ACCURACY OF FINE NEEDLE ASPIRATION CYTOLOGY IN THE DIAGNOSIS OF THYROID SWELLING COMPARED TO THE POSTOPERATIVE PATHOLOGY REPORT

Thesis

Submitted for Partial Fulfillment of Master Degree

in General Surgery

Submitted by

Abdihakim Elmi Abdishakur

MBBS

Faculty of Medicine, Kassala University. Sudan

Supervised by

PROF. WALEED ABDELLATEF ALYAN

Professor of General Surgery

Faculty of Medicine - Ain Shams University

PROF. AMR ABDELRAOUF ABDELNASER

Professor of General Surgery

Faculty of Medicine - Ain Shams University

DR. MOHAMED ABDEL SATTAR ABDEL HAMID

Assistant Professor of General Surgery

Faculty of Medicine - Ain Shams University

Faculty of Medicine - Ain Shams University

2019

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 Waleed Abdellatef Alyan,** *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 **Prof. Dr. Amr Abdelrouf Abdel Naser,** *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. Mohamed Abdel Sattar Abdel Hamid,** *Assistant Professor of General Surgery, Faculty of Medicine, Ain Shams University, for his great help, active participation and guidance.*

Abdihakim Elmi Abdishakur

Dedication

To my dear parents mom ***Fahma and Dad Elmi***

To my lovely wife ***Hani Abdullahi***

To my beautiful daughter ***Yusra***

List of Contents

List of Tables

List of Figures

List of Figures

INTRODUCTION

Thyroid disorders are one of the common problems encountered in clinical practice with majority of benign in nature ***(Burguera and Gharib, 2000).***

They are endemic in mountainous region of the world, where the soil, water & food supply contain little iodine ***(Elahi et al., 2005)*** and endemic area for iodine deficiency goiter. In many cases non-neoplastic goiter present as a solitary thyroid nodule (STN). Most of the STN are benign, few are malignant. The endemicity varies from one place to another. Nodular thyroid disease is more prevalent than diffuse goiter. Long standing goiter (more than 5 years) is regarded as a risk factor for the development of thyroid cancer ***(Suohel et al., 2009).***

Thyroid cancer is a relatively rare malignancy, representing only 1.5% of all the cancers, but it is the commonest endocrine cancer accounting for 92% of all endocrine malignancies ***(Islam, 2010).***

Papillary carcinoma is the most common thyroid cancer followed by follicular, medullary, anaplastic and lymphoma. So evaluation of thyroid swelling should be undertaken by careful history taking, physical examination and investigation like FT3, FT4 and TSH level with FNAC and further evaluation by postoperative histopathological examination.

Fine needle aspiration cytology (FNAC) is a well established outpatient procedure used in the primary diagnosis of palpable, thyroid swelling. FNAC gained acceptance in the UK and USA in 1970 ***(Niazi et al., 2007).***

Currently this technique is practices worldwide and it is the investigation of choice in thyroid swelling. The limitation includes follicular carcinoma, false negative results, false positive results and a proportion of FNAC result fall into the indeterminate or suspicious group. The sensitivity of thyroid FNAC ranges from 80 to 98% and its specificity from 58 to 100% ***(Thomson, 2006).***

FNAC is simple, cost effective, readily repeated and quick to perform procedure in the outpatient department with excellent patient compliance important factor for the satisfactory test includes representative specimen from the nodule and an experienced cytologist to interpret findings. It is often used as the initial screening test for diagnosis of thyroid nodules.

Thus, to summarise, FNAC plays a useful role in the preoperative investigation of the thyroid gland diseases. The experience, as well as the skills of the cytopathologist in aspiration and interpretation, is crucial. Fine needle aspiration is a good predictor of malignancy which results in a smaller proportion of excisions for benign nodules ***(Chandio et al., 2018)***.

Aim of the Work

The aim of this study is to compare accuracy of fine needle aspiration cytology in the diagnosis of solitary thyroid nodule compared to postoperative histopathological examination of the removed gland.

Identical results will probably save many patients unnecessary thyroidectomies.

Chapter 1
ANATOMY AND EMBRYOLOGY OF THYROID GLAND

Thyroid gland **(Fig. 1)** is one of the largest endocrinal organs. The normal adult thyroid gland weights between 14 and 20gm but it is larger in regions with iodine deficiency ***(Thompson, 1998).***

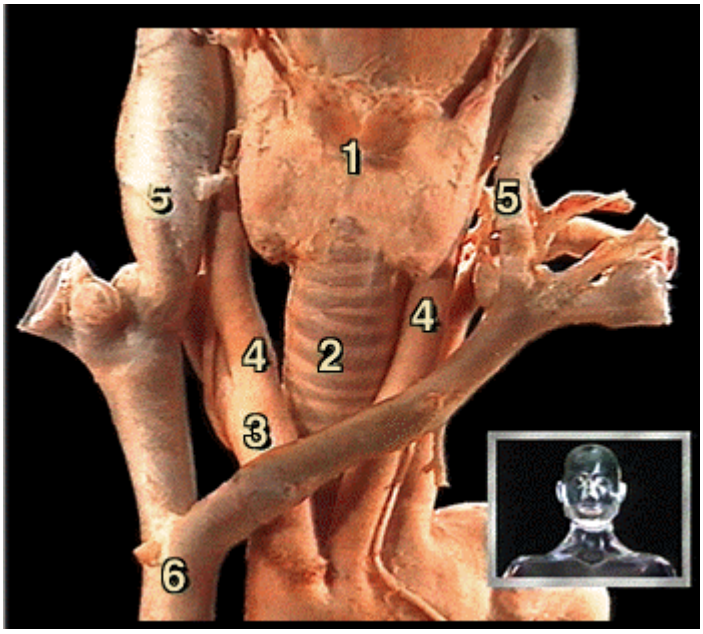

Figure (1): Trachea and major vessels of the neck, anterior view

1- Thyroid gland	2-Trachea
3- Brachiocephalic artery	4- Common carotid artery
5- Internal jugular vein	6- Superior vena cava

