

Should All Heart Failure Patients Undergo Echocardiographic Examination?

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Abstract

The recent advances in the management of chronic heart failure (CHF) have the potentials to delay the onset or slow down its progression, improve symptoms and quality of life with better clinical outcome. Early detection of CHF is very crucial for effective intervention but the diagnosis of mild cases is known to be difficult as there may be few clinical features at this stage. Although, some societies' guidelines require both symptoms and objective evidence of cardiac dysfunction for diagnosis, the role of echocardiography in the assessment of CHF in the presence of overt symptoms has been controversial. The concern bothers mainly on the cost-effectiveness of the procedure and whether or not it adds value to patient care. A test useful to a patient is one that leads to better understanding and choice of treatment associated with improved clinical outcome. Echocardiography provides a rapid, non-invasive assessment of cardiac function which is relatively cheaper compared with competing technologies. It often provides morphologic and hemodynamic information which may guide the management of patients with CHF. Brain natriuretic peptide (BNP) is useful for screening for heart failure due to systolic dysfunction but it is not a substitute for echocardiography in the diagnosis of heart failure. We suggest that all patients with CHF should have echocardiographic examination (if possible) for adequate diagnosis and accurate risk quantification. This is crucial for drug choice and monitoring of therapy.

INTRODUCTION

Heart failure is a chronic systemic inflammatory disease that is associated with high morbidity and mortality¹⁻². Some of the factors responsible for the progression of the disease include; cardiac remodelling³, neuro-hormonal alterations⁴, electrical instability⁵⁻⁶ and late detection of asymptomatic left ventricular dysfunction⁷. The recent advances in its management have the potentials to delay the onset or improve symptoms and quality of life, slow down progression, and improve clinical outcome⁸⁻¹⁰. Although, early detection of chronic heart failure (CHF) is very crucial for effective intervention, the diagnosis of mild cases is known to be difficult as there may be few clinical features at this stage¹¹. The American College of Cardiology and American Heart Association has identified 4 stages (A-D)¹² in the progression of CHF with early stages (A-B) providing opportunity for intervention to reduce adverse prognosis. More than 50% of CHF patients with reduced ejection fraction have asymptomatic left ventricular dysfunction (ALVD). The mortality profile of ALVD is similar to that of symptomatic left ventricular dysfunction (SLVD). Echocardiography clearly provides objective evidence of

systolic and or diastolic dysfunction in all patients with CHF which may be important for risk stratification and choice of drugs.

CHALLENGES IN DIAGNOSIS OF HEART FAILURE

In the diagnosis of heart failure (HF), the European Society of Cardiology's guidelines¹³ require both symptoms and objective evidence of cardiac dysfunction (systolic and or diastolic) to be present. However, the routine use of echocardiographic examination in the assessment of CHF patients with overt clinical signs is controversial¹⁴⁻¹⁵. The concerns often bother on cost and whether or not the procedure adds value to patients care.

The clinical criteria (Framingham¹⁶, Dukes¹⁷ and Boston¹⁸) were established to assist in the diagnosis of CHF before non-invasive techniques for the assessment of systolic and diastolic dysfunction became widely available. These clinical criteria are useful for detection of CHF in the primary health care setting, where availability and accessibility to echocardiography is poor. However, the criteria are noted to be helpful only in those with severe or

advanced HF which occurs in about 20-40% of patients with reduced left ventricular systolic function¹⁹. The implication of this is that majority of patients with systolic dysfunction are not identified by clinical examination alone. Although, the specificities of clinical signs are high²⁰ (jugular venous pressure=90%, third heart sound=99%), false-positive diagnosis of HF is common in primary health care²¹.

Obesity, unrecognized symptomatic myocardial ischemia without HF and pulmonary diseases are most important conditions that often lead to false-positive diagnosis of HF and inappropriate treatment²¹. The diagnosis of HF has also been found to be more difficult in women than in men²¹. BNP has been used to screen for heart failure with good sensitivity and specificity at the primary health care. However, BNP level is most useful in patients with systolic dysfunction. It is therefore not a replacement for echocardiography in CHF patients.

