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CLINICAL RESEARCH

Incidence, determinants and consequences of left atrial remodelling after a first anterior myocardial infarction

Incidence, facteurs prédictifs et conséquences du remodelage auriculaire gauche après un premier infarctus du myocarde de topographie antérieure

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KEYWORDS
Atrial;
Ventricular;
Remodelling;
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Summary
Background. — Left atrial (LA) volume is an important predictor of mortality and morbidity after myocardial infarction (MI). However, the process of LA remodelling has not been extensively investigated.
Aims. — Our purpose was to analyse the incidence, determinants and consequences of LA remodelling in a cohort of patients with a first anterior MI enrolled in the modern era of MI management.
Methods. — We used data from 246 patients with a first anterior MI who were included in a prospective study on left ventricular (LV) remodelling (REVE-2). Serial echocardiographic studies were performed before discharge and at 3 months and 1 year after MI.
Results. — LA volume increased from $20.5 \pm 5.9\,mL/m^2$ at baseline to $24.6 \pm 7.4\,mL/m^2$ at 3 months ($P < 0.0001$ versus baseline) and $25.4 \pm 7.6\,mL/m^2$ at 1 year ($P < 0.0001$ versus baseline). Patients with high LA volumes at baseline had higher LV volumes, decreased LV systolic function, increased E/Ea (early transmitral velocity/mitral annular early diastolic velocity ratio)

Abbreviations: BNP, B-type natriuretic peptide; E/Ea, early transmitral velocity/mitral annular early diastolic velocity ratio; LA, left atrial; LV, left ventricular; LVEDV, left ventricular end-diastolic volume; LVEF, left ventricular ejection fraction; LVESV, left ventricular end-systolic volume; MI, myocardial infarction; WMSI, wall motion score index.

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and increased B-type natriuretic peptide concentration. By multivariable analysis, the sole independent predictor of change in LA volume from baseline to 1 year was peak creatine kinase concentration ($P < 0.0001$). Patients with higher LA volumes at baseline were at higher risk of cardiovascular death or rehospitalization for heart failure during follow-up ($P = 0.015$).
Conclusions. — Despite modern therapeutic management, LA remodelling is common during the first 3 months after anterior MI. Patients with larger infarct size are at greater risk of LA remodelling after discharge.

MOTS CLÉS
Oreillette ;
Ventricule ;
Remodelage ;
Infarctus du myocarde

Résumé
Introduction. — Le volume de l'oreillette gauche est un prédicteur important de mortalité et morbidité après infarctus du myocarde. Cependant, le processus de remodelage auriculaire n'a fait l'objet que de peu d'études.
Objectifs. — Analyser l'incidence, les facteurs prédictifs, et les conséquences du remodelage auriculaire gauche dans une cohorte de patients présentant un premier infarctus antérieur et pris en charge de manière moderne.
Méthodes. — Nous avons utilisé les données de 246 patients avec un premier infarctus antérieur inclus dans une étude prospective sur le remodelage ventriculaire gauche (REVE-2). Une échocardiographie a été réalisée avant la sortie, après trois mois et après un an.
Résultats. — Le volume de l'oreillette gauche a augmenté de $20,5 \pm 5,9\,mL/m^2$ en base à $24,6 \pm 7,4\,mL/m^2$ à 3 mois ($p < 0,0001$ vs base) et $25,4 \pm 7,6\,mL/m^2$ à un an ($p < 0,0001$ vs base). Les patients avec un volume auriculaire gauche élevé en base avaient des volumes ventriculaires gauches plus élevés, une diminution de la fonction systolique, ainsi qu'un rapport E/Ea et un BNP plus élevés. En analyse multivariée, la seule variable de base indépendamment associée au remodelage auriculaire à un an était le pic de créatine kinase ($p < 0,0001$). Les patients ayant les volumes auriculaires gauches les plus élevés en base étaient ceux avec le plus haut risque de décès cardiovasculaire ou de réhospitalisation pour insuffisance cardiaque durant le suivi ($p = 0,015$).
Conclusions. — Malgré une prise en charge moderne, le remodelage auriculaire gauche demeure fréquent lors des trois premiers mois après un infarctus antérieur. Les patients à risque de remodelage auriculaire après l'hospitalisation initiale sont les patients présentant un infarctus de taille importante.

Introduction

Left atrial (LA) volume is an important predictor of mortality and morbidity after myocardial infarction (MI) [1,2]. However, the process of LA remodelling (i.e. dynamic changes in LA volume over time) has not been extensively investigated. The purpose of this report was to analyse the incidence, determinants and consequences of LA remodelling in a cohort of patients with a first anterior MI enrolled in the modern era of MI management.

Methods

Study population

The design and inclusion and exclusion criteria of the REVE-2 study have been published in detail elsewhere [3,4]. Briefly, it was a prospective multicentre study intended to analyse the association of circulating biomarkers with left ventricular (LV) remodelling [5]. We enrolled 246 patients with a first anterior wall Q-wave MI from February 2006 to September 2008. Inclusion criteria were hospitalization within 24 hours after symptom onset and a predischarge echocardiogram showing at least three akinetic LV segments in the infarct zone. Exclusion criteria were inadequate quality of the echocardiographic image, life-limiting non-cardiac disease, significant valvular disease or a prior Q-wave MI. The ethics committee of the Centre hospitalier et universitaire de Lille approved the research protocol, and each patient provided written informed consent. The protocol required serial echocardiographic studies at hospital discharge (day 3 to day 7) and at 3 and 12 months after MI.

Echocardiographic studies

Echocardiographic data were obtained using commercially available second harmonic imaging systems. Echocardiograms were performed by experienced ultrasonographers and repeated by the same operator wherever possible. Images were recorded on optical disks. A standard imaging protocol was used, based on apical four- and two-chamber views; two-dimensional echocardiograms of the LV short axis were recorded from the left parasternal region at three levels: mitral valve, mid-papillary muscle and apex. All echocardiograms were analysed at the Lille core echo laboratory as previously described [6].

LV end-diastolic volume (LVEDV), end-systolic volume (LVESV) and ejection fraction (LVEF) were calculated using a modified Simpson's rule. To evaluate regional systolic