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DIASTOLIC HEART FAILURE: ARE THERE SPECIFIC BEDSIDE CLINICAL MARKERS FOR ITS DIAGNOSIS?

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Key words: Diastolic heart failure, bedside diagnosis, clinical markers

Abstract

Background: Congestive heart failure due to diastolic dysfunction is common and accounts for 30-40% of patients with congestive heart failure. Since the prognosis and clinical management of congestive heart failure differs between systolic and diastolic heart failure there is need to differentiate between the two. Echocardiography has been the only available tool for the diagnosis of diastolic heart failure in our area of clinical practice. In view of the high cost of echocardiographic examination and its non-availability in most medical centres, this study was undertaken to find out if bedside clinical markers could serve as an alternative way of making the diagnosis of diastolic heart failure.

Methods: Left ventricular functions of 91 consecutive patients with congestive heart failure were determined by echocardiography with a view to separate these patients into those with isolated diastolic heart failure and those with isolated systolic heart failure. The frequency of each of the presenting signs and symptoms in both types of heart failure were recorded. The chest radiograph of each patient was done.

Results: No singular sign or symptom could be ascribed exclusively to systolic or diastolic heart failure. Exertional dyspnoea had a hundred percent occurrence in both forms of heart failure. In 4 of the major Framingham criteria for the diagnosis of definite heart failure, the frequency of occurrence was different (but not statistically significant) in the two forms of heart failure. The frequency of cough, ankle oedema and tachycardia, which are minor criteria, showed statistically significant difference in both forms of heart failure.

Conclusion: It is concluded from this study that there are no specific bedside clinical markers for the diagnosis of diastolic heart failure.

Résumé

Fond : L'arrêt du coeur congestif dû au dysfonctionnement diastolique est commun et compte pour 30-40 % de malades présentant l'arrêt du coeur congestif. Puisque le pronostic et la gestion clinique de l'arrêt du coeur congestif diffère de l'arrêt du coeur systolique et diastolique il y a le besoin de différencier entre les deux. L'échocardiographie a été le seul outil disponible pour le diagnostic de l'arrêt du coeur diastolique dans notre secteur de la pratique clinique. En raison du coût élevé d'examen échocardiographique et de sa non-disponibilité à la plupart des centres médicaux, cette étude a été entreprise pour découvrir si les marqueurs cliniques de chevet pourraient servir de manière alternative de faire le diagnostic de l'arrêt du coeur diastolique.

Méthodes : Des fonctions ventriculaires gauches de 91 malades consécutifs présentant l'arrêt du coeur congestif ont été déterminées par l'échocardiographie en vue de séparer ces malades dans ceux avec l'arrêt du coeur diastolique d'isolement et ceux avec l'arrêt du coeur systolique d'isolement. La fréquence de chacun des signes de présentation et des symptômes dans les deux types d'arrêt du coeur ont été enregistrés. La
radiographie de poitrine de chaque malade a été faite.

Résultats : Aucun signe ou symptôme singulier n'a pu être attribué exclusivement à l'arrêt du coeur systolique ou diastolique. La dyspnée exertionnelle a eu pour cent occurrences dans les deux formes d'arrêt du coeur. Dans 4 des critères principaux de Framingham pour le diagnostic de l'arrêt du coeur défini, la fréquence de l'occurrence était différente (mais pas statistiquement significative) dans les deux formes d'arrêt du coeur. La fréquence de la toux, de l'œdème de cheville et de la tachycardie, qui sont des critères mineurs, a montré statistiquement la différence significative dans les deux formes d'arrêt du coeur.

Conclusion : On peut conclure par cette étude qu'il n'y a aucun marqueur clinique de chevet spécifique pour le diagnostic de l'arrêt du coeur diastolique.

Introduction

Congestive heart failure due to diastolic dysfunction is common and accounts for 30-40% of patients with congestive heart failure.1

The commonly used techniques for differentiating between systolic and diastolic heart failure such as radionuclide angiography2 and echocardiography3, 4 that measure left ventricular systolic and diastolic functions are not readily available in many centres across the country.

The aim of this study is to find out if there are clinical markers that can be used to make a distinction between the two forms of heart failure by the bedside.

Patients and Methods

Ninety one consecutive patients with hypertensive heart failure were studied. The diagnosis of heart failure was made based on the Framingham criteria for definite heart failure.5 A patient whose blood pressure was ≥140/90 mm Hg or had a normal blood pressure at the time of evaluation but a definite history of hypertension in addition to some of the signs and symptoms of definite heart failure6 was said to be in hypertensive heart failure. A chest x-ray was also done on each patient to look for radiologic cardiomegaly defined as CTR > 0.55.

Left ventricular function (LVF) was assessed using ALOKA SSD 1700 two-dimensional echocardiograph/Doppler and colour flow ultrasound machine. Those patients with E/A ratio of <1.0 and normal ejection fraction (≥50%) were said to be in diastolic heart failure while those whose ejection fraction was <50% and E/A ratio of ≥1.0 were said to have systolic heart failure. 5 The patients whose E/A ratio was <1.0 and EF < 50% were said to have combined diastolic and systolic heart failure.6

Chi-squared tests were used to determine the statistical significance of the difference between the two groups.