SYSTOLIC VERSUS DIASTOLIC HEART FAILURE

Current approach to the management of CHF requires not only the description of type but also entails grading of severity of ventricular dysfunction for prognostication. Differentiating systolic from diastolic failure is essential because their long term treatments are different. At present, there are no clinical signs that distinguish systolic from diastolic dysfunction²². The latter occurs in about 40% of patients with HF²³. Although, the clinical staging using New York Heart Association (NYHA) classification may be useful, it is not very specific. Echocardiographic examination provides more refined risk stratification than the NYHA class. Previous reports have shown left ventricular ejection fraction as determined by echocardiography is the most powerful independent predictor of adverse prognosis in patients with left ventricular systolic dysfunction²⁴⁻²⁵. In addition, patients with left ventricular diastolic failure have various patterns of abnormal filling pressures which have been characterized using Doppler echocardiography²⁶⁻²⁷. These include impaired relaxation, pseudo-normalization and restrictive pattern with the latter being the most severe form. The presence of restrictive pattern of diastolic dysfunction requires immediate therapy to unload and reduce left ventricular filling pressure²⁷.

DETERMINING AETIOLOGY OF HEART FAILURE

In the evaluation of patients with CHF, the aetiology may not be apparent on clinical grounds and echocardiography is

therefore mandatory in determining the cause. HF due to congenital, rheumatic and other structural heart lesions required echocardiography for description of anatomic and hemodynamic abnormalities²⁸⁻²⁹. Such information is vital for choice of treatment modality and whether or not surgical intervention is indicated.

COST-EFFECTIVENESS OF ECHOCARDIOGRAPHY

Efficient utilization of scarce health resources is also very vital for the successful management of CHF patients. A useful test to a clinician is one that provides important new information leading to a change in approach or important confirmation of a previously selected approach. On the other hand, a test that provides new information that does not improve patient's outcome has no value. Echocardiography is relatively cheap and has capacity to influence choice of drugs with potentials to slow down the progression of CHF and improve survival of patients³⁰. Open access echocardiography at the community level is widely available to general practitioners in some countries and some studies showed that the diagnostic yields are fairly comparable to conventional outpatient echocardiography. One such study revealed that echocardiographic evaluation led to a change in management in 69% of patients examined. In the long run, the cost of echocardiography is offset by choice of appropriate drugs that add years to lives of the patients. Validity concern that measurements at echocardiography of cardiac dimensions are operator dependent with poor reproducibility is genuine³¹⁻³². However, in well trained hands, the test has high reproducibility with good intra and inter-observer correlations³³⁻³⁴. It gives validated, reliable, serial and accurate assessment of cardiac function. Indeed, Findings from echocardiographic modalities correlate well with those of cardiac catheterization and radio-nuclide studies³⁵⁻³⁶.

In conclusion, we suggest that all individuals afflicted by CHF should have early echocardiographic assessment for accurate diagnosis and total risk quantification.

Echocardiographic examination will also exclude patients with false-positive clinical diagnosis of HF from being placed on unwarranted medications.

PRACTICAL POINTS

1. Current treatment of CHF has potentials to slow down its progression and improve quality of life with better clinical outcome.

2. Early detection and accurate total risk quantification influence treatment choice in patients with heart failure.
3. More than 50% of CHF patients with reduced ejection fraction have ALVD and need echocardiographic examination for early diagnosis.
4. Mortality is similar for CHF patients with ALVD and SLVD.
5. Clinical criteria for heart failure diagnosis are essential but are mostly helpful only in those with advanced or severe disease.
6. There are no clinical signs that differentiate left ventricular systolic from diastolic dysfunction. This can be obtained easily at echocardiographic examination.
7. False-positive diagnosis of heart failure is common (34%) when clinical criteria are used alone especially in obese individuals and patients with pulmonary diseases.
8. BNP is a useful screening tool for left ventricular systolic dysfunction but it is not a replacement for echocardiography.
9. Patients with false-positive diagnosis are classified appropriately by echocardiography thereby preventing unwarranted treatment.
10. Echocardiography is useful for monitoring therapy and effectiveness of intervention.

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