INTIMA MEDIA THICKNESS OF COMMON CAROTID ARTERY IN PATIENTS WITH THYROID DYSFUNCTION

Thesis

Submitted for the Partial Fulfillment of Master Degree in Internal Medicine

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Acknowledgement

I would like to thank **(ALLAH)** *almighty who is most merciful.*

I wish to express my deepest thanks and greatest gratitude to Prof. ***Mohammed Ibrahim Sheta,*** *Professor of internal medicine Cairo University for his fatherly kindness and greatest support throughout this work, it was a great honor to work under his supervision.*

My deepest thanks and sincere gratitude to Prof. ***Ali Mamdouh Ashmaui,*** *Professor of internal medicine Cairo University for his kindness ,gentleness great support and help continuous meticulous supervision and guidance during this work from the start to the end.*

I am particularly indebted to Prof. ***Hebat'Allah Mustafa,*** *Professor of internal medicine Cairo university for her valuable supervision precious help, constant support and encouragement no words can express my deepest obligation.*

Finally I wish to thanks my family for their constant support and patience and for all people who have helped me along the course of my work.

Abstract

Thyroid disease is associated with increased rates of cerebrovascular disease. Both hypothyroidism and hyperthyroidism produce changes in cardiac contractility, myocardial oxygen consumption, cardiac output, blood pressure and systemic vascular resistance.

the aim of this work was to measure the IMT in patient with hypothyroidism and hyperthyroidism in comparison to normal subjects.

History taking, clinical examination, anthropometric measurement, thyroid function tests and measurement of IMT were done to all subjects.

The results showed that the IMT in patients with hypothyroidism is significantly increased than in control subjects, in patient with hyperthyroidism it is significantly decreased than in control subjects.

So the conclusion of this work can be that patients with thyroid dysfunction have different IMT than the normal subjects.

Key words(Thyroid dysfunction, Intima media thickness)

ABBREVIATIONS

ACTH	: Adrenocorticotropic hormone
ADH	: Antidiuretic hormone
AITD	: Auto immune thyroid disease
ATPase	: Adenosine triphosphatase
cAMP	; Cyclic adenosine monophosphate
CCA	: Common carotid artery
CEA	: Carcinoembryonic antigen
CHD	: Coronary heart disease
CT	: Computed tomography
CTLA-4	: Cytotoxic T lymphocyte antigen 4
DIT	: Diiodotyrosine
DNA	: Deoxyriboneuclic acid
ECF	: Extracellular fluid
ECG	: Electrocardiography
EEG	: Electroencephalogram
EMG	: Electromyogram
FNA	: Fine needle aspiration
FNAC	: Fine needle aspiration cytology
FT_4	: Free thyroxine
$FT_4$1	: Free thyroid index
GFR	: Glomerular filtration rate
GIT	: Gasrointestinal tract
GRTH	: Generalized resistance to thyroid hormone
HLA	: Human leucocyte antigen
HRT	: Hormonal replacement therapy
IMT	: Intima media thickness
IQ	: Intelligence qutient
LDL	: Low density lipoprotein
MDT	: Multi-disciplinary team

MEN	: Multiple endocrine neoplasia
MIT	: Monoidotyrosine
MRI	: Magnetic resonance imaging
mRNA	: Messenger RNA
NO	: Nitric oxide
N-R ATPase	: Sodium-potassium adenosine triphosphatase
OPG	: Osteoprotergin
RAI	: Radioactive iodine
RNA	: Riboneuclic acid
SVR	: Systemic vascular resistance
T_3	: Triiodothyronine
T_4	: Thyroxine
TBG	: Thyroid-binding globulin
TBH	: TSH receptors antibodies [TSH binding inhibitory immunoglobulins]
TBPA	: Thyroid-binding prealbumin
TED	: Thyroid eye disease
TNF	: Tumor necrosis factor
TPO	: Thyroid peroxidase
TR	: Thyroid hormone receptor
TR_3	: Reverse triiodothyronine
TREs	: Thyroid hormone response elements
TRH	: Thyrotropine-releasing hormone
TSH	: Thyroid stimulating hormone
TSI	: Thyroid stimulating immunoglobulin
VLDL	: Very low density lipoprotein
VSM	: Vascular smooth muscle

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INTRODUCTION

Thyroid disease is quite common current estimates suggest that it affects as many as 9% to 15% of adult female population and smaller percentage of adult males ***(Courir et al., 2000)***.

Untreated thyroid disease is associated with increased rates of cerebrovascular disease ***(Dayer and Klein, 2004)***. Hypothyroidism is associated with increased morbidity from cardiovascular disease.

Measurement of intima media thickness of carotid artery by (B mode ultrasonography) is a non invasive and easy applicable method to quantities carotid atherosclerosis. Intima media thickness (IMT) of the carotid artery has been shown to predict future incidence of cardiovascular disease ***(O'learly et al., 1999)***.

AIM OF THE WORK

The aim of the work is to study IMT in patients with thyroid dysfunction.

