Scholars Journal of Medical Case Reports **ISSN 2347-6559 (Online)**
Sch J Med Case Rep 2015; 3(6)457-459 **ISSN 2347-9507 (Print)**

(An International Publisher for Academic and Scientific Resources) DOI: 10.36347/sjmcr.2015.v03i06.002

Malignant Thyroid Nodule by Ultrasound

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Abstract: A 60 years old female patient suffering from neck stiffness with solid irregular anterior neck lump came to ultrasound clinic of Radiation and Isotope Centre of Khartoum (RICK), longitudinal and transverse ultrasound scan (U/S) was done for her both thyroid lobes; ultrasound results showed huge (Rt) thyroid lobe nodule with typical criteria's of malignant nodules (solid , solitary , irregular and had single feeding vessel on Color Doppler box) and this result was confirmed by histopathology result.
Keywords: Thyroid, U/S, Nodule, Malignant, Follicular.

INTRODUCTION

Ultrasound is the useful modality in characterizing and predicting the presence of malignancy in thyroid nodules, the incidence of malignancy in solitary nodules is not significantly higher [1, 2].

The mean age of patients with nodular goiters was 48.1years [standard deviation (SD), 15.05], the mean age of presentation for benign nodular goiters was 47.9 years and the mean age of presentation for malignant thyroid tumors was 49.25 years [3]. Al-Jaradi M *et al*. reported that the ratio of thyroid cancer as 9:1 between females: males [4].

The thyroid gland consists of right and left lobes connected by a narrow isthmus (Fig. 1). It is a very vascular organ, surrounded by a sheath derived from the pretracheal layer of a deep fascia, the sheath attaches the gland to the larynx and the trachea (Fig. 2) [5].

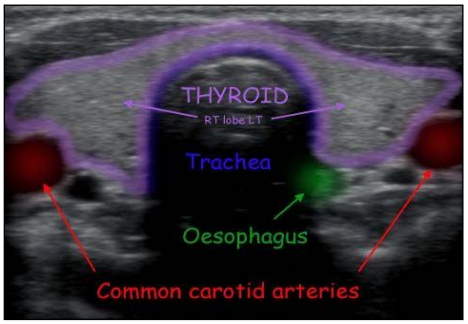

Fig. 1: Transverse View of a Normal Thyroid (www.ultrasoundpaedia.com)

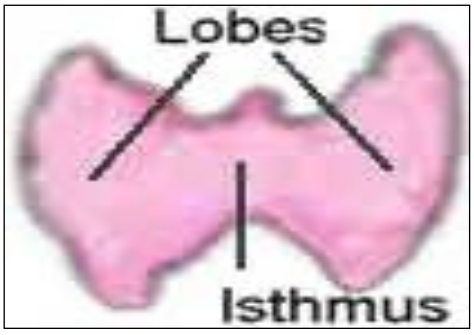

Fig. 2: Shows right and left thyroid lobes connected by a narrow isthmus

The incidence of follicular carcinoma that represents 15%-20% of thyroid cancers peaks in those aged 40-50 years [6]. Christensen SB *et al*. studied 100 consecutive patients selected for surgical treatment of a clinically solitary thyroid nodule. Histopathological study reported malignancy in 18 cases and benign in 82 [7].

Thyroid cancer is the ninth most common cancer in the female population of Singapore [8]. Thyroid nodules are present in 4% to 7% of the population by neck palpation (the incidence increases with increasing age) and (30% to 50%) by Sonography [3, 9-11].

Fine-needle aspirate cytology is a fast, accurate and inexpensive test to obtain cellular samples. A series of reviews have reaffirmed its importance in the assessment of thyroid nodules [12, 13].

The incidence of malignancy in thyroid nodules is present in (4% to 7%) of the population and the risk of malignancy in solitary thyroid nodules is not negligible. Therefore, suspicious findings in ultrasound scan should be carefully evaluated to detect any underlying malignant foci, which may require further surgical intervention.

Follicular carcinoma is the second subtype of well differentiated thyroid cancer [14], occurs most often among elderly patients and accounts for about 15 percent of all cases of thyroid cancer, affecting females more often than males [15, 16].

