Introduction

Heart failure is a clinical syndrome that arises secondary to abnormalities of cardiac structures and /or function that impair the left ventricle to fill or eject blood; these abnormalities may impair the functional capacity and quality of life of the affected individuals; however they do not necessarily dominate the clinical picture concurrently ***(Givertz et al., 2005).***

Exercise intolerance is intimately entwined in the definition of heart failure as well as its pathophysiology, prognosis and therapy, in addition; measures of exercise tolerance are powerful independent predictors of mortality (***Jones et al, 2004***).

Although cardiopulmonary tests, exercise testing and walking test provide reliable and objective results about the functional capacity; NYHA functional classification remains the most widely used because of being easy, cheap and practical (***Weber et al., 1982; Solal et al., 1991; Wilson et al., 1999; Hunt.,2005).***

Echocardiography is, according to the recently released American College of cardiology and American Heart Association (ACC/AHA) guidelines for the diagnosis and management of heart failure; the single most useful diagnostic test in the evaluation of patients of heart failure ; because of its ability to accurately and noninvasively provide measures of ventricular function and asses causes of structural heart disease ***(Hunt et al,2005).***

In patients with congestive heart failure (CHF), impaired exercise capacity is one of the most common clinical manifestations. Various markers of left ventricular (LV) systolic and diastolic function derived from Doppler

echocardiography have been used to predict functional capacity, including LV cavity dimension, ejection fraction, and transmitral inflow velocity. Doppler examination of mitral inflow has been widely used to evaluate diastolic function. The mitral inflow velocity profile is affected by several factors, however, including left atrial pressure, volume status, and the rate of myocardial relaxation ***(Choong et al., 1987).***

TDI is a new echocardiography technique that enables the evaluation of the global and regional LV longitudinal functions by the analysis of systolic and diastolic myocardial velocities obtained from mitral annulus and are not affected by the quality of the images or the geometric shapes of the left ventricle ***(Sutherland. 1999; Waggoner et al., 2001).***

In recent years, systolic myocardial velocity (Sa) obtained by TDI has been suggested to be an alternative method in the assessment of systolic myocardial functions of various cardiac diseases ***(Vinereanu et al., 2005).***

The TDI of early mitral annulus velocity has been reported to be a relatively preload independent index of LV relaxation, and the ratio of peak early diastolic mitral inflow velocity over the myocardial velocity can be used to estimate LV filling pressure ***(Garcia et al., 1997).***

The importance of the measurements that are based on mitral annular velocities in determining functional capacity has not been well studied.