The Evaluation of Routine Central Nodal Dissection In Radiologically Node Negative Differentiated Thyroid Carcinoma

Thesis

Submitted for Partial Fulfillment of the MD degree ***in General Surgery***

Presented by

Ahmed Yosry AbdulAleem Ammar

M.B.,B.CH

MSc. General Surgery

Faculty of Medicine Ain Shams University

Supervisors

Prof. Dr. Ayman AbdAllah AbdRabo

Professor of General Surgery

Faculty of Medicine-Ain Shams University

Dr. Mohamed Fayek Mahfouz

Assistant Professor of General Surgery

Faculty of Medicine, Ain Shams University

Dr. Ahmed Adel Darwish

Assistant Professor of General Surgery

Faculty of Medicine, Ain Shams University

Faculty of Medicine

Ain shams University

2018

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to **ALLAH**,
the Most Kind and Most Merciful.

I'd like to express my respectful thanks and profound gratitude to **Prof. Dr. Ayman AbdAllah AbdRabo,** *Professor of General Surgery Faculty of Medicine-Ain Shams University for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to **Dr. Mohamed Fayek Mahfouz,** *Assistant Professor of General Surgery Faculty of Medicine, Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

I am deeply thankful to **Dr. Ahmed Adel Darwish,** *Assistant Professor of General Surgery Faculty of Medicine, Ain Shams University, for his great help, active participation and guidance.*

Ahmed Yosry AbdulAleem Ammar

Dedication

I would like to extend my deepest thanks to people who inspired me and supported me through out my entire life,

My Parents,

My Wife,

My Daughter,

And My Family

To Everyone of You, My Life is Dedicated.

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List of Abbreviations

Abb.	Full term
99 Tc	Technetium-99
AP/T	Anteroposterior diameter of the nodule to the transverse diameter ratio
ATA	American Thyroid Association
ATC	Anaplastic thyroid carcinoma
Bil-PCND	Bilateral prophylactic central neck dissection
CLND	Central lymph node dissection
cN+	Clinically positive neck
CT	Cricothyroid
DTC	Differentiated thyroid cancer
EBSLN	External branch of the superior laryngeal nerve
FNA	Fine needle aspiration
fT4	Free thyroxine
FTC	Follicular thyroid carcinoma
fT3	Free triidothyronine
FVPTC	Follicular variant of papillary carcinoma
IBSLN	Internal branch of the superior laryngeal nerve
IC	Inferior constrictor muscle
IpsiCND	Ipsilateral central neck dissection
ITA	Inferior thyroid artery
MEN	Multiple endocrine neoplasia
MTC	Medullary thyroid carcinoma

List of Abbreviations Cont...

Abb.	Full term
NRLN	Non-Recurrent Laryngeal Nerve
pCND	Prophylactic central neck dissection
PTC	Papillary thyroid carcinoma
RAI	Radioactive iodine
RCLD	Routine Central Lymph node Dissection
RLN	Recurrent laryngeal nerve
SLN	superior laryngeal nerve
TE	Tracheoesophageal
Tg	Thyroglobulin
TSH	Thyroid Stimulating Hormone
TT	Total thyroidectomy
US	Ultrasound

INTRODUCTION

Thyroid cancer is the most common endocrine malignancy, and its incidence is increasing at the highest rate among cancers worldwide ***(Hennessy and Goldenberg, 2016).***

Differentiated thyroid cancer (DTC), which derives from follicular epithelial cells, includes papillary and follicular cancer; DTC accounts for more than 90% of all thyroid cancers ***(White et al., 2007).***

Lymph node metastases are a common finding in papillary thyroid carcinoma (PTC), occurring in 20–50 % of patients in the central compartment of the neck (level VI) and in 10–30 % in the lateral compartment of the neck (levels II – V) ***(Barczyński et al., 2014).***

However, despite good prognosis, loco- regional recurrence is relatively common after curative surgery. With recognition of the step-wise progression of metastasis from central (level VI) to lateral (levels II–V) compartments, routine prophylactic central neck dissection (pCND) has been advocated at the time of total thyroidectomy to minimize loco-regional recurrence ***(Wong and Lang, 2014).***