Key words: Intima media thickness …. thyroid dysfunction

CHAPTER I

Embryology of the Thyroid Gland

The thyroid gland is a shield-like **(thymus Greek-shield)** organ derived from pharyngeal epithelium. It is embryologically present at 4 weeks, but iodide concentration and thyroid hormone producing ability are not apparent until the 11th week ***(Robin, 1996).***

The thyroid gland appears in embryos as a median thickening of endodermis in the floor of the pharynx between the first and second pharyngeal pouches. This one is later evaginated to form a median bud, which appears during the second half of the fourth week from which the thyroid gland develops ***(Charles and Russel, 1992).***

The connection of the median diverticulum with the pharynx is termed the thyroglossal duct. It extends from the foramen coecum ventrally across the first and second arches then caudally in front of the remaining arches as far back the commencement of the trachea. The distal part of the thyroglossal duct frequently persists and if it differentiates into thyroid parenchyma it forms the pyramidal lobe of the thyroid gland ***(Mc Minn, 1990).***

The ultimobranchial body, which arises from a diverticulum of the fourth or the fifth pharyngeal pouch on each side, amalgamates with the corresponding lateral lobe. Para follicular C-cells are derived from the neural crest and reach the thyroid gland via ultimobranchial body. Recently, consideration has been given to the possibility that some c-cells are of endodermal rather than neural crest origin. It is doubtful whether

the branchial apparatus itself contribute to the thyroid follicular cells ***(Charless and Russel, 1992).***

Congenital anomalies:

1. Ectopic thyroid tissues: some residual thyroid tissue along the course of the thyroglossal tract is not uncommon and may be lingual, cervical or intra thoracic. Very rarely the whole thyroid gland is ectopic ***(Kaplan, 1988).***

A. Lingual thyroid:

This forms a rounded swelling at the back of the tongue at the foramen coecum and it may represent the only thyroid tissue present. It may cause dysphagia, impaired speech, respiratory obstruction or hemorrhage.

B. Median ectopic thyroid:

This forms a swelling in the upper part of the neck and is usually mistaken for thyroglossal cyst. Again, this may be the normal thyroid tissue present ***(Kaplan, 1988).***

C. Intracardiac ectopic thyroid:

Ectopic thyroid tissue is extremely rare in the heart. A case of 42 year-old woman was reported who had right bundle branch block of the heart, and a systolic murmur in the pulmonary area. Echocardiography showed a tumor mass that was situated in the anterior wall of the right ventricle and interventricular septum projecting in the right ventricular cavity. An operation was performed. The tumor weighted 33g, measured

5×4×3 cm, and was bordered by a fibrous tissue. Macroscopically, it was soft, transparent, and pinkish in color with areas of focal hemorrhage. Microscopically, the tumor consisted of micro and macro thyroid follicles, focal hemorrhage and fibrosis ***(Kaplan, 1988).***

2. Persistent remnants of the thyroglossal duct:

The foramen coecum of the tongue and the pyramidal lobe of the thyroid gland are normal remnants of thyroglossal duct. Between these structures the track forms an epithelial tube, usually broken at several places.

Thyroglossal cyst:

This may be present in any part of the thyroglossal tract. The common situations, in order of frequency, are prehyoid 75%, thyroid cartilage 15%, suprahyoid 5%, cricoid level 4%, and base of the tongue 1%. Such a cyst occupies the midline, except in the region of the thyroid cartilage, where the thyroglossal tract is pushed to one side, usually to the left ***(Shanda Lakis, 1983).***

Thyroglossal fistula is never congenital and it is usually the result of infection, attempted drainage of a misdiagnosed abscess, or after inadequate surgical excision without removal of the thyroid. It is presenting in 15% of the cases ***(Ranadine 1984).***

3. Agenesis:

Total agenesis of one thyroid lobe may occur. This is rare but can be clinically important, leading to confusion in diagnosis, especially in toxic gland, when it could be diagnosed as a secreting nodule ***(Decker***

and Duplesis, 1986). One lobe, usually the right, may be smaller than other (7%) or even completely absent (1.7%).The isthmus is absent in (10%) and the pyramidal lobe is absent in about 50 % ***(Shanda Lakis et al 1983).***

Anatomy of Thyroid Gland

The thyroid gland is placed in the lower part of the front of the neck between the level of the fifth cervical to the of the first thoracic vertebra. It consist of two conical lobes on each side of the trachea connected to each other by a narrow median isthmus. In 40% of specimens, a process of gland tissue called the pyramidal lobe extend upwards from the upper lobe of the isthmus in front of the cricoid and thyroid cartilage (***Romans1981).*** *fig (1)*

The weight of the thyroid gland is usually about 25gm being slightly heavier in females and enlarging during menstruation and pregnancy, each lobe is about 5cm long, its greatest transverse and anteroposterior dimensions are about 3 cm and 2cm respectively ***(McMinn, 1990).***

The thyroid gland has a connective tissue capsule, which is continuous with the septa that make up the stroma of the gland. This is called the true capsule of the thyroid. Outside it, there is a layer of fascia derived from pretracheal fascia known as the false capsule. Anteriorly and laterally this fascia is well developed, while posteriorly it is thin and loose, permitting enlargement of the thyroid posteriorly. There is a thickening of the fascia that fixes the back of each lobe to the cricoid cartilage, which is called the suspensory ligament of Berry ***(Decker and Duplesis, 1986).***

The anterior surface of the gland is covered by three strap muscles *(sternohyoid, superior belly of omohyoid, and sternohyoid,)* separated only by the false capsule. These muscles are ensheathed by the general investing layer of the cervical fascia that unites them in the midline, and branches from the ansa cervicalis supply them ***(Decker and Duplessis, 1986).***