INTRODUCTION

Atrial Fibrillation (AF) is the most common form of cardiac arrhythmia with approved incidence of 0.4 to 1.0 % in general population ***(Go et al., 2001).*** The prevalence of AF increases with age reaching 8.0% in those older than 80 years ***(Feinberg et al., 1997).***

AF is associated with increased risk of stroke, heart failure and all- cause mortality ***(Fuster et al., 2006).***

It is an extremely costly public health problem which is accompanied by remarkable social burden ***(Le Huzey et al., 2004).***

Thus early detection of left ventricular dysfunction (LV) in patients with AF is important in predicting which patients are at high risk of developing heart failure and in providing therapeutic intervention to reduce the future incidence of heart failure and its accompanied medical and social costs.

Additionally AF is associated with diastolic dysfunction even in the presence of a normal LV ejection fraction resulting in considerable risk of diastolic heart failure ***(Tsang et al., 2002).***

The precise assessment of diastolic dysfunction in AF is extremely difficult because irregular RR intervals produce constantly changing loading conditions and the applicability of standard Doppler echocardiographic criteria for the diastolic dysfunction is hampered by the lack of late filling phase (A wave) from atrial contraction ***(Oyama et al.,2004).***

Averaging some diastolic indices using Doppler echocardiography in multiple consecutive beats is tedious and cumbersome and its routine application is often difficult in busy clinical scenarios ***(Tabata et al., 2004).***

In sinus rhythm mitral inflow velocities usually consist of 2 forward flow velocities: the early rapid filling wave (E wave) and late atrial filling (A wave).

However, mitral inflow may have additional forward flow during mid- diastole. The prominent mid-diastolic filling wave which has been described as mitral L wave is rarely encountered in sinus rhythm. But its existence has been reported as indicating advanced diastolic dysfunction with elevating LV filling pressures ***(Ha et al., 2006).***

The mitral L wave defined as a distinct forward flow velocity after the E wave with a peak velocity > 20 cm/second. ***(Ha et al., 2006).***

The genesis of a mitral L wave is thought to be the result of:

(1) Delayed and prolonged LV relaxation and/or

(2) Elevated LA pressure. (***Lam et al., 2005).***

The extension of the relaxation phase creates a mid diastolic pressure gradient across the mitral valve with resultant additional ventricular filling this formulates L wave ***(Frommelt et al., 2003)***.