(Thompson, 1998)

Embryology

The thyroid is the first endocrine gland to develop in the embryo. It begins to form about 24 days after fertilization from a median endodermal thickening in the floor of the primordial pharynx. This thickening soon forms a small out-pouching – 'the thyroid primordium'. As the embryo and tongue grow, the developing thyroid gland descends in the neck, passing ventral to the developing hyoid bone and laryngeal cartilages. For a short time the thyroid gland is connected to the tongue by a narrow tube, the thyroglossal duct. At first the thyroid primordium is hollow but it soon becomes solid and divides into right and left lobes connected by the isthmus of the thyroid gland which lies anterior to the developing 2nd and 3rd tracheal rings. By seven weeks the thyroid assumes its definitive shape and reaches its final site in the neck. The thyroglossal duct by this time has normally degenerated and disappeared. The proximal opening of the thyroglossal duct persists as a small pit in the tongue-'the foramen cecum'. A pyramidal lobe extends superiorly from the isthmus in about 50% of people. The pyramidal lobe may be attached to the hyoid bone by fibrous tissue and /or smooth muscle'the levator of thyroid gland'. A pyramidal lobe and the associated smooth muscle represent a persistent part of the distal end of the thyroglossal duct

Histogenesis of the thyroid gland

The thyroid primordium consists of a solid mass of endodermal cells which breaks into a network of epithelial cords as it is invaded by the surrounding vascular mesenchyme. By 10th week the cords have divided into small cellular groups. A lumen forms in each cell cluster and cells become arranged in a single layer around a lumen. During 11th week colloid begins to appear ***(Khatawkar et al., 2015).***

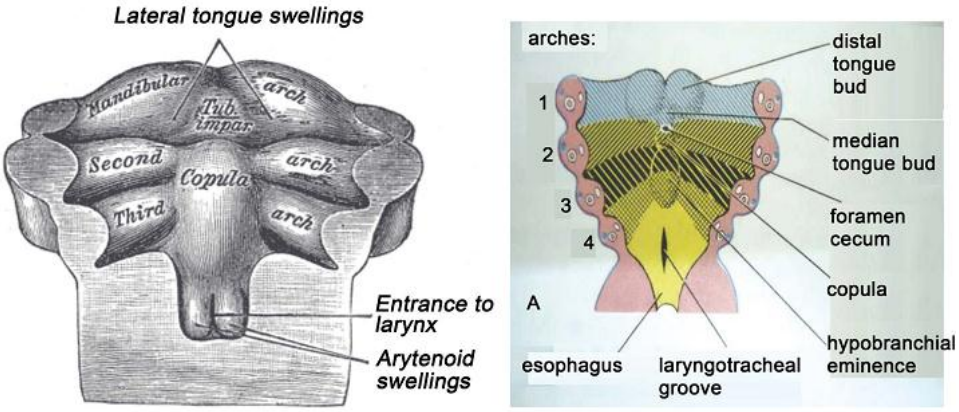

Figure (2): Origin of thyroid gland at the foramen cecum and the tuberculum impar (median tongue bud).

ANATOMY OF THYROID GLAND

The thyroid gland is an extremely vascular organ that is brown to red in color, firm in consistency, located posterior to the strap muscles, and anteriorly in the lower aspect of the neck, extending from the level of the fifth cervical vertebra down to the first thoracic vertebra. The shape of the thyroid gland varies from an H to a U shape and is formed by two lateral lobes with superior and inferior poles connected by a median isthmus, with an average height of 12 to 15 mm, overlying the second to fourth tracheal rings (Figure 3). Rarely, the isthmus may be absent, and the gland exists as two distinct lobes. Each of the lateral thyroid lobes measures an average of 50 to 60 mm (8 to 10 ml in volume), with the superior poles diverging laterally at the level of the oblique lines on the laminae of the thyroid cartilage (Figure 3). The lower poles diverge laterally at the level of the fifth tracheal cartilage. Even though the weight of the thyroid gland varies, it averages between 15 g to 30 g in adults and it is somewhat heavier in women ***(Fancy et al., 2010).***

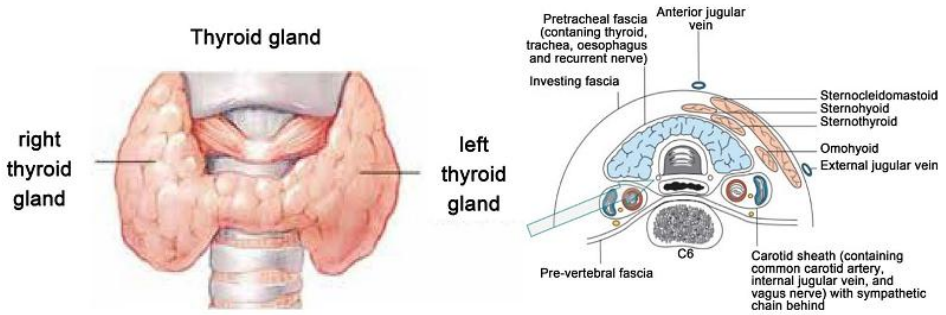

Figure (3): The thyroid gland and its anatomic relationships.