Speckle Tracking with Semi-Automated Strain for Cardiac Contractility Assessments in Dogs, Minipigs, and Non-Human Primates

R. Kubaszky, R. Forster, and S. Authier
INTRODUCTION

M-Mode which was historically used for cardiac contractility assessment with echocardiography presents significantly limitations owing to the unidimensional rectilinear approach with high risks for variations due to changes in ultrasound probe angle. Speckle tracking imaging enables semi-automated contractility evaluation of the entire ventricular circumference with segmental ventricular analysis as well as global integrated contractility assessment. The goal of this study was to characterize the performance of this methodology in dogs, minipigs and non-human primates in the context of drug safety assessment.

METHODOLOGY

Echocardiography with speckle tracking imaging was performed on Beagle dogs, Göttingen minipigs and cynomolgus monkeys at baseline and after pimobendan and itraconazole administration. Dogs and minipigs were evaluated with the right parasternal short and long-axis views in right lateral recumbency on an echographic table. Cynomolgus monkeys were evaluated in apical and parasternal views in standing and left lateral decubitus. A Siemens 4v1c probe was used. Electrocardiogram was taken for systole and diastole marking for calculation of strain rate, displacement and velocity.

INTERPRETATION AND CONCLUSION

SPECKLE tracking for measurement of strain appears to be an adequate modality for measurement of ventricular contractility in dogs, minipigs and non-human primates with dimensional resolution superior to the legacy M-mode echocardiography. As for all measures of ventricular contractility, strain measured at baseline was heart rate dependent suggesting that handling procedures are critical to the quality of the data in drug safety testing.
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