



Two-dimensional speckle tracking echocardiography in calves: feasibility and repeatability study

L. Lecoq, Dr Med. Vet., M.Sc^{a,*}, N. Moula, Dr Med. Vet., PhD^b,
H. Amory, Dr Med. Vet., PhD^a, F. Rollin, Dr Med. Vet., PhD^c,
A. Leroux, Dr Med. Vet., PhD^a

^a *Clinical Department of Companion Animals and Equids, Faculty of Veterinary Medicine, University of Liege, Quartier Vallée 2 B41, Avenue de Cureghem 5A-5D, 4000 Liège, Belgium*

^b *Department of Animal Production, Faculty of Veterinary Medicine, University of Liege, Quartier Vallée 2 B42, Avenue de Cureghem 7A-7D, 4000 Liège, Belgium*

^c *Clinical Department of Production Animals, Faculty of Veterinary Medicine, University of Liege, Quartier Vallée 2 B42, Avenue de Cureghem 7A-7D, 4000 Liège, Belgium*

Received 10 May 2016; received in revised form 5 October 2017; accepted 31 October 2017

KEYWORDS

Bovine;
2DST;
Ventricular function;
Cardiac function

Abstract Objectives: To assess the feasibility and repeatability of two-dimensional speckle tracking echocardiography for the evaluation of left ventricular function in healthy calves.

Animals: 12 Holstein calves, 62 ± 11.6 days old; 75.25 ± 5.4 Kg.

Methods: Observational study. Right parasternal short-axis views at papillary muscle level were recorded in standing calves and subsequently analyzed by two-dimensional speckle tracking for global and regional radial and circumferential strains and strain rates and radial displacement. Echocardiographic examinations were performed by 2 observers to evaluate intra- and interobserver repeatability and variability.

Results: Two-dimensional speckle tracking was feasible in all calves. Automated tracking was better in systole than in diastole. Repeatability of the technique was good in calves. Systolic radial strain and strain rate peak values showed little

Poster presented at the ACVIM Forum, June 3–6 2015, Indianapolis, IN, USA.

* Corresponding author. Clinical Department of Companion Animals and Equids, Faculty of Veterinary Medicine, University of Liege, Quartier vallée 2 b41, Avenue de Cureghem 5A-5D, 4000 Liège, Belgium.

E-mail address: Laureline.lecoq@ulg.ac.be (L. Lecoq).

<https://doi.org/10.1016/j.jvc.2017.10.008>

1760-2734/© 2017 Elsevier B.V. All rights reserved.

variability compared with systolic circumferential strain and strain rate and to all diastolic measurements. Variability of the interobserver measurements was greater than the intraobserver measurements.

Conclusions: Two-dimensional speckle tracking is feasible in calves. As in other species, evaluation of systolic radial left ventricular function is more reliable than circumferential and diastolic left ventricular function.

© 2017 Elsevier B.V. All rights reserved.

Abbreviations

2DST	two-dimensional speckle tracking
ANT	anterior
ANTSEPT	anteroseptal
CV	coefficient of variation
DR _S	systolic radial displacement
INF	inferior
IVS	interventricular septum
LAD	left atrium diameter
LAT	lateral
LVID	left ventricular internal diameter
LVPW	left ventricular posterior wall
POST	posterior
ROI	region of interest
SC	circumferential strain
SEPT	septal
SrC _A	late diastolic circumferential strain rate
SrC _E	early diastolic circumferential strain rate
SrC _S	systolic circumferential strain rate
SR	radial strain
SrR _A	late diastolic radial strain rate
SrR _E	early diastolic radial strain rate
SrR _S	systolic radial strain rate

Introduction

Early diagnosis of cardiac diseases in the bovine species is difficult based on clinical signs only [1]. However, early recognition of those patients might improve treatment outcome or avoid unnecessary costs associated with the treatment of an animal with a poor prognosis.

Many cardiac diseases in cattle, and particularly in calves, directly affect the myocardium including primary dilated cardiomyopathy [2,3], cardiomyopathy secondary to bacterial or viral infections [4,5], vitamin E/Selenium deficiency [6], or intoxication with ionophore [7] or doxycycline [8–10].

Two-dimensional speckle tracking (2DST) echocardiography is an innovative technique that

allows quantitative assessment of regional and global systolic left ventricle function based on a frame-by-frame tracking of acoustic speckles on two-dimensional grayscale conventional images [11,12]. The relative measurement of deformation of a myocardial segment is described by its strain (e.g. lengthening or shortening compare to its original size). The strain rate represents the speed at which this deformation occurs [13,14]. Both parameters provide complementary information and have been used to quantify the myocardial function in humans, dogs, cats, horses, and goats [13,15–22].

The goal of this study was to assess the feasibility and reliability of 2DST echocardiography for quantification of circumferential and radial strains and strain rates and displacement of the left ventricle in short-axis views at papillary muscle level in healthy calves.

Animals, material and methods

Animals

For this observational study, 12 Holstein lactated calves (6 males and 6 females; mean age: 62 ± 11.6 days; mean body weight: 75.25 ± 5.4 Kg) were used. Calves were deemed healthy based on history, general examinations, electrocardiography, and conventional as well as Doppler echocardiography. Speckle tracking was performed on all calves on day 1 and day 3 by a single operator (LL) to assess intraobserver repeatability. The 6 female calves (mean age: 66 ± 6 days; mean body weight: 76.6 ± 4 Kg) were also evaluated by a second operator (HA) on day 2 to assess interobserver repeatability. Before 2DST image acquisition, calves were handled for 2 days, and general examination, cardiac auscultation, electrocardiography and complete two-dimensional echocardiography, including M-mode, color and pulse wave Doppler echocardiography, were performed following the guidelines of the local animal care committee.

Download English Version:

<https://daneshyari.com/en/article/8484534>

Download Persian Version:

<https://daneshyari.com/article/8484534>

[Daneshyari.com](https://daneshyari.com)