Results

Ninety-one patients were recruited into the study. Fifty-two had isolated systolic heart failure, 15 had isolated diastolic heart failure while 24 had combined diastolic and systolic heart failure. The 24 patients with combined systolic and diastolic heart failure were excluded.

Table 1 shows the relative frequency of each sign and symptom in both systolic and diastolic heart failure group. Ninety-seven percent of those with systolic heart failure had definite radiologic cardiomegaly, CTR > 0.55, and 83% of those with diastolic heart failure.

Table 1: The relative frequency of each sign and symptom in both systolic and diastolic heart failure

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>Systolic heart failure n= 52 (%)</th>
<th>Diastolic heart failure n=15 (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PND +</td>
<td>41 (78.8)</td>
<td>6 (40.0)</td>
<td>0.0037*</td>
</tr>
<tr>
<td>Exertional dyspnoea #</td>
<td>52 (100)</td>
<td>15 (100)</td>
<td>NA</td>
</tr>
<tr>
<td>Ankle oedema #</td>
<td>40 (76.9)</td>
<td>7 (46.6)</td>
<td>0.0240*</td>
</tr>
<tr>
<td>Cough #</td>
<td>49 (94.2)</td>
<td>10 (66.6)</td>
<td>0.0037*</td>
</tr>
<tr>
<td>Tachycardia #</td>
<td>42 (80.7)</td>
<td>6 (40.0)</td>
<td>0.0020*</td>
</tr>
<tr>
<td>Neck Vein Distension+</td>
<td>38 (73.0)</td>
<td>4 (26.6)</td>
<td>0.0010*</td>
</tr>
<tr>
<td>Cardiomegaly +</td>
<td>52 (100)</td>
<td>14 (93.3)</td>
<td>0.0606 (NS)</td>
</tr>
<tr>
<td>S3 gallop +</td>
<td>45 (86.5)</td>
<td>12 (80.0)</td>
<td>0.5312 (NS)</td>
</tr>
<tr>
<td>Crepitations +</td>
<td>49 (94.2)</td>
<td>12 (80.0)</td>
<td>0.089 (NS)</td>
</tr>
<tr>
<td>Pulmonary oedema +</td>
<td>18 (34.6)</td>
<td>2 (13.3)</td>
<td>0.1125 (NS)</td>
</tr>
<tr>
<td>Hepatomegaly #</td>
<td>31 (59.6)</td>
<td>5 (33.3)</td>
<td>0.0720 (NS)</td>
</tr>
</tbody>
</table>

PND = Paroxysmal nocturnal dyspnoea; * = Statistically significant; NS= Not significant; ++ Major Framingham criterion; # = Minor Framingham criterion ; NA= Not available statistically
Discussion

Radionuclide angiography and echocardiography are among the various techniques commonly used to assess left ventricular function. Both systolic and diastolic functions can be assessed using these techniques which are able to differentiate between heart failure due to systolic dysfunction from that due to diastolic dysfunction. These techniques are not widely available in most of the hospitals across the country especially the secondary and primary institutions. Even in tertiary hospitals, where they are available, all year round coverage is not often possible for logistic reasons.

Distinguishing between systolic and diastolic heart failure has important prognostic and clinical management benefits. This study was unable to reveal discriminatory “bedside” clinical markers that could differentiate between the two forms of heart failure. Of the 6 major criteria for the diagnosis of definite heart failure in this study only 2, PND & JVP showed statistically significant difference in the two types of heart failure while in the remaining four the differences were not significant (Table 1). Again while exertional dyspnoea which is a minor criterion occurred in 100% of the patients in both types of heart failure, there was no symptom or sign that occurred exclusively in one of the two types of heart failure.

These clinical symptoms and signs of heart failure seem to occur with the same relative frequency in both systolic and diastolic heart failure. This is a confirmation of earlier report that the distinction between diastolic and systolic heart failure cannot easily be made at the bedside since the clinical signs and symptoms occur with the same relative frequency in both systolic and diastolic heart failure. Attempts had been made to use a combination of certain aspects of the history and physical examination, with the clinical measurements to differentiate diastolic dysfunction from systolic heart failure. Patients with hypertensive heart disease for example, especially those with severe left ventricular hypertrophy are said to often experience heart failure because of diastolic dysfunction. This is not absolutely correct because some of the patients with hypertensive heart failure may have symptoms and signs due to isolated systolic dysfunction. In this attempt also there was no sign or symptom that was shown to have occurred exclusively in one of the two types of heart failure. It follows from these previous reports and our current study that signs and symptoms are not reliable distinguishing markers between systolic and diastolic heart failure.

It is concluded from this study that there are no specific “bedside” clinical markers for the diagnosis of diastolic heart failure. The clinical findings in congestive heart failure syndrome in patients with hypertensive heart disease are just as likely to be related to diastolic dysfunction as to systolic ejection dysfunction. Because of the therapeutic benefits to be derived from accurate diagnosis echocardiography services at affordable cost should be provided at all levels of medical care. Studies using larger patient sample should be carried out in this area using subjects with different causes of heart failure.

References