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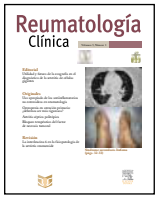

Editorial

Utility and Future Direction of Echography in the Diagnosis of Giant Cell Arteritis

Utilidad y futuro de la ecografía en el diagnóstico de la arteritis de células gigantes

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The progress of medicine is based on continuous change. This rate of change has accelerated in the past decades and has improved the precision and validity of its procedures, in addition to centering attention on the patient and in being cost-effective. These keystones, validity, patient satisfaction, and cost reductions are the basis of the thoughts that will be laid out as follows in order to evaluate the usefulness and future of echography in the diagnosis of giant cell arteritis (GCA).

The diagnosis of GCA is fundamentally based on the criteria proposed by the American College of Rheumatology (ACR)[1] published in 1990 and on a biopsy of the temporal artery. Experts tend to be satisfied by these criteria but some vocal critics have pointed out its possible weaknesses. Therefore, in spite of the fact that the diagnosis of GCA can be considered satisfactory, there is a margin for improvement in order to reach excellence.

The ACR criteria are meant for classification, but in daily clinical practice they are employed as diagnostic guides. In principle, the ACR criteria seem valid; in their original publication they reach a sensitivity of 93.5% and a specificity of 91.2%, numbers that leave most clinicians satisfied. However, several articles have discussed the results that led to the origin of these criteria. The problem lies in the fact that the sensitivity and specificity of any test depends on the sensitivity prior to the test. The results of the ACR criteria come from a vasculitis clinic and the sensitivity and specificity calculations were performed in this type of patients, not in those in a general rheumatology clinic who would be expected to have a lower probability prior to the test or in atypical patients in which the probability is even lower. In that tenor, according to Rao et al,[2] who applied these criteria in a general rheumatology clinic, sensitivity reached 75%, with a specificity maintained at 92%, but with a positive predictive value (PPV) of only 29%. PPV points to the probability of having the disease if the results of the criteria employed are positive. In summary, we would treat our patients with a large dose of steroids with a 29% chance of being right, something that obviously is uncomfortable for any clinician. Fortunately, this low probability is due to the fact that the first 4 criteria of the ACR are very sensitive but hardly specific; therefore the need for a fifth criteria, biopsy, in order to reinforce the specificity of the diagnosis.

To this point it would seem that the biopsy offers the diagnostic solution in this disease. But the biopsy also has its weaknesses; it is efficient when the result is positive leading to the acceptance of the fact that its specificity and PPV is 100%; the problem is its low sensitivity, around 60%.[1] As we know, sensitivity indicates the probability of correctly classifying an individual as sick. The number of recognized temporal artery biopsy false negatives oscillates between 9% and 44%,[3-5] but when this is limited to patients with GCA, biopsy can be negative in up to 68% of cases according to the literature. The sources of variability in the negative cases are mainly 3: *a)* parched and asymmetrical affection of the lesions, something that has led to a lot of publications—experts recommend wide samples of 3-6 cm according to the probability prior to the test of each patient and always selecting the most symptomatic artery, in order to improve sensitivity—; another fact that corroborates the assumption of this lack of sensitivity is the tendency to perform a second biopsy in those cases with negative results and a high suspicion of disease[6]; *b)* surgical technique; and *c)* interpretation by the pathologist.

The low sensitivity of the biopsy, together with the fact that a second biopsy only provides 3%-10% of positive results,[7] justifies the search of new diagnostic methods, especially color Doppler echography.

In the past years, Doppler echography has been shown as valid for the diagnosis of GCA in multiple articles, among them a meta-analysis of 23 studies with 2036 patients.[7-9] The results of the meta-analysis show a sensitivity of 88% and a specificity of 78% versus temporal artery biopsy, while with the ACR criteria as a standard, sensitivity is 87% and specificity is 96%.These results are obtained through the detection of 3 echocardiographic signs: *a)* a hypoechoic halo; *b)* stenosis; and *c)* vascular occlusion. The hypoechoic halo is the most specific sign and represents vessel wall edema associated with vasculitis. As a limitation of this meta-analysis, it must be pointed out that there is a noticeable heterogeneity in the studies, some being small and modest in quality.

