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CLINICAL RESEARCH

Right ventricular dysfunction in patients with idiopathic dilated cardiomyopathy: Prognostic value and predictive factors



Dysfonction ventriculaire droite chez les patients avec cardiomyopathie dilatée idiopathique : valeur pronostique et facteurs prédictifs

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KEYWORDS

Right ventricular dysfunction;
Dilated cardiomyopathy;
Propensity analysis;
Heart failure

Summary

Background. — Right ventricular (RV) dysfunction is an important predictor of impaired prognosis in idiopathic dilated cardiomyopathy.

Aims. — To determine the prognostic role of RV dysfunction, independent of left ventricular (LV) dysfunction.

Methods. — A total of 136 consecutive patients (73% men; mean age 59.0 ± 13.2 years) with idiopathic dilated cardiomyopathy (LV ejection fraction $\leq 45\%$) were enrolled retrospectively. Thirty-four patients (25%, group 1) presented with RV dysfunction, defined as tricuspid annular plane systolic excursion (TAPSE) ≤ 15 mm; 102 patients (group 2) had preserved RV function.

Abbreviations: CI, confidence interval; DCM, dilated cardiomyopathy; DT, deceleration time; FAC, fractional area change; HF, heart failure; HR, hazard ratio; LV, left ventricular; LVEF, left ventricular ejection fraction; LVOT, left ventricular outflow tract; MACE, major adverse cardiac events; MRI, magnetic resonance imaging; OR, odds ratio; RV, right ventricular; RVEF, right ventricular ejection fraction; sPAP, systolic pulmonary artery pressure; TAPSE, tricuspid annular plane systolic excursion; TR, tricuspid regurgitation; TVI, time-velocity integral.

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Results.— Mean LV ejection fraction was $27.5 \pm 8.7\%$. Mean TAPSE was 18.6 ± 5.4 mm ($15\text{--}21.8$ mm). Multivariable predictors of RV dysfunction were LV outflow tract time-velocity integral (odds ratio 0.8, 95% confidence interval [CI] 0.7–0.9; $P=0.003$) and E-wave deceleration time ≤ 145 ms (odds ratio 4.1, 95% CI 1.3–12.8; $P=0.017$). Major adverse cardiac event-free survival rates at 1 and 2 years were 64% and 55%, respectively, in group 1 and 87% and 79%, respectively, in group 2 ($P=0.002$). Both by multivariable analysis and after stratification using a propensity score, RV dysfunction emerged as an independent predictor for major adverse cardiac events (hazard ratio 3.2, 95% CI 1.3–7.6; $P=0.009$), along with right atrium area and age.

Conclusion.— In idiopathic dilated cardiomyopathy, RV dysfunction with TAPSE ≤ 15 mm offers additional prognostic information, independent of the extent of LV dysfunction.

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MOTS CLÉS

Dysfonction ventriculaire droite ; Cardiomyopathie dilatée ; Analyse de propensité ; Insuffisance cardiaque

Résumé

But. — La dysfonction ventriculaire droite (VD) est un facteur prédictif important de l'altération du pronostic dans la cardiomyopathie dilatée (CMD) idiopathique. Le but était de déterminer le rôle pronostique de la dysfonction VD indépendamment du niveau de dysfonction ventriculaire gauche (VG).

Méthodes. — Au total, 136 patients consécutifs (73 % d'hommes, âge moyen : $59,0 \pm 13,2$ ans) avec CMD idiopathique (FEVG ≤ 45 %) étaient inclus rétrospectivement. Trente-quatre patients (25 %, groupe 1) présentaient une dysfonction VD définie par une excursion systolique du plan de l'anneau tricuspide (TAPSE) ≤ 15 mm et 102 (groupe 2) avaient une fonction VD préservée.

Résultats. — La FEVG moyenne était de $27,5 \pm 8,7$ %. Le TAPSE moyen était de $18,6 \pm 5,4$ mm ($15\text{--}21,8$ mm). Les facteurs prédictifs de la dysfonction VD en analyse multivariée étaient l'intégrale temps-vitesse (TVI) de la chambre de chasse du VG (OR 0,8 [95 % IC, 0,7–0,9], $p=0,003$) et le temps de décélération de l'onde E ≤ 145 ms (OR 4,1 [95 % IC, 1,3–12,8], $p=0,017$). La survie sans événements cardiaques majeurs (MACE) à 1 et 2 ans était respectivement de 64 % et 55 % dans le groupe 1 et de 87 % et 79 % dans le groupe 2 ($p=0,002$). Après analyse multivariée et stratification en utilisant un score de propensité, la dysfonction VD apparaissait comme un facteur prédictif indépendant des MACE (HR 3,2 [95 % IC, 1,3–7,6], $p=0,009$), en plus de la surface de l'oreillette droite et de l'âge.

Conclusion. — Dans la CMD idiopathique, la dysfonction VD définie par un TAPSE ≤ 15 mm offre une information pronostique additionnelle indépendante du niveau de dysfonction VG.

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Background

Idiopathic dilated cardiomyopathy (DCM) is the second most frequent cause of heart failure (HF). Despite recent changes in diagnosis and treatment of HF, prediction of prognosis remains uncertain from one patient to another [1–3].

The effect of left ventricular (LV) function on outcome in HF has been well documented [2–5]. Furthermore, the new variables of myocardial deformation obtained by two- and three-dimensional speckle tracking give additional prognostic information [6,7].

Right ventricular (RV) performance is connected to LV dysfunction in multiple ways (shared fibres and septal wall, biventricular cardiomyopathy process, increased LV filling pressures, ventricular interdependence and inextensible pericardial space) [8,9]. Evaluation of RV performance remains challenging in routine practice and, as a result, RV function has long been neglected [8–10]. Progress in

echocardiography has helped to redefine the importance of RV evaluation for further risk stratification [11,12].

The prevalence of RV dysfunction in DCM varies from 34 to 65% [13,14]. Several studies have demonstrated the additional prognostic value of RV dysfunction in HF and, most particularly, in idiopathic DCM [15–18]. Propensity analyses are rarely used in clinical studies; they are mostly used in pharmacological and epidemiological studies, to counter the effect of potential confounding bias caused by the indication for treatment. The use of a propensity analysis in this context could provide further information about the prognostic role of RV dysfunction, independent of the level of LV dysfunction, and also about the factors associated with RV function [19,20]. Such an analysis has not been performed in primary DCM.

The aim of our study was to establish the prevalence of RV dysfunction in a consecutive series of patients with idiopathic DCM, based on tricuspid annular plane systolic

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