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CLINICAL RESEARCH

Prospective comparison of speckle tracking longitudinal bidimensional strain between two vendors

Comparaison prospective de la déformation longitudinale bidimensionnelle par *speckle tracking* entre 2 vendeurs

Anne-Laure Castel[a], Catherine Szymanski[b,c], François Delelis[a], Franck Levy[c], Aymeric Menet[a], Amandine Mailliet[a], Nathalie Marotte[a], Pierre Graux[a], Christophe Tribouilloy[b,c], Sylvestre Maréchaux[a,b,*]

[a] *Université Lille Nord de France, GCS-Groupement des Hôpitaux de l'Institut Catholique de Lille, Faculté Libre de Médecine, Université Catholique de Lille, Lomme, France*
[b] *INSERM U 1088, Université de Picardie, Amiens, France*
[c] *Centre Hospitalier Universitaire d'Amiens, Amiens, France*

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KEYWORDS
Echocardiography;
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Summary
Background. — Speckle tracking is a relatively new, largely angle-independent technique used for the evaluation of myocardial longitudinal strain (LS). However, significant differences have been reported between LS values obtained by speckle tracking with the first generation of software products.
Aims. — To compare LS values obtained with the most recently released equipment from two manufacturers.
Methods. — Systematic scanning with head-to-head acquisition with no modification of the patient's position was performed in 64 patients with equipment from two different manufacturers, with subsequent off-line post-processing for speckle tracking LS assessment (Philips QLAB 9.0 and General Electric [GE] EchoPAC BT12). The interobserver variability of each software product was tested on a randomly selected set of 20 echocardiograms from the study population.

Abbreviations: Cb, Bias correction factor; CCC, Concordance correlation coefficient; CV, Coefficient of variation; GE, General Electric; GLS, Global longitudinal strain; LOA, Limits of agreement; LS, Longitudinal strain; LV, Left ventricular.

* Corresponding author. Cardiology Department, GCS-Groupement des Hôpitaux de l'Institut Catholique de Lille, Faculté Libre de Médecine/Université Catholique de Lille, Rue du Grand-But, 59160 Lomme, France.
E-mail address: sylvestre.marechaux@yahoo.fr (S. Maréchaux).

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Results. — GE and Philips interobserver coefficients of variation (CVs) for global LS (GLS) were 6.63% and 5.87%, respectively, indicating good reproducibility. Reproducibility was very variable for regional and segmental LS values, with CVs ranging from 7.58% to 49.21% with both software products. The concordance correlation coefficient (CCC) between GLS values was high at 0.95, indicating substantial agreement between the two methods. While good agreement was observed between midwall and apical regional strains with the two software products, basal regional strains were poorly correlated. The agreement between the two software products at a segmental level was very variable; the highest correlation was obtained for the apical cap (CCC 0.90) and the poorest for basal segments (CCC range 0.31—0.56).
Conclusions. — A high level of agreement and reproducibility for global but not for basal regional or segmental LS was found with two vendor-dependent software products. This finding may help to reinforce clinical acceptance of GLS in everyday clinical practice.

MOTS CLÉS
Échocardiographie ;
Strain longitudinal global ;
Speckle tracking

Résumé
Contexte. — Le *speckle tracking* est une technique relativement nouvelle, largement indépendante de l'angle, utilisée pour l'évaluation du strain myocardique longitudinal. Toutefois, des différences significatives ont pu être mises en évidence entre les valeurs de strain longitudinal obtenues par *speckle tracking* avec les premières générations des logiciels de différents vendeurs.
Objectifs. — Comparer les valeurs de strain longitudinal obtenues avec les 2 plus récentes versions de logiciels de 2 vendeurs.
Méthodes. — Une échocardiographie sans modification de la position du patient était réalisée chez 64 patients par 2 échographes de 2 vendeurs différents pour obtention en déporté du strain longitudinal (Philips QLAB 9,0 et GE EchoPAC BT12). La variabilité interobservateur de chaque logiciel était étudiée sur un échantillon aléatoire de 20 patients issus de la population de l'étude.
Résultats. — Les coefficients de variation de GE et Philips pour le strain longitudinal global étaient de 6,63 % et 5,87 % respectivement, indiquant une bonne reproductibilité. La reproductibilité était très variable au niveau segmentaire, avec des coefficients de variation variant de 7,58 % à 49,21 % pour le strain longitudinal avec les 2 logiciels. Le coefficient de concordance pour le strain longitudinal global était haut à 0,95, ce qui indique une bonne concordance entre les 2 méthodes. Tandis qu'une bonne concordance était observée pour le strain apical et médian, les valeurs de strain régionales basales étaient peu corrélées. La concordance entre les 2 méthodes était très variable au niveau segmentaire, les meilleures corrélations étant obtenues pour l'apex (coefficient de concordance à 0,90) et les plus mauvaises étant obtenues pour les segments basaux (coefficients de concordance allant de 0,31 à 0,56).
Conclusions. — Une bonne concordance et une bonne reproductibilité sont retrouvées pour le strain longitudinal global de 2 vendeurs, mais pas au niveau régional basal ou segmentaire. Les données de cette étude pourraient aider à renforcer l'importance du strain longitudinal global en pratique clinique.

Background

Longitu dinal strain (LS) describes myocardial deformation, i.e. the fractional change in length of a myocardial segment. Speckle tracking is a relatively new, largely angle-independent technique used for the evaluation of myocardial LS that has been experimentally validated against sonomicrometry [1—3]. Global LS (GLS) is the average longitudinal component of strain in the entire myocardium, which can be approximated by the averaged segmental strain components in individual myocardial wall segments [4]. Clinical studies have demonstrated the major additional diagnostic and/or prognostic contribution of GLS compared with conventional indices of left ventricular (LV) systolic function in various clinical settings, such as heart failure, valvular heart disease or cardiomyopathies [5]. However, previous reports have demonstrated significant differences between LS values obtained by speckle tracking with the first generation of software products released by various manufacturers [6,7]. Post-processing appears to be the most important determinant in intervendor variation, while acquisition appears to have only a limited effect [6]. However, speckle tracking standardization among manufacturers is essential, as clinicians must be able to interpret data generated by different devices, irrespective of the vendor [8]. The present study was therefore designed to compare GLS and segmental LS values obtained with the most recent releases from two different manufacturers. To address this issue, systematic scanning with head-to-head acquisition was performed in patients with equipment