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Original Article

Risk for malignancy of thyroid nodules: Comparative study between TIRADS and US based classification system

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ABSTRACT

Purpose: To compare between TIRADS and thyroid ultrasound classification system proposed by Kim and his colleagues.

Methods and materials: Prospective analysis of ultrasound and power Duplex images of 450 patients with thyroid gland disease was conducted. The thyroid lesions were categorized into 5 groups: TIRADS 1, Normal thyroid gland; TIRADS 2, benign in aspects; TIRADS 3, probably benign aspects; TIRADS 4A, low suspicious aspects; TIRADS 4B & TIRADS 5, high suspicious aspects. Next, the detected nodules in 350 patients were divided into solid and partially cystic nodules and rated according to Kim et al., classification. The final diagnosis was done by biopsy (n = 370) and clinical follow-up (n = 80). Statistical analysis in comparison with cytopathological findings was calculated.

Results: The odds ratio (OR) was 7 for TIRADS 5, 2 for TIRADS 4B, 0.67 for TIRADS 4A, 0.2 for TIRADS 3 and 0.01 for TIRADS 1 & 2. The PPV of malignancy rises gradually from 0% for TIRADS 1 & 2 to 6.7% for TIRADS 3 & 4A to 20% for TIRADS 4B and reaches 67% for TIRADS 5. TIRADS 5 showed 100% sensitivity, 86% specificity and 89% accuracy.

Conclusion: TIRADS classification is reliable, easier and simpler than other classification system for reporting. It has higher sensitivity for prediction of thyroid malignancy.

1. Introduction

Ultrasound criteria to differentiate between benign and malignant nodules of thyroid gland have been the point of research in many scientific papers; many of the published papers proved that ultrasound is highly sensitive but less specific in detection of malignant thyroid nodules [9,10].

Ultrasound features for prediction of malignancy include hypoechogenicity, microcalcifications, taller than wide shape, irregular or microlobulated margins and increased intranodular vascularity [2,3].

Dubitable nodules will require fine-needle aspiration cytology (FNAC). Selection of nodules for FNAC is still confusing for clinicians and radiologists as the categorization of the same thyroid nodule may be differed according to the used ultrasound classification system [11].

A practical thyroid imaging reporting and data system (TIRADS) for thyroid nodules have been recently proposed to classify nodules of thyroid gland and to solve the problem of nodule selection for FNAC [7].

TIRADS is a classification made by a multidisciplinary team, recently published in the JCEM (Journal of Clinical Endocrinology & Metabolism) [3], and the original idea was to adapt the BI-RADS concept (Breast Imaging Reporting and Data System) from the ACR (American College of Radiology) [1], to thyroid pathology.

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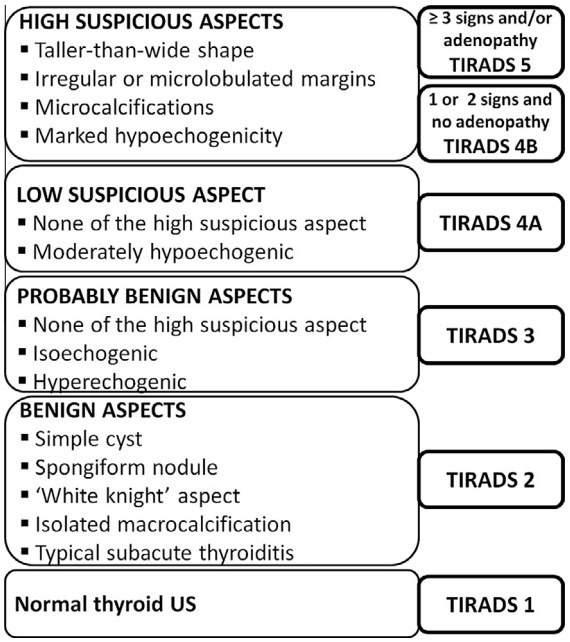

Fig. 1. TIRADS classification algorithm [9].

Many attempts have been made to reach an easy simple and reliable categorization model until the modified Russ TIRADS categorization has been proposed in 2013, Fig. 1 [12].

Kim et al. [5] proposed thyroid ultrasound based classification system to classify thyroid nodules depending on the type of thyroid nodules whether they are partially cystic or solid nodules [6] as shown in Fig. 2, Tables 1 and 2.

