Journal of Medical Ultrasound (2015) 23, 25—28

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.jmu-online.com

ORIGINAL ARTICLE

Incidental Thyroid Abnormalities on Carotid Color Doppler Ultrasound: Frequency and Clinical Significance

Masoud Pezeshki Rad [1], Seyed Rasoul Zakavi [2], Parvin Layegh [3], Alireza Khooei [4], Aria Bahadori [5*]

[1] *Vascular and Endovascular Research Center, Imam Reza Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran,* [2] *Nuclear Medicine Research Center, Qaem Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran,* [3] *Endocrinology Research Center, Imam Reza Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran,* [4] *Department of Pathology, Imam Reza Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran, and* [5] *Department of Radiology, Imam Reza Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran*

Received 23 July 2013; accepted 26 March 2014
Available online 4 July 2014

KEY WORDS
carotid artery,
duplex Doppler ultrasound,
fine-needle aspiration,
thyroid nodule

Background: Thyroid nodules are often incidentally detected during physical examination, Doppler ultrasound of carotid artery, and other imaging modalities and there are many controversies about the management of these incidentalomas. We focused on incidental thyroid lesions during carotid ultrasound and evaluated their importance and suspected malignant features.
Patients and methods: The thyroid gland was evaluated for any nodule(s) following carotid Doppler ultrasound in 290 patients. If there was an abnormal finding in the thyroid ultrasound, the patient was referred to an endocrinologist and after clinical and laboratory evaluation, fine-needle aspiration (FNA) biopsy was done if required.
Results: We found an abnormal thyroid in 63 (21.8%) patients and 57 (19.6%) of patients had incidental thyroid nodules; these were mainly in women and older patients. Based on size and ultrasound findings of the nodules, 28 (44.4% of abnormal thyroids) patients were referred for fine-needle aspiration biopsy and 15 patients agreed with this procedure. Aspiration cytology showed two nondiagnostic samples (13.3%), 10 benign lesions (66.6%), two follicular cell lesions (13.3%), and one (6.6%) Hürthle cell neoplasm lesion.

Conflicts of interest: The authors declare no conflicts of interest.

* Correspondence to: Dr. Aria Bahadori, Department of Radiology, Imam Reza Hospital, School of Medicine, Mashhad University of Medical Sciences, Mashhad, Iran.
E-mail address: aria_bhd@yahoo.com (A. Bahadori).

http://dx.doi.org/10.1016/j.jmu.2014.04.005

Conclusion: Thyroid evaluation during carotid ultrasound has little benefits.

Introduction

The duplex ultrasound is a widely accepted method in evaluation of bilateral common carotid arteries and their internal and external branches. Grayscale ultrasound reveals atherosclerotic plaques and in conjunction with color and spectral Doppler ultrasound, the severity of stenosis can be determined [1,2].

The thyroid gland is located in close proximity to carotid vessels. Evaluation of the thyroid gland during carotid ultrasound is not a time consuming process and may have diagnostic benefits.

By contrast, thyroid malignancies do not usually have local symptoms and in most patients, thyroid nodules are discovered incidentally during physical examination and neck imaging for other purposes [3].

The reported prevalence of thyroid incidentalomas during Doppler ultrasound varies significantly in different studies and is affected by iodine supplementation, the patient's age and other less important factors [4,5]. The main goal of this study is to determine the prevalence of incidental thyroid lesions and their clinical significance during carotid ultrasound.

Patients and methods

This study was conducted under approval by the Institutional Review Board (with patient informed consent).

Study population

Possible associated thyroid disease and our project were explained to all patients who were referred for carotid ultrasound. After obtaining a written consent, all underwent thyroid ultrasound. Also, physical examination findings, signs and symptoms related to thyroid disease, and all demographic data were recorded. The patients were referred for carotid ultrasound because: (1) they were candidates for coronary artery bypass grafting; (2) they had a history of stroke or transient ischemic attack (TIA); or (3) they had vertigo (vertebral Doppler evaluation is almost always performed during the carotid Doppler process). Patients with known thyroid disease were excluded from the study.

Imaging and patient evaluation

Ultrasound examinations were performed with an available scanner (G40; Siemens, Erlangen, Germany), equipped with a linear transducer operating at 10 MHz. A board certified radiologist performed all carotid duplex examinations. Echogenicity of the thyroid, size and echogenicity of any focal abnormality (echogenicity of nodule relative to adjacent strap muscles), presence or absence of calcification, and border description of all lesions were recorded during ultrasound examinations.

In the presence of thyroid disorders, the patients were referred to an endocrinologist for further evaluation. The guidelines of the American Association of Clinical Endocrinologists were used for management of the patients [4]. Fine-needle aspiration (FNA) biopsies were performed with US guidance according to key recommendations of the guidelines.

The Bethesda system for reporting thyroid cytopathology was used for evaluation of cytological specimens [6].

Data and statistical analysis

Statistical analyses were performed by SPSS version 16 (SPSS Inc., Chicago, IL, USA). Univariate analysis was used for description of the findings and the Chi-square test and *t* test were used for comparison of the proportions and quantitative variables, respectively. Statistical significance was set at p value <0.05.

Results

General information

This study consisted of 290 patients undergoing carotid ultrasound over a 1 year period (September 2011 to September 2012). The mean (±standard deviation) age of the studied patients was 65 ± 11.8 (range: 30–91) years, including 167 (57.6%) males and 123 (42.4%) females.

Thyroid ultrasound results

Among 290 patients, 63 (21.8%) had thyroid abnormalities. Six patients (9.5%) had diffuse thyroid disease without distinct nodules and 57 patients (90.5%) had one or more thyroid nodule(s).

The mean (±SD) age of patients with thyroid abnormalities was statistically higher (67.8 ± 9.2 years) compared to patients with normal thyroid (64.3 ± 12.4 years, $p = 0.04$). The independent *t* test revealed that there was a statistically significant difference between the above group's age ($t = 2.056$, $p = 0.041$).

The female to male ratio was higher in patients with abnormal thyroid ultrasound (36/27) compared to patients with normal thyroid (87/140) ($p = 0.007$).

In patients with thyroid nodular disease, 34 (59.65%) had nodule(s) $\geq$ 10 mm. Analysis of echogenicity showed that 20 (31.7%) nodules were hypoechoic, 10 (15.9%) nodules were hyperechoic, and nine (14.3%) nodules were cystic (Table 1). The minimum size of detected thyroid nodules was 3 mm and the maximum size was