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Letter to the Editor

Three-dimensional speckle tracking echocardiography for strain and rotational analysis of a carotid artery (from the MAGYAR-Healthy Study)

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There is an increasing scientific interest on the evaluation of functional properties of large vessels including carotid arteries. Assessments of pulse wave velocity or carotid elastic properties based on imaging technique-derived diameter/area data and blood pressures are real options. Three-dimensional (3D) speckle tracking echocardiography (3DSTE) is a new non-invasive clinical tool for non-invasive quantification of myocardial deformations [1]. However, there is no clinical information about its usefulness on the assessment of strain and rotational characteristics of carotid arteries. Therefore, we present a 29-year-old healthy male subject who was examined by 3DSTE. The subject was involved into the MAGYAR-Healthy Study (**M**otion **A**nalysis of the heart and **G**reat vessels b**Y** three-dimension**A**l speckle-t**R**acking echocardiography in **Healthy** subjects). Informed consent was obtained from the case and the study protocol conformed to the ethical guidelines of the 1975 Declaration of Helsinki, as reflected in a priori approval by the institution's human research committee. Due to software limitations to assess a cylinder-like structure like carotid artery several manipulations were used for quantification of its strain and rotational mechanics. 3DSTE is able to evaluate a "sack" like heart chambers, therefore a "sack" had to be created. First, longitudinal sectional planes (Fig. 1A and B) were optimalized to the longitudinal axis of the left common carotid artery. Cross sectional views (Fig. 1, C3, C5, C7) of the carotid artery were optimalized to the middle of the visible part of vessel. Following automatic contour detection with manual corrections, a 3D cast of the left common carotid artery has been created, of which 'peak' ("the bottom of the sack") represented the side of the carotid artery closer to the aorta (Fig. 1). This part of the "sack" (distal one-third) was excluded from evaluations. The results of this case could suggest that strain and rotational mechanics of the carotid arteries could be quantified by 3DSTE (Fig. 2). This opportunity could open new possibilities in the evaluation of functional properties of carotid arteries. At this moment little is known about these movements, moreover their clinical value is also not well known. Further comparative studies with larger number of healthy subjects and pathological cases are warranted to evaluate these parameters by 3DSTE.

Conflict of interest

No potential conflict of interest.

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The authors of this manuscript certify that they comply with the Principles of Ethical Publishing in the International Journal of Cardiology.

Reference

[1] Nemes A, Kalapos A, Domsik P, Forster T. Three-dimensional speckle-tracking echocardiography — a further step in non-invasive three-dimensional cardiac imaging. Orv Hetil 2012;153:1570–7.

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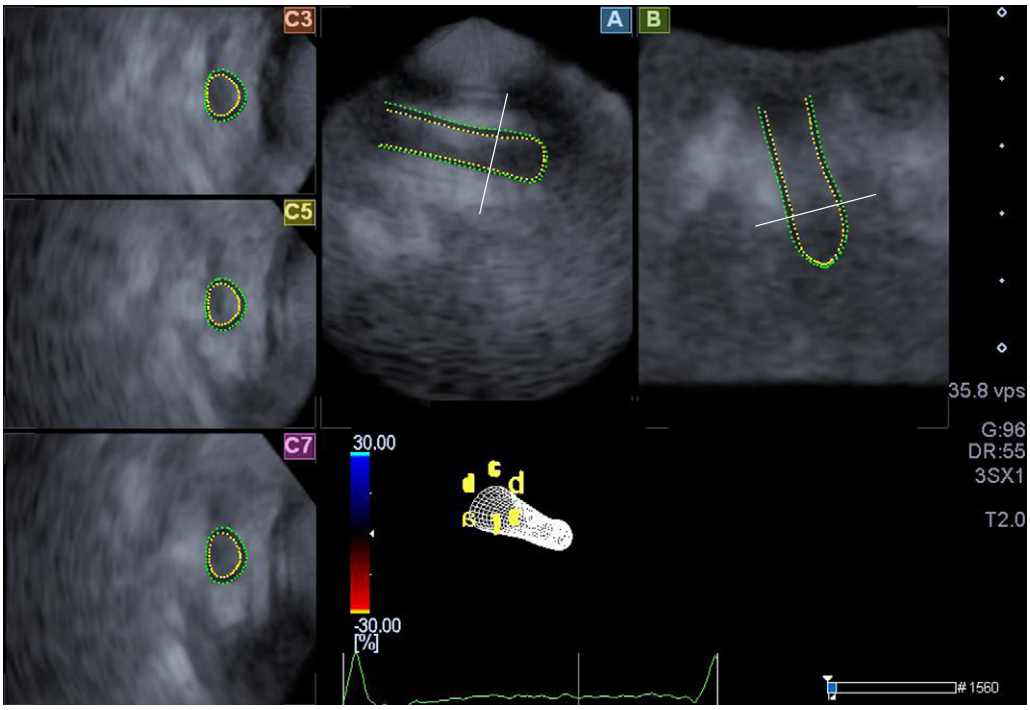

Fig. 1. Longitudinal sectional planes (A and B) were optimalized to the longitudinal axis of the left common carotid artery. Cross-sectional views were chosen at different levels of the carotid artery (C3, C5, C7). A three-dimensional cast of the carotid artery is also presented, of which 'peak' ("the bottom of the sack") represented side of the carotid artery closer to the aorta. This part of the three-dimensional cast of the vessel was excluded from the evaluations.

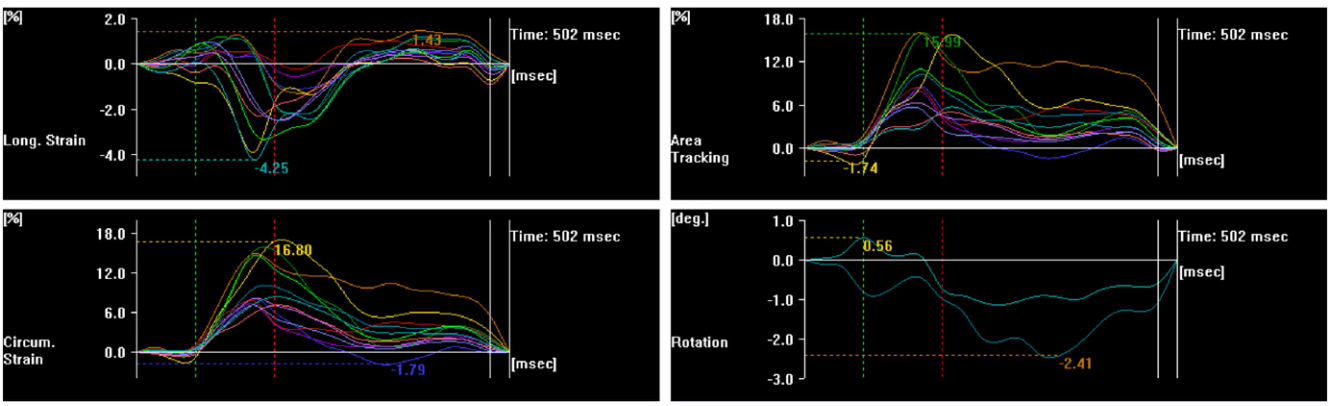

Fig. 2. Different strain and rotational characteristics of the left common carotid artery are presented.