HITACHI
Inspire the Next

LV Function Evaluation using LV eFlow

LV eFlow – A Tool within the Hitachi Aloka HDAnalytics™

LV eFLOW is a noninvasive, high-definition blood flow imaging mode which drastically improves spatial and temporal resolution to improve visualization of the endocardial border in the left ventricle with higher sensitivity and resolution than with conventional methods.

LV eFlow may change a technically difficult study into a diagnostic study without using contrast.

BACKGROUND

One of the challenges for every echocardiography lab is the technically difficult patient. Conventionally, labs have used contrast agents to enhance endocardial border visualization. The difficulties with contrast agent use are increased patient exam time, as well as the increased resources and cost to the echo lab and the patient. Additionally, the non-invasive exam now becomes an invasive exam.

In an effort to offer a solution, Hitachi Aloka has developed a unique technology that assists in the evaluation of the left ventricle when visualization is limited. LV eFlow was designed to demonstrate the discrimination between the blood flow and the cardiac tissue and offer an alternative to contrast agent use in some cases.

Dr. Zuyue Wang and technologist Marvin Tyson of MedStar Washington Hospital Center had an opportunity to use this technology in their practice over a period of 3 months. Their protocol included identifying patients that were candidates for contrast agents due to the difficulty in visualizing the endocardial border of the left ventricle. LV eFlow was added to the exam protocol for this patient set. Following the exam, the quality of the endocardial border delineation was evaluated by comparing the LV eFlow images with the images using contrast agents.

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Ultrasound Solutions Clearly Defined™

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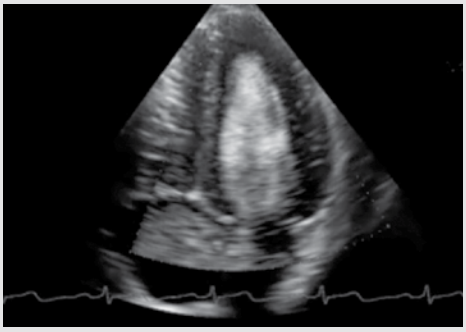


"LV eFlow converted a suboptimal study into an optimal study, with markedly improved endocardial border delineation"

Dr. Zuyue Wang, Director of Structural and Interventional Echocardiography at MedStar Washington Hospital Center

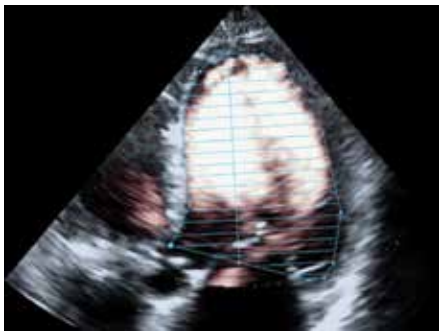
Hitachi Aloka Medical America, Inc.

LV Function Evaluation using LV eFlow

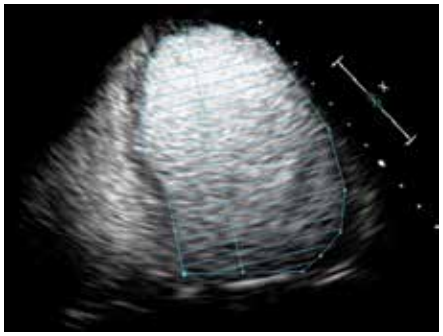
WHAT THEY FOUND

Dr. Wang and Marvin Tyson compared LV eFlow and echo contrast agents in patients with suboptimal image quality and were impressed with the results. They found that "LV eFlow was comparable to echo contrast in improving visualization of difficult-to-image segments in selected patients". Additionally, they found that "LV eFlow converted a suboptimal study into an optimal study, with markedly improved endocardial border delineation".

Dr. Wang believes "LV eFlow can be used as first line method to improve the visualization of the endocardial border". Dr. Wang concludes, "Because echo contrast agents normally require IV access and extra cost, echo contrast agents should only be utilized when LV eFlow fails to enhance the endocardial borders".



LV eFlow - LVED Volume = 238 ml



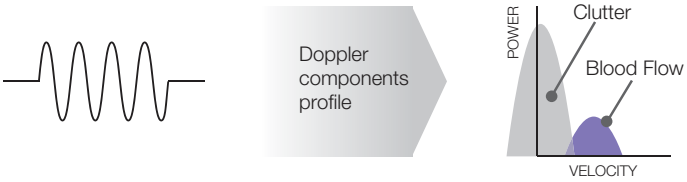
Contrast - LVED Volume = 244 ml

"LV eFlow can be used as first line method to improve the visualization of the endocardial border".

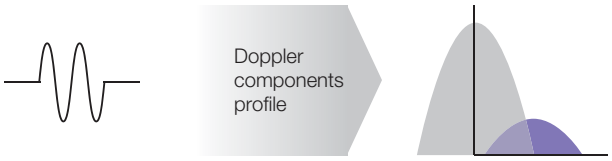
Dr. Zuyue Wang, Director of Structural and Interventional Echocardiography at MedStar Washington Hospital Center

HOW IT WORKS

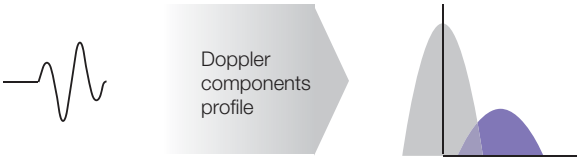
LV eFLOW is a left ventricular (LV) cavity blood flow imaging mode with high spatial and temporal resolution, thanks to widened bandwidth of the ultrasound transmitter/receiver and the reviewing processing method. LV eFLOW suppresses attenuation of the LV cavity signal in each data processing, and enhances the processing to discriminate blood flow of the LV cavity from tissue. This enables fine display of LV cavity blood flow with flow direction, which is clinically useful. Using ultrasound transmission pulses with short pulse widths help to enhance axial resolution. By optimizing the ultrasound transmission pulse with programmable wave forming, clutter and noise components in the Doppler reception signal are reduced.



Color/Power Doppler Waveform As transmission pulse width is long and transmission bandwidth is narrow, resolution is low.



Simple Short Burst Transmission As transmission bandwidth is wide, unnecessary clutter noise is mixed.



LV eFLOW Programmable Wave Forming As the transmission pulse width is short and the transmission bandwidth is wide, resolution is high. Transmission is made with optimized waveform in which unnecessary components other than the reference frequency are eliminated. This results in reduced clutter and noise.

CONCLUSION

Hitachi Aloka's LV eFlow assists with LV function evaluation by providing markedly improved endocardial border delineation, potentially reducing contrast use.

Disclaimer: This paper is provided as a service to our customers to share information and opinions from Hitachi Aloka Medical America. The views expressed in this paper are those of the authors based on a small patient survey. Additional investigation is recommended.

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