2. Aim of the work

The aim of this work was to detect which of both classification systems (TIRADS and thyroid ultrasound based classification system proposed by Kim et al. [5]) is more reliable, reproducible and accurate.

2.1. Patients & methods

2.1.1. Patients

From January 2013 to June 2014 series of 450 patients (350 females and 100 males) with age range between 10 and 70 years (mean 38.7 ± 15.7 SD) underwent thyroid ultrasound. The study was approved by our institution's ethics committee and all patients gave their informed consent before inclusion in the study. The inclusion criteria were neck swelling in 150 patients, palpable mass in 200 patients and abnormal thyroid function in 100 patients. Patients with multiple thyroid nodules were excluded from this study.

Thyroid Ultrasound: ultrasound examination of the neck was done by using a 12.5 MHz linear-array transducer on a Toshiba Xario 200 system. Neck ultrasound

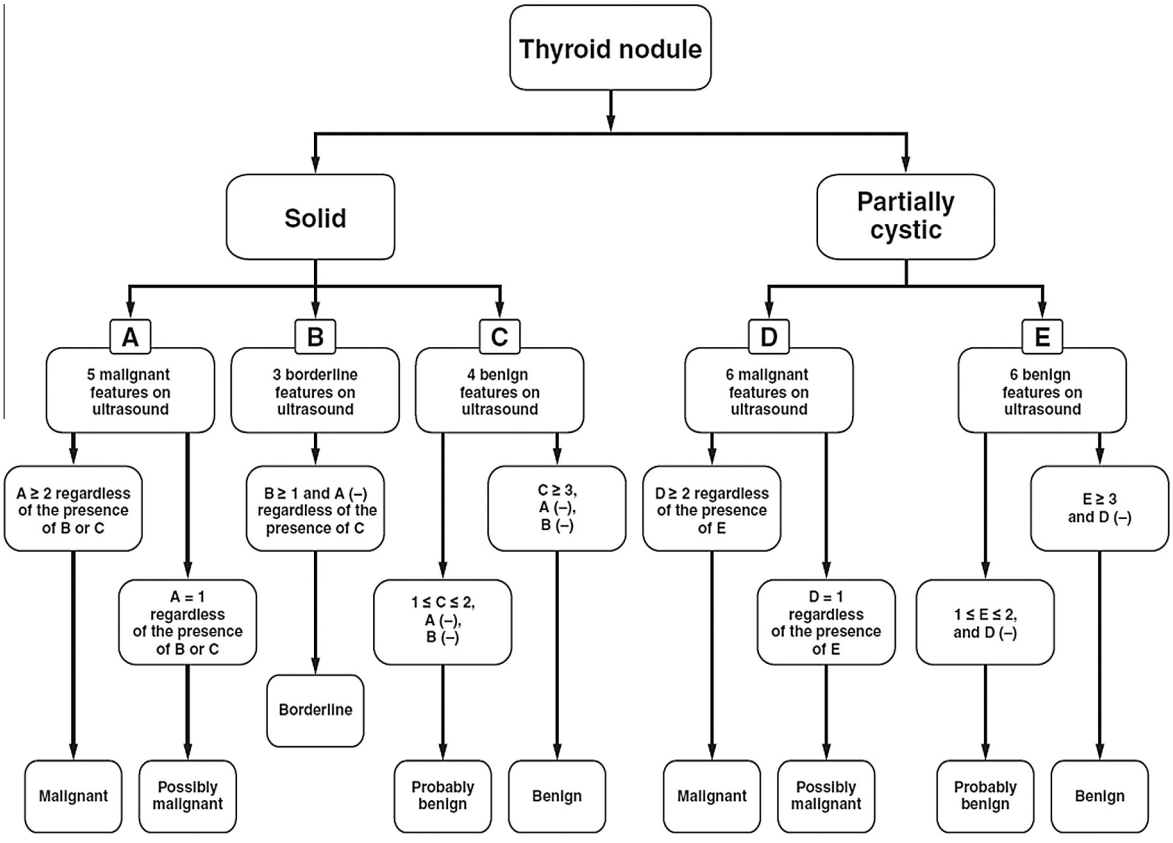

Fig. 2. Algorithm for thyroid ultrasound based classification system (kim et al. [5]).

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