This type of thyroid cancer is more aggressive and tends to spread through the bloodstream to other parts of the body [17].

Ultrasound equipment

Equipment used was HDI (4000) Philips machine, with high resolution, real time, linear transducer 7.5 MHz with Colour Doppler flow imaging (low flow filter and optimized color gain). The thyroid scan was done according to the standard protocol (by using lubricant substance called (jell) to obtain the accurate diagnosis.

Scanning protocol

Sonography (U/S and Color Doppler (CD) is useful for evaluation of thyroid nodules because of its safety, noninvasiveness, non radioactivity and effectiveness. Ultrasound scoring method was used ; the scoring system was formed by ultrasound characteristics of the lesion patterns which were: (solitary , mixed echogenicity, hypo-echoic, been solitary, irregular out-lined, presence of central-Doppler flow, presence of micro-calcification and fixation).This results then were compared with Fine Needle Aspiration biopsy (FNAB) to confirmed the suspected diagnosis on U/S.

CASE REPORT

A 60 years old female patient suffering from neck stiffness with solid anterior neck lump (during physical examination by doctor) and difficulties in swelling for the last 4 months presented initially in 2010 to the outpatient endocrine clinic of Radiation and Isotope Centre of Khartoum (RICK) they reported that her symptoms started four months ago consisting with neck and shoulders pain; regarding her social history, no occupational factors. then referred to ultrasound clinic , longitudinal and transverse ultrasound scan (U/S) was done for her both thyroid lobes; ultrasound results showed huge thyroid nodule with suspicious criteria's of malignancy during the scan; (solitary , irregular , had single feeding vessel on Color Doppler box and marked calcifications) and this result was confirmed by histopathology result as malignant thyroid nodule.

A total thyroidectomy was performed after tow month and histopathology result showed malignant thyroid nodule (Follicular type) (Fig. 3).

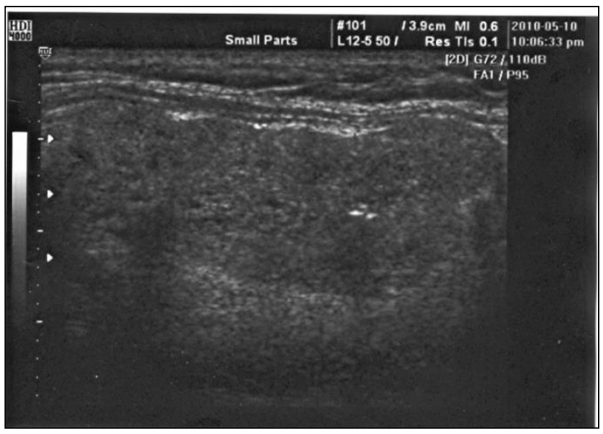

Fig. 3: 60 years old female had irregular fixed thyroid mass with ill-defined margins and marked calcification with shadow(white arrow) suggested to be malignant during U/S scan . Cut-off biopsy result was follicular carcinoma of thyroid gland.

DISCUSSION

Now a day, high resolution real time U/S not only detects the presence, site, numbers and sizes of thyroid nodules, but also it shows the characteristics of thyroid nodules and provided information that is highly predictive of malignancy [18-20].

The health problem of the thyroid gland dysfunction has become a serious problem in the modern society, influencing the health of 600 million people around the world. Large number of patients with thyroid dproblem has been found to be reported to the specialized endocrines clinics. Patient's age range has become younger and younger. The youngest patient is as low as 3 months [21].

U/S sensitivity and specificity 100% and 94.1% respectively in diagnosis of this cases, and FNAC had sensitivity, specificity, accuracy and positive predictive value of 94.1%, 99%, 99.2% and 88.9% respectively, and this is acceptable because literature has also reported Fine Needle Aspiration Biopsy (FNAB) has sensitivity of 65% to 98% and specificity of 72% to 100% in detecting malignant nodules [22, 23]. However malignancy cannot always be detected in routine FNAB examinations and it is very often found that the only possible diagnostic report is 'follicular neoplasm (FN).

U/S was sensitive in prediction of malignancy and that sensitivity becomes higher if the nodule scores

is high (then confirmed by FNAB) and no single U/S character can suggest alone if the nodule is benign or malignant.

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