CLINICAL IMAGE

Metastases of renal clear-cell carcinoma to the thyroid: a comparison of shear-wave and quasi-static elastography

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Metastases to the thyroid gland do not always look suspicious on ultrasonography.[1] New noninvasive ultrasound methods are potentially helpful in the differentiation between malignant and benign lesions; for example, elastography helps predict malignancy and select an optimal site for tissue biopsy.[2]

Currently, there are 2 different elastography techniques available. In the first one, external compression is applied for comparison between the stiffness of the lesion and reference tissue, i.e., normal thyroid tissue (quasi-static elastography). The result is based on relative stiffness (strain ratio). This method is useful in diagnosing focal lesions but should not be used for diffuse diseases.

In the second method, shear-wave elastography, the velocity of a shear wave propagating throughout the tissue is directly related to tissue stiffness. Elasticity is calculated by measuring the velocity of wave propagation (in kPa), without manual compression, and the result is expressed as absolute stiffness. This method can be applied for both focal and diffuse diseases, for example, thyroiditis.[3]

There have been no reports on evaluating metastases to the thyroid by elastography and on comparing the 2 different elastography methods.

We report a case of a 65-old-year woman with metastases of renal clear-cell carcinoma to the thyroid. A physical examination revealed nodular lesions in the right thyroid lobe. Conventional ultrasonography showed 3 solid hypoechoic lesions with increased central blood flow and blurred margins. Next, the lesions were examined by the same physician, using quasi-static elastography (AplioXG, Toshiba Medical Systems Corp., Shimoishigami, Otawara-shi, Tochigi-ken, Japan) and shear-wave elastography (Aixplorer,

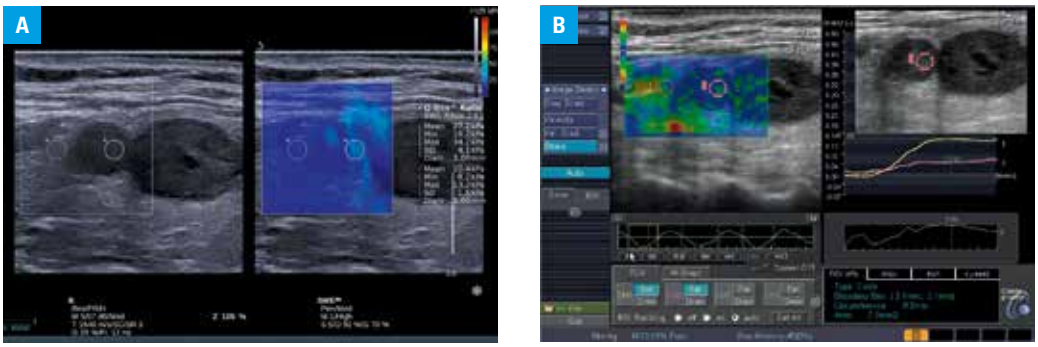

FIGURE 1 **A** – shear-wave elastography; tissue elasticity was directly calculated by measuring the speed of wave propagation, whereas quantitative data, regarding local elastic properties, are provided in real time; we calculated the stiffness ratio between the metastasis and surrounding healthy tissue—the lesion was almost 3-fold harder than the reference tissue but the values of stiffness in both examined Q-boxes (expressed in kPa) were within the range characteristic for benign lesions; **B** – quasi-static elastography; numerical values, corresponding to the deformation ratios, were obtained by semi-quantitative analysis; we calculated the stiffness ratio between the same regions as in shear-wave elastography and the results were very similar—the metastasis was 3-fold harder than the reference tissue

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Supersonic Imagine, Aix en Provence, France). Both techniques revealed differences in relative stiffness (strain ratio) between the normal tissue and metastases. However, the absolute stiffness values for metastases in shear-wave elastography were within the normal range, as shown in our previous report[4]; the values were similar to those characteristic of benign lesions (**FIGURE 1**). Thus, the stiffness ratio, both in quasi-static and shear-wave elastography, may have some additional diagnostic significance, while the cut-off value for the differences in stiffness between the normal tissue and various malignancies may not be clearly defined in shear-wave elastography. Moreover, it must be noted that elastography findings should always be evaluated in the context of the overall clinical picture.[5]

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