



Letter to Editor

L wave in mitral inflow doppler – lessons for the anaesthesiologist: A case report with a short review

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Dear editor,

The evaluation of a patient during a pre-anaesthetic checkup for cardiac risk stratification is often challenging, especially when patients present to the clinic with nonspecific symptoms of palpitation or dyspnoea. Quantification of dyspnoea is sometimes difficult when the patient restricts his/her activity either due to dyspnoea or due to a lower limb problem. On interrogating these patients, they may claim “asymptomatic.” Indirect signs like the presence of left atrial enlargement in ECG can provide clues in such cases.¹ These patients can develop pulmonary oedema when subjected to perioperative stress. In this patient, mitral inflow Doppler showed an L wave without any significant symptomatology.

A 41-year-old woman presented with vague palpitations and no apparent signs of heart failure. Her vital signs were unremarkable, with a pulse rate of 60 beats per minute and a blood pressure of 130/82 mmHg. A physical examination did not reveal any significant cardiorespiratory problems. ECG showed nonspecific ST-T changes and a heart rate of 56 beats/min (Figure 1).

A routine renal and liver function test results were normal. Transthoracic echocardiography revealed mild enlargement of the left atrium and left ventricle, suggesting possible diastolic dysfunction (DD). Pulmonary pressure

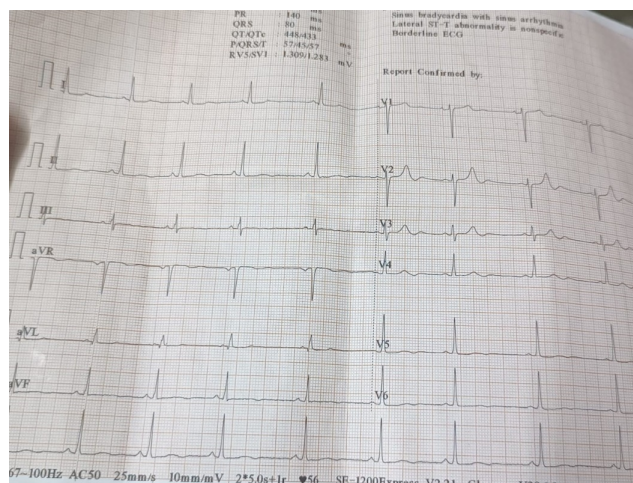


Figure 1: Showing bradycardia without evidence of ischemia or chamber hypertrophy

was normal with normal structural valves. Notably, an L-wave was observed in the diastolic phase following the E-wave, suggesting continued blood inflow into the left atrium after rapid filling. This observation indicated a significant diastolic dysfunction (Figure 2).

Tissue Doppler Imaging (TDI) at the mitral flow inlet confirmed the presence of an L wave, providing objective evidence of diastolic dysfunction. TDI is particularly useful

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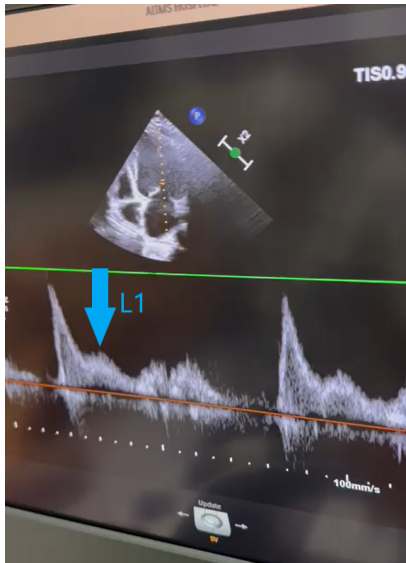


Figure 2: Showing the L1 wave

for evaluating diastolic function, and the L wave is a rare but significant finding associated with severe diastolic dysfunction. Dysfunction occurs when the heart's relaxation and filling during diastole are impaired, leading to increased filling pressures. This can progress to heart failure with preserved ejection fraction (HFpEF), which commonly affects women and the elderly.^{2,3}

Anaesthesiologists should look for diastolic echocardiography markers, including left atrial enlargement or left ventricular hypertrophy, in female patients aged > 70 years with hypertension, diabetes, chronic renal disease, recent weight gain, or exercise intolerance. From an anaesthetic standpoint, the optimal management of the patient with L wave diastolic dysfunction should be difficult with individualized plans to optimize cardiovascular stability. The presence of an L wave on echocardiography is a marker of advanced diastolic dysfunction and elevated left atrial pressures that complicates fluid management and hemodynamic control of patients during surgery. To reduce the risk of diastolic dysfunction, specific preoperative measures are needed: Maintenance of normotension, normovolemia, and sinus rhythm are the key features. Optimization of heart rate and blood pressure are compulsory. It's worthwhile to note that on optimization, the L wave can disappear to demonstrate successful preoperative management.^{4,5}

Neuhauser et al proved.⁶ that isoflurane has no deleterious effects on pre-existing DD or any direct negative lusitropic effects. Other investigations have shown that isoflurane, sevoflurane, and desflurane enhance LV in an afterload-dependent manner. Little research is available concerning IV anaesthetics, although ketamine reduces LV compliance, and propofol increases isovolumic relaxation time without aggravating DD.

In the intensive care setting, LV DD is now considered a relevant factor in the probability of unfavourable outcomes among critically ill patients.³ DD classification is rather intricate, and the existing guidelines are somewhat restricted in the ICU context. Perhaps the identification of an L-wave can provide an indication of aggravation of diastolic dysfunction.

In conclusion, the presence of an L wave in the diastolic phase on echocardiography provides objective evidence of diastolic dysfunction, even when patients may claim to be asymptomatic. The L wave is highly variable throughout the therapeutic process of heart failure and is influenced by fluid volume, heart rate, and heart rhythm. The L-wave may be a valuable indicator for assessing treatment efficacy for heart failure. Anaesthesiologists should look for diastolic echocardiography markers and manage diastolic dysfunction,⁷ before anaesthetic intervention. The identification of an L-wave may provide an indication of worsening DD and the need for careful follow-up.


1. Conflict of Interest


None.

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