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Original article

Characteristics, mortality and prognostic factors of acute right ventricular myocardial infarction: A case-control study

Caractéristiques, mortalité et facteurs pronostiques de l'infarctus du myocarde inférieur étendu au ventricule droit : une étude cas-contrôle

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Abstract

Background. – Right Ventricular (RV) involvement during inferior acute myocardial infarction (AMI) was known to be associated with poor outcome, but might have been mitigated by recent therapeutics. The aim of study was to determine the characteristics and outcomes of patients with RVAMI compared to isolated inferior AMI.

Methods. – This is an observational study that enrolled consecutive patients with RVAMI; age-sex matched patients with isolated inferior AMI served as controls.

Results. – A total of 51 patients with RVAMI were studied (male 39, age 63 ± 16) and compared to 39 age-sex matched patients with isolated inferior AMI. Atherosclerosis risk factors, previous MI and treatment at presentation were similar in both groups. Primary coronary angioplasty was successful in > 90% in both groups. When compared to patients with isolated inferior AMI, patients with RVAMI had more frequent cardiogenic shock at presentation (35% versus 0%, $P < 0.01$), and in-hospital mortality (18% versus 0%, $P < 0.01$). Associated factors with in-hospital mortality included age, sex, RV involvement, delay from onset to management, angioplasty, anti GPIIb-IIIa treatment, ejection fraction, creatinine level but not the severity at presentation (including the presence of cardiogenic shock). After discharge from hospital and during a mean 200 weeks follow-up period, mortality increased similarly in both groups.

Conclusion. – RVAMI is still associated with high in-hospital mortality. The severity of initial presentation is not a prognostic factor. Mortality rates after discharge increased very slowly and similarly in both groups.

Keywords: Inferior; Right ventricle; Acute myocardial infarction; Mortality; Revascularization

Résumé

Objectifs. – L'impact de la revascularisation précoce sur la mortalité des infarctus aigus du myocarde inférieur étendu au VD (IDMVD) est peu connu. Le but de cette étude est d'évaluer les caractéristiques et le pronostic des patients ayant un IDMVD en les comparant à des patients ayant un IDM inférieur isolé (IDMI).

Patients et méthode. – Il s'agit d'une étude observationnelle ayant évaluée les patients admis consécutivement pour IDMIVD. Ces patients ont été appariés avec l'âge et le sexe aux patients admis pendant la même période pour IDMI (groupe témoin).

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Résultats. – Au total, 51 patients (39 males, âge moyen 63 ± 16 ans) ayant développé un IDMIVD ont été comparés à 39 patients avec un IDMI. Les caractéristiques de base des patients étaient comparables dans les deux groupes. Comparés aux patients avec un IDMI, les patients avec IDMIVD présentaient plus fréquemment un choc cardiogénique à la prise en charge (35 % versus 0 %, $p < 0{,}01$). La mortalité intra-hospitalière était plus élevé dans le groupe IDMIVD (18 % versus 0 %, $p < 0{,}01$). Les facteurs associés à la mortalité intra-hospitalière étaient l'âge, le sexe, l'atteinte du VD, une angioplastie retardée, un traitement par anti-GPIIb-IIIa, la fraction d'éjection et la créatinine plasmatique. La présence d'un choc cardiogénique à l'admission n'était pas associée à la mortalité. Après la sortie de l'hôpital et pendant un suivi moyen de 200 semaines, la survie était similaire dans les deux groupes.

Conclusion. – L'atteinte du VD dans l'IDM inférieur reste associée à une mortalité intra-hospitalière élevée. La sévérité clinique initiale ne semble pas être un facteur pronostique.

Mots clés : Infarctus du myocarde inférieur ; Extension VD ; Mortalité ; Revascularisation

1. Introduction

The management of patients with Right Ventricular infarction associated to acute myocardial infarction (RVAMI) is a serious clinical problem [1]. RVAMI occurs in approximately 30% of patients with inferior wall AMI, and less frequently in the course of anterior AMI or as isolated AMI [1,2].

Depressed RV function in the course of RVAMI may be responsible of decreased left ventricular preload thereby reducing cardiac output despite usually preserved left ventricular contractility [3,4]. Its clinical features range from asymptomatic RV dysfunction to cardiogenic shock [1].

As a consequence, RVAMI is considered as a poor prognosis factor [5–8]. In the SHOCK study, in-hospital mortality of patients with RVAMI associated with hemodynamic compromise was more than 50% and was similar to the one of patients with cardiogenic shock consecutive to large anterior AMI [5].

Optimal management of patients with RVAMI includes immediate revascularisation and intensive medical strategies; of note, the possible RV haemodynamic changes will impose therapeutic specificities [7,8]. As an example, nitrates and diuretics are contraindicated, inotropic support is often advisory and Beta-blockers and angiotensin converting enzyme inhibitors are to be used cautiously [9–11].

Using such optimised strategies, a better outcome is expected [12–14]. The aim of our study was to determine the clinical characteristics, short and long-term prognostic factors, with special attention to initial collapses, of patients with RVAMI.

2. Methods

This was an observational study performed at a single tertiary medical-centre, the Cochin Hospital in Paris. During a 3-years period between December 2007 and October 2010, we included consecutive patients with documented ST-segment elevation RVAMI and patients with isolated inferior wall ST-segment elevation AMI without RV involvement after they provided informed consent.

After the inclusion of each patient with RVAMI, the following patient hospitalized within 1 month with isolated inferior AMI that matches for age and sex was included and constituted the control group.

ST-segment elevation AMI (STEMI) was defined according to guidelines [15]. Specifically, isolated inferior STEMI patients had to have ST-segment elevation in at least 2/3 standard leads (II, III and aVF), whereas RVAMI was based on ST-segment elevation superior to 1 mm in V3R and V4R leads [9,15].

This study was approved by the local Ethics Committee.

The presence of collapse was defined by persistence of a systolic blood pressure inferior to 90 mmHg despite volume expansion (after 0.5 to 1 L of fluid), without any other identified cause that reduced RV output [9].

2.1. Data collection

Upon admission, all patients underwent a detailed clinical evaluation, 18-lead ECG, screening blood tests, chest roentgenogram, and echocardiography. Their management, including the decision to perform immediate revascularization, was at the discretion of the Intensive Cardiac Care Unit physician.

The following data were prospectively collected and entered in a dedicated database: baseline characteristics and past medical history, characteristics at presentation (including the presence of any collapse), initial ECG, echocardiography records, the delay to hospital admission and coronary angiography, coronary angiogram records and management.

All coronary angiograms were assessed blindly by two experienced investigators; the TIMI flow score of the culprit lesion of the right coronary artery (0 → no perfusion, 1 → penetration without perfusion, 2 → partial reperfusion, 3 → complete reperfusion), the existence of single versus multivessel disease, the successful nature of the revascularization procedure, and haemodynamic support if applicable (Intra-aortic balloon pump, assist device. . .).

All treatment administered during hospitalisation (including fluid expansion and vasopressive agents) were recorded as well as the timing of treatment.

2.2. Follow-up and outcome assessment

All patients were contacted by telephone by the investigators to document any subsequent clinical events. If unsuccessful, the primary care physicians were contacted and the medical

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