The central compartment is bounded by the hyoid bone (superior), carotid artery (lateral), and sternal notch or innominate artery (inferior). The American Thyroid Association (ATA) defines central compartment neck dissection as "comprehensive,

compartment-oriented removal of the prelaryngeal and pretracheal nodes and at least one paratracheal lymph node basin ***(Hennessy and Goldenberg, 2016).***

The inability to diagnose lymph node metastases accurately by preoperative ultrasonography (low sensitivity) or intraoperative inspection, the high incidence of lymph node metastases, the decreased risk of local recurrence and need for reoperation and its morbidity, the improved ability to justify radioactive iodine (RAI) treatment, the better thyroglobulin (Tg) surveillance, and the failure of 131I ablation in approximately 30% of cases are considered factors that favor routine (or prophylactic) central lymph node dissection ***(Conzo et al., 2014).***

Given the excellent overall survival rates associated with PTC and the potential morbidity associated with reoperative cervical surgery, prophylactic CND may seem to be appropriate, as it may decrease the disease recurrence rate by extirpating level VI lymph nodes ***(Lee et al., 2015).***

Aim of the Work

This work aims to prospectively compare between total thyroidectomy alone and total thyroidectomy combined with central node dissection in clinically and radiologically negative lymph nodes in cases of differentiated thyroid carcinoma. This is regarding value of the procedure versus morbidity caused by it in the two groups of cases. This study will be conducted at Ain Shams University Hospitals.

Chapter 1

ANATOMY OF THE THYROID GLAND

Embryology of the thyroid gland:

The primordial thyroid gland is first identifiable during the fourth week of gestation, beginning as an endodermal invagination of the tongue at the site of the foramen cecum. The foramen cecum lies where the midline intersects the sulcus terminalis, which divides the tongue into anterior two thirds (oral part) and posterior one third (pharyngeal part). The thyroid diverticulum begins its descent through the tongue carrying with it the thyroglossal duct. The path of descent carries the developing gland anterior to the hyoid bone and the larynx. During the descent in the fifth week, the superior part of the duct degenerates. By this time, the gland has achieved its rudimentary shape with two lobes connected by an isthmus. It continues to descend until it reaches the level of the cricoid cartilage at about the seventh week. By the twelfth week of development, thyroid hormone is secreted. The distal part of the thyroglossal duct degenerates but may remain as a pyramidal lobe ***(Mansberger and Wei, 1993).***

Thyroid gland shape and size:

The Germans call the thyroid gland Scilddruse or the ‘‘shield gland,’’ but the English word for the thyroid gland is

derived from the Greek word thyreoeidos (Thyreos – sheild, eidos – from) with the same meaning. It consists of two lateral lobes which are united by isthmus located anterior to the trachea and weighs about 15–25 g in adults. The thyroid lobes measure about 4 cm superiorly to inferiorly, 15–20 mm in width and the thickness of 20–39 mm. One should keep in mind that these dimensions may be drastically altered due to disease ***(Mohebati and Shaha, 2012)***.

The gland is covered by a thin fibrous capsule without true lobulations. The lateral lobes of the thyroid are located between the trachea and larynx medially and the carotid sheath and sternocleidomastoid muscle laterally. Laterally, the deep cervical fascia creates a loose false capsule on lateral portion of the gland ***(Wartofsky and Van Nostrand, 2014).***

Anteriorly, the gland is covered by the superficial fascia and plathysma, and, posteriorly, the condensation of the deep cervical fascia forms the suspensory ligament of Berry affixing the thyroid to the trachea and larynx. The ligament is attached to the inferior margin of the cornu of the cricoid cartilage extending inferio-medially onto the tracheal wall attaching the thyroid to the first two tracheal rings ***(Mohebati and Shaha, 2012).***

Pyramidal lobe and isthmus:

The pyramidal lobe is a potential pitfall of thyroid surgery and could be a source of recurrent disease if it is left