Assessment of the Relationship of Left Atrial Wall Contraction Velocity by Tissue Doppler Echocardiography to the Mitral Flow Velocity Pattern among patients with systolic heart failure.

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List of abbreviations

A2C: Apical two chamber view**.**

A4C： Apical four chamber view

Bp LAVpostI: biplane left atrial volume pre left atrial systole

BP LAVpreI: : biplane left atrial volume post left atrial systole

BSA: body surface area

E.F.: ejection fraction

LA:left atrium

LAD: Left atrium dimensions.

LASVI: Left atrial stroke volume index.

LAVpost: Left atrial post atrial systole volume.

LAVpostI: Left atrial post atrial systole volume index.

LAVpre: Left atrial pre atrial systole volume

LAVpreI: Left atrial pre atrial systole volume index.

BP LAVpreI: Biplane left atrial pre systole volume index.

LAWV:left atrial wall velocity contraction velocity.

LV:left ventricle.

m-mode: Motion mode.

Sm:systolic wave of mitral annulus by tissue Doppler imaging.

TDI:tissue Doppler imaging.

Introduction

The left atrial (LA) pump function (active emptying) during the late left ventricular (LV) diastole plays an important role in LV filling, such as in patients with hypertension or myocardial infarction or heart failure. Matsuda et al. Constructed pressure–volume curves for the left atrium in patients with remote myocardial infarction and found that the LA contribution to the LV function depends on the Frank–Starling mechanism. ***(Matuszaki M,et al 1991)***

The transmitral peak flow velocity during atrial contraction is augmented with mild dilatation of the left atrium and mild elevation of the LV diastolic pressure. ***(Matusda Y,et al 1983)***.

Another factor determining LA emptying may be the LA contractility. In patients with heart failure, the LV diastolic pressure (afterload) may increase, and it may affect LA contractility. Triposkiadis reported that active LA emptying is inversely related to the LA tension at the end of atrial systole ***(Triposkiadis. et al, 2008)***

The ventricular myocardial contraction velocity in various heart diseases has been evaluated as one of the indices of myocardial contractility by using tissue Doppler echocardiography. ***(Okamoto M et al, 1986)***

Similar to the ventricular wall contraction velocity, the LA wall contraction velocity (LAWV) may be an indicator of LA contractility during atrial contraction. It is previously reported that LAWV correlates with the LA appendage flow velocity or fractional shortening; this finding suggests that LAWV is a marker of LA contractile function ***(Kimura K, et al 2001), (paraskevaidis IA, et al: 2002)***

The role of LAWV in LA emptying has been studied using tissue Doppler echocardiography in patients with hypertrophic cardiomyopathy. ***(Skulstad , et al:2006)***

However, the role of LA contractility in patients with heart failure has not been well established in, especially in relation to the degree of diastolic dysfunction (the of pattern of mitral inflow).

Aim of the work

Was to assess the relationship of left atrial wall contraction velocity by tissue Doppler echocardiography in relation to pattern of mitral flow velocity among patients with systolic heart failure with reference to active left atrial volume.

Review of literature

Chapter 1: LEFT ATRIUM

ANATOMY:

Cavity and walls of the Left Atrium(LA) are largely formed by the proximal parts of the pulmonary veins, incorporated into the atrium during development. The LA is roughly cuboidal and extends behind the right atrium, separated from it by the obliquely positioned septum. Thus, the right atrium is in front and anterolateral to the right part of the left atrium. The left part is concealed anteriorly by the initial segments of the pulmonary trunk and aorta, with part of the transeverse pericardial sinus between it and these arterial trunks. Antero-inferiorly and to the left, it adjoins the base of the left ventricule (LV) at the orifice of the mitral valve. Its posterior aspect forms most of the anatomical base of the heart and is approximately quadrangular, receiving the terminations of (usually) two pulmonary veins from each lung **(Johnson et al., 2008).**

It forms the anterior wall of the oblique pericardial sinus. This surface ends at the shallow vertical interatrial groove that descends to the cardiac crux. The left atrial appendage is constricted at its atrial junction and all the pectinate muscles of the LA are contained within it. Interiorly the four pulmonary veins open into the upper posterolateral surface of the LA, two on each side. The LA has thicker walls (3mm on average) than the right atrium Fig. (1) ***(Gabella et al., 1994)***.