Contrast-Enhanced Ultrasound of lymph nodes: towards better imaging

Adrian Săftoiu

Research Center of Gastroenterology and Hepatology Craiova, University of Medicine and Pharmacy Craiova, Romania

We read with great interest the article by Poanta L et al entitled “The place of CEUS in distinguishing benign from malignant cervical lymph nodes: a prospective study.” published in the current number of *Medical Ultrasonography* [1]. The article describes the role of contrast-enhanced ultrasound (CEUS) as compared to gray-scale and color Doppler ultrasound for the differential diagnosis of benign versus malignant superficial cervical lymph nodes. The study was prospective and included 61 patients with cervical lymphadenopathy, with the final diagnosis obtained through biopsy or after surgery. The authors compared various parameters obtained by gray-scale ultrasound, Doppler parameters (vessel location, vascular pattern, pediculus number, resistivity, and pulsatility index) and CEUS parameters (enhancement pattern, derived peak intensity, regional blood volume (RBV), time to peak and area under the curve). Furthermore, they tried to incorporate CEUS in the algorithm conventionally used for the differential diagnosis of benign and malignant lymph nodes.

An imaging method with a high sensitivity and specificity for the differential diagnosis would certainly be needed in order to choose the most probable lymph node that should be subsequently targeted by ultrasound-guided fine needle aspiration biopsy. Nevertheless, the task is not simple as various authors tried to compare various state-of-the-art technologies like ultrasound and mag-

netic resonance imaging [2]. Ultrasound is particularly useful as a cheap high-resolution method, available at the point-of-care, including in low-income resource settings. However, gray-scale ultrasound has a low accuracy for the differential diagnosis of benign and malignant lymph nodes [3]. Thus, using the transverse-to-longitudinal diameter ratio in combination with texture and margin analysis, the correct diagnosis can be made in only approximately 80% of the lymph nodes. This has been also shown in the initial studies that used endoscopic ultrasound as a high resolution technique used to image mediastinal or abdominal lymph nodes [4]. None of the gray-scale derived features (size greater than 1 cm, hypoechoic, distinct margins, and round shape) are considered independent predictors of malignancy of the lymph nodes. Other proposed features like irregular echogenic foci representing coagulation necrosis, are still unrecognized although it could have a high positive predictive value for malignancy of approximately 90% [5].

Contrast-enhanced color or power Doppler has been used consistently for the differential diagnosis, yielding better results as compared to gray-scale analysis of lymph nodes [6]. Other authors found that contrast-enhancement is not needed in comparison with native colour and power Doppler [7]. Excellent results have been also found in the study of Poanta L et al [1], for the receiver operator curve (ROC) analysis for both the resistivity index (RI) and pulsatility index (PI), used for the differential diagnosis of benign and malignant lymph nodes. Low-mechanical index CEUS has been proposed as a better method of evaluation for microvascular changes, including necrosis or tumor angiogenesis [8]. Thus, the EFSUMB Guidelines and Recommendations on the Clinical Practice of Contrast Enhanced Ultrasound (CEUS): Update 2011 on non-hepatic applications [9] recommended the use of CEUS for the differential diagnosis of benign and malignant superficial lymph nodes in

Received Accepted

Med Ultrason

2014, Vol. 16, No 1, 5-6

Corresponding author: Adrian Saftoiu

Research Center of Gastroenterology

and Hepatology

University of Medicine and Pharmacy

1 Mai Bvd, no 60, 200355 Craiova, Dolj

Romania

Phone/Fax: +40251 310.287

E-mail: adrian.saftoiu@umfcv.ro

special clinical settings, without being useful for routine discrimination. Also, CEUS with subcutaneous injection of contrast for identification of the sentinel lymph node is considered a field of ongoing research, not ready for clinical practice. Nonetheless, although not perfect, CEUS yielded good results in a few published studies, better than conventional ultrasonography, with an accuracy of approximately 80%. This is especially true for quantitative analysis of CEUS time-intensity curves, with good values reported in the current study, especially for the CEUS enhancement pattern and regional blood flow (RBV) [1]. The authors also made efforts in finding the right place for CEUS in the current algorithms used for the ultrasound evaluation and differentiation of benign and malignant lymph nodes. The technique should be used in the uncertain cases where the information obtained from gray-scale and Doppler studies is not enough for a correct diagnosis, because the added value of CEUS yields a high accuracy of the differential diagnosis. This should not preclude the usage of ultrasound-guided FNA biopsy, especially if a positive result would change consistently the clinical management of the patient.

In conclusion, the usage of CEUS for the differential diagnosis of benign and malignant superficial lymph nodes is still controversial, while the data brought by the current article might solve some missing pieces of the puzzle. Other techniques like elastography might also add to the complexity of the problem [10], although complementary informations are always desirable to increase the accuracy of differential diagnosis in between benign and malignant lymph nodes [11,12]. Last, but not least, US-guided FNA biopsy should be left in place as the method of choice for confirmation of the diagnosis, while the role of imaging should not be over-emphasized.

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