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After demonstrating the validity of echography in the diagnosis of CGA, a debate has developed on wether echography, due to its superior sensitivity compared to biopsy and its good specificity, can substitute histology in the diagnosis of the disease. The debate is open and up until now the answer was negative because biopsy, with a 100% specificity, was unquestionable; however, echography is gaining terrain as the quality of new equipment improves, and in 2006 the first article pointing out that the detection of a bilateral halo sign in temporal arteries is 100% specific for the diagnosis of GCA, therefore eliminating the need for a biopsy, was published.[10] These results have been confirmed by our group with a larger number of examinations.[11] Even if we accept this hypothesis, biopsy would still be needed when the lesions affect a branch of the superficial temporal artery or when the type of vasculitis was in doubt, because although echography can easily discover edema of the vessel wall, this can be seen not only in GCA, but also in diseases such as arteritis nodosa, Wegener's granulomatosis, tromboangiitis obliterans (Buerger's disease), malignant histiocytosis, or HIV infection. In the case of Churg-Strauss vasculitis, the echographic pattern of vessel wall edema is different, making it possible to not reach the differential diagnosis, even when the temporal arteries are not affected. All of this leads to the infrequent possibility, approximately in 3% of the cases,[12,13] that temporal artery biopsy would still be needed. An additional contribution has been the demonstrated fact that echography increases the sensitivity of a biopsy (18 of 18 cases) when this is performed in the zone where the hypoechoic halo has been observed.[10]

The better sensitivity of echography versus biopsy is due to the fact that it is capable of examining several vessels along their route, giving it a larger validity regarding aspect and content. In addition, and according to the clinical data of the patients, more vessels can be examined, such as occipital arteries in the case of headaches in this region, or subclavian and brachial arteries in the case of asymmetrical tension, or loss of pulse in the upper extremities.[14,15] An additional advantage of echography is that it allows to confirm relapses of the disease in patients who have undergone treatment, something that cannot be done through histology,[16] and supervising the response to treatment, especially when there are discrepancies between the clinic and acute phase reactants.

Criticism of echography mainly relates to reproducibility because it has always been considered as an operator dependent technique. In this sense, it must be pointed out that echography is subject to 3 sources of variability: the equipment employed, the training of the examiner, and the capacity to differentiate pathological images from normal ones. Variability of equipment is being reduced as the quality of echographs increases. Regarding the capacity of the examiner, the literature points out that training must include the recognition and follow up of at least 30 temporal arteries in normal patients, preferably of the same age as the target population, in order to gain enough experience and know the Doppler examination technique (frequency, PRF, window orientation, etc). Finally, it has been shown[17] that operator agreement is high, with a κ=0.84, something vastly superior to that obtained through other clinical diagnostic means.

Finally, the health system can benefit from cost reductions. Echography costs 34.39 euros, versus 174.63 euros of direct costs related to biopsies, a reduction of 500% (calculations based on the Boletín Oficial del Estado. 2006;62:10172-86). In our unit, this technique was requested for 63 new patients during the past year, leading to savings of 8835 euros and a consumption of 1 week of medical attention time (calculating half-an-hour for the procedure including writing the report), in other words, an efficient technique. The patient benefits of the rapid and non-aggressive examination, leading to more satisfaction on their part.

In conclusion, echography is a valid and trustworthy technique which reduces costs, increases patient satisfaction, has a higher validity regarding aspect and content and facilitates diagnostic and therapeutic decision making. All of this is leading to the passage of echography in GCA from being a research tool to something that is applicable in the daily practice and has a promising future.

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