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Editorial

Path to Accurate and Universal Strain Measurement: Insights From a Validation Study

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▸ See the article "Echocardiography Core Laboratory Validation of a Novel Vendor-Independent Web-Based Software for the Assessment of Left Ventricular Global Longitudinal Strain" in volume 31 on page 135.

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While myocardial strain measurement is not currently considered a mandatory assessment in the guidelines of various cardiac disease, unlike left ventricular ejection fraction, it is a topic of active research among many investigators due to its potential clinical utility.[1] The results of these studies have been promising, suggesting that myocardial strain measurement could become a necessary assessment in the near future. However, there are several challenges that need to be addressed before myocardial strain can be widely used in routine clinical practice. One of the main issues is that strain values can vary depending on the software used for measurement, and there is currently no standardization method for correcting these differences. As a result, it can be difficult to compare strain values obtained using different software programs, which can limit the utility of strain measurements in clinical decision-making. As such, the validation of strain measurement software is a critical step in establishing the reliability and accuracy of this tool. As these developments continue, it is likely that myocardial strain measurement will become an increasingly important tool for the diagnosis, treatment, and management of cardiac disease.

In the current issue of *Journal of Cardiovascular Imaging*, Spitzer et al.[2] compared a novel web-based tool with 2 algorithms of an established strain platform and test its reproducibility. We should first be well aware of the strengths and weaknesses of the validation study of vendor-independent software. Although the results of the CAAS Qardia validation study were promising, the small sample size of 30 patients raises concerns about the generalizability of the findings to a larger population. At the same time, this study also highlights several weaknesses and challenges that need to be addressed in future research. One of the main challenges is the lack of standardization in strain measurement software, which can lead to differences in strain values and limit the comparability of results obtained using different software programs. The study also raises questions about the impact of inter- and intra-observer variability on strain measurement accuracy, as well as the generalizability of the results to other patient populations. Furthermore, as previously mentioned, vendor-independent software has lower accuracy compared to vendor-specific software. In the case of TomTec, the values are slightly lower compared to those obtained from vendor specific software such as EchoPAC of GE or Toshiba.[3] To address these concerns, future studies with larger sample sizes will be necessary to confirm the validity and reproducibility of the software in a clinical setting.

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Then, it is imperative to consider whether vendor-specific strain measurements offer superior accuracy and fewer limitations compared to vendor-independent software. Vendor-specific software is often limited to working only with images obtained from a particular manufacturer's imaging system. Clinicians who want to use this software to measure myocardial strain must therefore use the specific imaging system that the software is designed for. However, this may not always be practical or possible, as the necessary imaging system may not be available. In contrast, vendor-independent software for measuring myocardial strain is not tied to a specific imaging system and can work with images obtained from various different manufacturers. The major advantage of vendor-independent software for measurement of myocardial strain is its ability to be used with images obtained from multiple different imaging systems, regardless of the manufacturer. This is because vendor-independent software is designed to be compatible with a wide range of imaging systems and file formats. By using vendor-independent software, clinicians have more flexibility in choosing imaging systems and can use images obtained from a variety of different sources. This can be particularly beneficial in clinical settings where patients may receive care from various clinicians who use different imaging systems, or in research settings where data from multiple studies conducted using different imaging systems need to be analyzed together. Overall, the major advantage of vendor-independent software for measurement of myocardial strain is its compatibility with a wide range of imaging systems, which provides greater flexibility and usability in clinical and research settings.

However, vendor-independent software is often limited to working only with images obtained from a different manufacturer's imaging system, making it necessary for clinicians who wish to use the software to measure myocardial strain to have access to the specific imaging system that the software is designed for. It may not be fully integrated with all imaging systems, which can lead to some compatibility issues. Additionally, some imaging systems may have proprietary features or settings that are not available to vendor-independent software. The accuracy and precision of strain measurements can vary depending on the imaging system used and the quality of the images obtained. Because imaging system manufacturers may not provide support for the use of vendor-independent software, which can make it more difficult to troubleshoot problems or obtain assistance if issues arise, strain value obtained using vendor-independent software may be less accurate or precise than those obtained using vendor-specific software that is optimized for a particular imaging system. These are big huddles for strain analysis using vendor-independent software. A report from the European Association of Cardiovascular Imaging /American Society of Echocardiography strain standardization task force reported that the receiver operating characteristic curves to detect for segmental stretching of GE, Toshiba, and TomTec were 0.95, 0.97 and 0.84, respectively.[4] And finally, as with any software, the accuracy and reliability of strain measurements obtained using vendor-independent software can be influenced by the skill and experience of the user. As a result, clinicians or researchers using the software need to be properly trained and experienced in its use to obtain accurate and reliable results.

Sanna et al.[5] reported that universally accepted cutoff values and variability across vendors remain an area to be fully explored, hence limiting routine application of this technique in clinical practice. By this paper, we can see that there is quite a gap between a general cardiologist and a cardiologist who encounters strains every day. Ultimately, the key to overcoming any gap in knowledge or experience is a commitment to ongoing learning and professional development in software. By staying up-to-date with the latest research and validation of new software, and seeking out corroborations to verify from previous papers, cardiologists can provide the best possible care for their patients.

In conclusion, the validation of myocardial strain measurement software is an important step in establishing the reliability and accuracy of this promising tool for the diagnosis and management of cardiac disease. While the study by Spitzer et al.[2] provides valuable insights into the strengths and weaknesses of a new vendor software for myocardial strain measurement, additional research is needed to address the challenges associated with standardization and generalizability, as well as to establish the clinical utility of strain measurement in diverse patient populations.

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Conflict of Interest
The author has no financial conflicts of interest.

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