Relative Observer and Technical Error in the Ultrasound Monitoring of Thyroid Nodular Growth Using Nodular Volume (VOL), vs. Longest Dimension (LD), vs. the Sum of the 3 Nodular Dimensions (SUM3D)

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Though not a reliable indicator of malignancy, ultrasonic monitoring of nodule growth still has a role in the evaluation of nodules, e.g. indicating when a nodule may require biopsy or re-biopsy. Observer and technical limitations, however, limit the precision of ultrasonic determination of simple growth, vs. stability or shrinkage. Ultrasonic parameters used for this purpose all have their own limitations. Monitoring nodule growth by VOL frequently exhibits wide and conflicting swings in apparent size compared to the penultimate size, doubtlessly reflecting measurement limitations. As a growth parameter, LD typically exhibits a smoother time course but does not address growth in the other two dimensions. SUM3D includes changes in all dimensions but, like LD, is not a true measure of nodule mass or volume. This study was to determine the relative error of these three growth parameters and how it relates to their relative efficacy for nodular growth monitoring. The anterior-posterior (AP), left-right (LR) and superior-inferior (SI) dimensions of 34 benign nodules were determined ultrasonographically by four pairs of trained observers. One observer of a pair was regarded as a Time-1 observer and the other as a Time-2 observer, simulating the process for determining growth change over time. All observers measured the same image of each of the 34 nodules but were unaware of the measurements obtained by any other observer. For each image for each pair of observers, the dimensions were used to calculate the VOL, LD and SUM3D and the perceived changes thereof from Time-1 to Time-2. Since only one image for each nodule was distributed, differences between the Time-1 vs Time-2 measurements for each nodule could only reflect observer-based differences. “S”-curves plotting the nominal %-change in a parameter reported by the Time-2 observer compared to that reported by the Time-1 observer (x-axis) were rank-ordered from negative to positive changes (y-axis). The %-change in each parameter due to observer/technical error ranging from the highest overestimate to the lowest were, in order from Top 10%, Middle 40%, and Bottom 10%, respectively: LD: 19-36%, 4 to 6%, -15 to -42%; SUM3D: 15 to 28%, -4 to 4%, -11 to -43%; VOL: 48 to 105%, -13 to 15%, -33 to -81%. The magnitude of %-change from Time-1 to Time-2 for the VOL parameter were 2 to 3 times greater than that of the LD or SUM3D parameters for the top 10% of values, the middle 40% of values, and the bottom 10% of values. These degrees of difference coincide with the wide variability seen in nodular growth curves [not illustrated here] when nodular VOL (y-axis) is plotted as a function of length of observation (x-axis). This study helps explain why monitoring nodular growth by LD or by the SUM3D usually provides a clearer, less fluctuant illustration of thyroid nodule growth over time than does VOL.

Thyroid

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Research on Clinical, Subclinical Characteristic of Incidental Thyroid Nodules

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Background: Incidental thyroid nodules has become more prevalent in recent years due to applying diagnostic imaging tests. Many studies show that the rate of thyroid cancer in this group of patients is relatively high. Objective: To assess patients with incidentally detected thyroid nodules, including those who were diagnosed with thyroid cancer. Materials and Methods: A cross-sectional study, which involved 208 patients with 389 thyroid nodules detected by thyroid ultrasound. All patients have thyroid function tests. 272 nodules were performed fine-needle aspiration. Patients with thyroid cancer were assessed histopathology after removal. Results: The participants’ mean age was 47.22 ± 12.02. The female / male ratio is 6.7/1. No patients had history of head and neck irradiation or living in epidemiological areas with high prevalence of goiter. TSH level: 96.2% normal, 2.4% low, 1.4% high. In thyroid cancer group: 100% of patients had normal thyroid function. Nodule characteristics on ultrasound: Majority of thyroid nodules had diameters less than 1.5 cm (85.6%), multi-nodularity(52.9%). The largest carcinoma nodule was 2.35 cm, 22.2% of patients with thyroid cancer had ≥ 3 nodules. The malignancy rate of TIRADS 5 was 70.6%. FNA results of 272 thyroid nodules: the majority were Bethesda II (74,2%); the incidence of carcinoma (Bethesda V, VI) is 17.4%. 36 patients account for 17.3%, with 42 nodules were performed surgery; the results of histopathology were 100% of papillary thyroid carcinoma, which was consistent with cytological results. Conclusion: Thyroid nodules are common in women patients at the age of 31-60 with normal thyroid function. Most of them are <1.5 cm in size. There are 17.3% of patients were thyroid carcinoma.

Thyroid

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Should Mode of Presentation Influence Interpretation of Thyroid Nodule Ultrasounds?

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Background: The American College of Radiology (ACR) TI-RADS is a standardized scoring system for thyroid ultrasound reports providing recommendations on the need for fine needle aspirations (FNAs) independent of patient presentation. Aim: The aim of this audit was to determine if the initial presentation of the patient should be considered during