Haemorrhage

Peripheral nerve injury

Phrenic nerve injury

Marginal branch of facial nerve injury

Lingual nerve injury

Hypoglossal nerve injury

Vagal nerve injury

Injury to internal jugular vein

Air embolism

Post operative complication

Haematoma

Chyle leak

Infection

Flap necrosis

Carotid artery exposure or rupture

Oedema

Shoulder dysfunction

Follow up