

The Role of Ultrasonography in Diagnosis of Cervical Lymphadenopathies

Abstract

Cervical lymphadenopathy is a frequent cause of presentation of the patient to the doctor.

Objectives. This study focuses on the validation of ultrasonography (US) as a diagnostic test for cervical lymphadenopathy. Using certain ultrasound features we could study the efficiency of ultrasonography in differentiating malignant from benignant cervical lymphadenopathy.

Materials and methods. The prospective study was conducted in the ENT department of County Emergency Clinical Hospital of Târgu Mureş during a period of four years (January 2008 - December 2011) and included a sample of 140 hospitalized patients with cervical masses considered lymphadenopathy which were investigated using ultrasonography based on imaging criteria established in accordance with the literature. Then the final diagnosis was obtained by histopathological examination of suspicious cervical mass.

To assess the performance of ultrasonography in setting the malignant or benignant character it is use various statistical parameters (sensitivity (Se), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV) and accuracy (Ac)). Also to tracking the performance of the diagnostic test it was used figures like the ROC curve, which describes the area under the curve (AUC) and multivariate analysis by calculating the estimated risk (OR) for each ultrasound character studied.

Results. Of the 140 patients investigated 40 hadn't any lymphadenopathy, which is why they were excluded from the study. At those 100 patients included in the study (25 with diagnosis of benignancy and 75 with a diagnosis of malignancy) were studied statistically and ultrasonographically 158 lymphadenopathies of which 44 (27.8%) were histopathologically benignant and 114 (72.2%) malignant.

After statistical account among gray scale ultrasound features suggestive for predicting the malignancy in the first place lies the abnormal appearance of hilum echogenicity (OR – 31.500) followed by: hypoechogenic homogeneous appearance of parenchyma (OR – 12.104), poorly defined edges of the lymph nodes (OR – 8.913), minimal axial diameter exceeding 10 mm (OR - 6.00), round shape (OR - 5.841) and presence of intranodal necrosis (OR - 1.562). Among Color Doppler ultrasound aspects the abnormal parenchymal vascular pattern (OR – 33.783) and abnormal hilum vascular pattern (OR – 33.783) have decisive

value in predicting malignancy. However the importance of ultrasound features suggesting benignancy is central hilar vascular pattern (OR - 0.030), echogenic hilum (OR - 0.032), hypoechogenic homogeneous parenchyma (OR - 0.083), well defined shape (OR - 0.112), the minimal axial diameter below 10 mm (OR - 0.167), on the last place being the oval shaped of the lymph node (OR - 0.171). Also it was seen that if there are more ultrasound features revealing a malignant lymphadenopathy, PPV can reach 100% value, this increasing the ultrasound specificity in differentiating lymphadenopathy. Thus when there are several malignant or benignant features the diagnostic ultrasound accuracy is increased.

Also it was established the role of clinical examination in the study group who had a Se of 74.56%, a Sp of 59.09%, a PPV of 82.52%, a NPV of 47.27% and an accuracy of 70.25% ($p < 0.05$). At the end of results were achieved correlation between histopathology and ultrasonography on account of 24 clinical cases.

Discussions. The present study shows that ultrasonography is superior to clinical examination in establishing the malignant diagnosis of lymphadenopathies. There were noted similarities between statistical results and the results of other similar studies in international literature. Ultrasound aspects should be used in a summation mode, the presence of several unusual characteristics indicating a high probability of malignancy. Also the sensitivity and specificity of gray scale ultrasonography indicating the nature of malignant lymphadenopathy were improved significantly after using the vascular discriminative ability of color Doppler examination.

Conclusions. Ultrasonography related to cervical lymph nodes pathology remains a topical subject but it is important to investigate a minimum number of ultrasound parameters.

Given that the presence of cervical mass is always a pathological condition and that the gray scale US combined with Color Doppler US is a real time reproducible method, noninvasive, unirradiated with a high degree of accuracy and accessible, will place this examination on the first place among paraclinical investigation techniques of inflammatory or tumoral lymphadenopathy before computer tomography or magnetic resonance imaging.

After studying the ultrasound parameters it was possible to develop a practical guide line for diagnostic management of cervical lymphadenopathy using ultrasound examination which will fit the case in the category of benignant or malignant nature lesions and will help in guiding the treatment options.

Keywords: ultrasonography, lymphadenopathy, malignancy, positive predictive value, accuracy, benignancy.