Contemporary Management of Solitary Thyroid Nodule

Essay

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Waleed Moustafa Elnahas
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بسم الله الرحمن الرحيم

(قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا
إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ
الْعَلِيمُ الْحَكِيمُ)

(سورة البقرة الآية٣٢)

DEDICATION

To…

MY PARENTS,

MY WIFE &

MY DAUGHTER

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LIST OF ABBREVIATIONS

ABBA : Axillo-bilateral-breast approach

BA : Breast approach

CEA : Carcino-embryonic antigen

CNB : Core-needle biopsy

CO2 : Carbon dioxide

CT : Computed tomography

FDG : Fluorodeoxyglucose

FNAC : Fine needle aspiration Cytology

FNA : Fine needle aspiration

FNC : Fine-needle capillary biopsy

FS : Frozen section

H&E : Hematoxylin and eosin stain

HCC : Hurthle cell carcinoma

^{123}I&^{131}I : Radioisotopes of iodine

ILP : Interstitial laser photocoagulation

LNA : Large-needle aspiration biopsy

MEN : Multiple endocrine neoplasia syndromes

MRI : Magnetic resonance imaging

MTC : Medullary thyroid carcinoma

OSHA : Occupational safety and health administration

PEIT : Percutaneous ethanol injection therapy

PET : Positron emission tomography

RLN : Recurrent laryngeal nerve

SCM : Sternoclediomastoid muscle

SC : Scintigraphy

STN : Solitary Thyroid Nodule

T3 : Tri-iodothroxin

T4 : Thyroxin

^{99}Tc : Technetium-99 pertechnetate

TSH : Thyroid stimulating hormone

UAS : Ultrasonically activated shears

US : Ultrasonography

VAT : Video-assisted thyroidectomy

CONTENTS

INTRODUCTION

Solitary thyroid nodule is one of the most common problems in head and neck area. It is defined as a discrete swelling in an otherwise impalpable gland. Whereas a discrete swelling in a gland with clinical evidence of generalized abnormality in the form of a palpable contralateral lobe or generalized mild nodulatory is termed as dominant nodule **(Krukowski, 2004)**.

The main risk of such nodules is the possibility of malignancy, the incidence of cancer discovered in nodules removed by routine surgical excisions 11-20% **(Kendall and Cordon, 1999)**.

The development of the management strategy involves the integration of information from a variety of possible sources including history, clinical examination, biochemical assessment and spectrum of additional investigation **(Harvey, 1990)**.

Ultrasonography of the thyroid gland is used in differentiating the true solitary thyroid nodule from those with multinodular gland. Also it classifies the nodules into solid, cystic, or mixed. However it admits a little help in determining the pathological types of the nodule **(Van Herle et al., 2000)**.

Radionucletide thyroid scans detect areas of active or decreased thyroid hormone synthesis but do not provide information that allows clear separation of benign and malignant nodules **(Van Herle et al., 2000)**.

Fine needle aspiration cytology has become the corner stone investigation **(Meab and Qureshi, 1998)**.

This procedure is safe, inexpensive, and easy to perform, and it allows better selection of patients for operation than does any other technique **(Van Herle et al., 2000)**.

Most patients until recently have been referred for operative treatment, although surgery is still the main method of treatment in such patients, the number of patients with solitary thyroid nodules treated surgically is less than in the past **(Bastos and Pomorski, 2000)**.

Percutanous ethanol injection under sonographic guided is a relatively safe, low cost, outpatient method of treatment that has been applied successfully as an alternative to surgery for the management of benign and malignant lesions of various tissues and organs. Among endocrine diseases, thyroid nodules; both cystic and solid, have been treated effectively using this technique **(Ponorski and Bastos, 2002)**.

U.S. guided interstitial laser photocoagulation could become a useful non surgical alternative in the treatment of benign solitary solid cold thyroid nodule in patients who can't or will not undergo surgery **(Dosssing et al., 2002)**.

For surgical treatment of solitary thyroid nodule, several procedures are available varying from simple aspiration of a cyst up to total thyroidectomy. The specific use of these techniques depends on the particular morphologic and functional findings **(Sahin et al., 1999)**.

Finally, conventional open thyroidectomy leaves an undesirable scar on the anterior surface of the neck and for this reason, endoscopic thyroidectomy is a technically feasible and safe procedure that leads to an improved cosmetic result and a quicker recovery **(Gagna and Inahnet, 2001)**.

AIM OF THE WORK

This work aims at throwing light on the modern diagnostic and treatment modalities of solitary thyroid nodule.

PATHOLOGY OF SOLITARY THYROID NODULE

Definition:

A thyroid nodule is a discrete lesion within the thyroid gland that is palpably and /or sonographically distinct from the surrounding thyroid parenchyma. A solitary thyroid nodule exists within a thyroid gland of normal dimensions and morphology, whereas a dominant thyroid nodule exists within a diffuse or multinodular goiter **(Cooper et al., 2006)**.

Incidence:

Solitary thyroid nodules present in approximately 4 present of individuals **(Morgan et al., 2003).**

Solitary thyroid nodules are about four times more common in women than in men. The age of incidence was 20 to 60 years old, with exceptions below 20 years old and above 60 years old. Nodules are 10 times more frequent when the gland is examined at autopsy, during surgery or by ultrasonography **(Marqusee et al., 2000).**

Classification (causes) of S.T.N.

Virtually any thyroid disease can present as a S.T.N Of nodules removed surgically, as estimated, 42 to 77 % are non-neoplastic colloidal nodules, 15 to 40 percent are adenomas, and 8 to 17 percent are carcinomas **(Mazzaferri, 1993, Mahmood and Mazzafrrri, 1998 and Bennedbaek and Hegedus, 2000).**

Table (1): Pathology of thyroid nodules **(Clark, 1989).**

Benign	Malignant
Adenomatous (colloid) nodule	Papillary carcinoma
Autonomous nodules	Follicular carcinoma
Adenoma	Medullary Carcinoma
Cyst	Anaplastic Carcinoma
Embryologic defects: Thyroglossal duct or cyst Ectopic thyroid	Lymphoma
Thyroiditis	Metastatic(2 ries)

Embryologic defects presenting as S.T.N.

Some embryologic defects appear as solitary thyroid swelling. These abnormalities usually occur in the middle line of the neck & most often as ectopic sublingual thyroid or as a thyroglossal cyst. These lesions are cephalad to the thyroid and move with deglutition or protrusion of the tongue **(Krukowski, 2004).**

Thyroid cysts presenting as S.T.N.

Although the term cyst implies a benign process, this is far from true. A thyroid cyst may be one of several pathologic conditions including congenital, developmental and neoplastic, and all arise from benign masses undergoing degenerative and cystic changes. It is doubtful