RADIOLOGÍA

ORIGINAL REPORT

Usefulness of semiquantitative elastography in predicting malignancy in thyroid nodules☆

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Abstract
Objective: To retrospectively review the diagnostic capacity of semiquantitative elastography in differentiating between benign and malignant thyroid nodules.
Patients and methods: We analyzed 314 thyroid nodules in 295 consecutive patients referred to the endocrinology department for cytological study, studying all by conventional ultra-sonography, elastography, and fine-needle aspiration cytology (FNAC). Using a semiquantitative elastography system that portrays tissue stiffness through a color map, we designed our own classification system for thyroid nodules based on their characteristics on elastography. We classified nodules into three groups: predominantly soft, predominantly stiff, and mosaic patterned. We used logistic regression analysis to investigate the relation between elastography and thyroid cancer.
Results: We obtained a definite diagnosis of malignancy after surgery in 19 nodules, of which on elastography 8 had the mosaic pattern, 6 were predominantly stiff, and 5 were predominantly soft. We found no significant association between the pattern on elastography and the probability of malignancy in any of the models.
Conclusion: According to our study, a probability of malignancy in a thyroid nodule is not related to the findings at elastography. Therefore, semiquantitative elastography as used in this study cannot obviate FNAC.
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PALABRAS CLAVE

Nódulo tiroideo;
Elastografía;
Biopsia

Utilidad de la elastografía semicuantitativa para predecir la malignidad de los nódulos tiroideos

Resumen

Objetivo: Evaluar retrospectivamente la capacidad diagnóstica de la elastografía semicuantitativa para diferenciar entre nódulos tiroideos benignos y malignos.

Pacientes y métodos: Se analizaron 314 nódulos tiroideos de 295 pacientes consecutivos remitidos por el Servicio de Endocrinología del Centro Médico de Especialidades para estudio citológico; a todos ellos se les realizó ecografía convencional, elastografía y punción aspirativa con aguja fina. Disponemos de una elastosonografía semicuantitativa que mediante un mapa de colores refleja la elasticidad de los tejidos. Elaboramos una clasificación propia de los nódulos tiroideos basándonos en sus características de elastografía, distinguiendo tres grupos: predominantemente blandos, predominantemente rígidos y en mosaico. Se realizó un análisis estadístico mediante regresión logística para investigar la relación entre la elastografía y el cáncer de tiroides.

Resultados: Obtuvimos un resultado definitivo de malignidad después de la cirugía en 19 nódulos, de los cuales 8 presentaron un patrón en mosaico en la elastografía, 6 fueron predominantemente rígidos y 5 predominantemente blandos. En ninguno de los modelos estimados obtuvimos que el patrón de elastografía analizado estuviera significativamente relacionado con la probabilidad de malignidad del nódulo tiroideo.

Conclusión: La probabilidad de malignidad de un nódulo tiroideo, según nuestro estudio, no está relacionada con los resultados de la elastografía. Por consiguiente, la elastografía semicuantitativa, tal y como nosotros la hemos definido, no permite reducir el número de punciones aspirativas con aguja fina realizadas.

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Introduction

The increase in the number of ultrasound exams of the neck has led to an important rise in the number of diagnosed thyroid nodules[1,2] and consequently it has given rise to the need for performing numerous fine needle aspirations (FNA) in order to differentiate benign from malignant nodules since it is the modality of choice to this end. However, FNA is an invasive procedure that does not provide immediate information and it is subjected to uncertainties or sample and analysis errors,[1,3,4] so tests are needed to determine what nodules should be biopsied and which are susceptible of follow-up. The elastography could be that tool that would help us reduce the number of patients undergoing FNA.

Elastosonography is a non-invasive diagnostic modality that uses ultrasounds to provide an estimation of tissue consistency while providing information about the internal structure of the tissue by measuring the degree of deformity that appears when an external force is applied.[5] It is based on the principle that soft tissues are deformed more easily than hard tissue, and these differences can be reflected by images, called elastograms, which represent the distribution of the deformation in the tissue by means of a colored map. In general, malignant tumor tissues are more rigid than normal surrounding tissue. This way, when mechanical compression is applied, tension in the tumor is lower than in adjacent healthy tissues, and consequently it is less deformed.[3,5]

The goal of this study is to analyze the diagnostic capacity of elastographies to distinguish benign from malignant thyroid nodules. To this end, the anatomopathologic analysis of the piece after surgical exeresis has been used as the standard reference test, and in non-operated cases we used the cytological study obtained through FNA.

Material and methods

We expressly declare our adherence to the Helsinki declaration. The necessary written informed consents were obtained in order to be able to examine all the patients.

Patients

Two hundred and ninety-five (295) consecutive patients were included in the study, with 314 thyroid nodules, of which 257 corresponded to women, with an average age of 57 years (age range 21–87), and 57 to men, with a average age of 56 years (age range 23–79 years), referred by the Endocrinology Unit of the Specialty Medical Center to perform ultrasound-guided FNA for a period of 3 years, from January, 2012 to December, 2014. To determine the inclusion criteria, we followed the recommendations set by the Guidelines from the American Association of Clinical Endocrinology and the American Thyroid Association.[6–8]

Seven (7) patients were excluded from the study because their elastography showed artifacts due to the following causes: the thyroid nodule was very superficial or very deep and it could not be properly compared to the surrounding tissue, the nodule to be examined was not clearly distinguished