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Original article

Efficacy of an Integrated Hospital-primary Care Program for Heart Failure: A Population-based Analysis of 56 742 Patients

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ABSTRACT

Introduction and objectives: The efficacy of heart failure programs has been demonstrated in clinical trials but their applicability in the real world practice setting is more controversial. This study evaluates the feasibility and efficacy of an integrated hospital-primary care program for the management of patients with heart failure in an integrated health area covering a population of 309 345.
Methods: For the analysis, we included all patients consecutively admitted with heart failure as the principal diagnosis who had been discharged alive from all of the hospitals in Catalonia, Spain, from 2005 to 2011, the period when the program was implemented, and compared mortality and readmissions among patients exposed to the program with the rates in the patients of all the remaining integrated health areas of the *Servei Català de la Salut* (Catalan Health Service).
Results: We included 56 742 patients in the study. There were 181 204 hospital admissions and 30 712 deaths during the study period. In the adjusted analyses, when compared to the 54 659 patients from the other health areas, the 2083 patients exposed to the program had a lower risk of death (hazard ratio = 0.92 [95% confidence interval, 0.86-0.97]; $P = .005$), a lower risk of clinically-related readmission (hazard ratio = 0.71 [95% confidence interval, 0.66-0.76]; $P < .001$), and a lower risk of readmission for heart failure (hazard ratio = 0.86 [95% confidence interval, 0.80-0.94]; $P < .001$). The positive impact on the morbidity and mortality rates was more marked once the program had become well established.
Conclusions: The implementation of multidisciplinary heart failure management programs that integrate the hospital and the community is feasible and is associated with a significant reduction in patient morbidity and mortality.

Eficacia de un programa integrado hospital-atención primaria para la insuficiencia cardiaca: análisis poblacional sobre 56.742 pacientes

Palabras clave:
Insuficiencia cardiaca
Resultados en salud
Programas de gestión de enfermedades
Modelo de atención a la cronicidad
Experimento natural

RESUMEN

Introducción y objetivos: Los programas de insuficiencia cardiaca han demostrado su eficacia en ensayos clínicos, aunque su aplicabilidad en un entorno de práctica real es más controvertida. Este estudio evalúa la factibilidad y la eficacia de un programa integrado hospital-atención primaria para la gestión de pacientes con insuficiencia cardiaca en un área integral de salud de 309.345 habitantes.
Métodos: Para el análisis, se incluyó a todos los pacientes consecutivos ingresados por insuficiencia cardiaca como diagnóstico principal y dados de alta vivos en todos los hospitales de Cataluña durante el periodo 2005-2011, en el que se implantó el programa y se comparó la mortalidad y los reingresos entre los pacientes expuestos al programa y todos los pacientes de las demás áreas integrales de salud del Servei Català de la Salut.

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◇ A list of the members of the Working Group of the Integrated Heart Failure Management Program of the Barcelona Litoral Mar Integrated Health Care Area is provided in the appendix.

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Resultados: Se incluyó en el estudio a 56.742 pacientes. Se produjeron 181.204 hospitalizaciones y 30.712 defunciones en ese periodo. En los análisis ajustados, los 2.083 pacientes expuestos al programa, respecto los 54.659 pacientes de las otras áreas sanitarias, tuvieron menor riesgo de muerte (hazard ratio = 0,92 [intervalo de confianza del 95%, 0,86-0,97]; p = 0,005), menor riesgo de reingreso clínicamente relacionado (hazard ratio = 0,71 [intervalo de confianza del 95%, 0,66-0,76]; p < 0,001) y menor riesgo de rehospitalización por insuficiencia cardiaca (hazard ratio = 0,86 [intervalo de confianza del 95%, 0,80-0,94]; p < 0,001). Se observó que el impacto positivo en la morbimortalidad fue más notorio en el periodo de consolidación del programa.

Conclusiones: La implantación de programas multidisciplinarios para la gestión de la insuficiencia cardiaca que integran hospital y comunidad es factible y se asocia a una reducción significativa de la morbimortalidad de los pacientes.

Abbreviations

CPG: clinical practice guidelines
HF: heart failure
IHFP: integrated heart failure program

INTRODUCTION

Despite treatment advances in recent decades, patients with heart failure (HF) have high rates of morbidity and mortality.[1,2] Although there is evidence that adherence to clinical practice guidelines (CPG) by health care professionals during follow-up is associated with an improvement in the course of HF, the application of this evidence-based management in the real world shows a high degree of variability in daily practice.[3]

Randomized controlled trials have shown that organizing health care in HF management programs in accordance with the principles of the chronic care model[4] improves adherence of the management strategy to the CPG and clinical outcomes.[5–7]

However, the real world applicability of these integrated models is unknown, largely due to their organizational complexity and to the potential biases that can occur in controlled trials evaluating these programs, which hamper extrapolation of their results to a real-world practice setting.[8]

To avoid the selection bias characteristic of clinical trials,[9] some authors maintain that a realistic analysis of the efficacy of the disease management programs in a specific geographical location in a real world practice setting should take into account all of the individuals with the clinical condition targeted by the intervention who participate in the program, independently of the actual real world participation in the intervention: this would be the only way to obtain a realistic measure of the impact of the program on the management of the specific disease in question.[10] Thus, the exposure of each participant to the geographical area where the management model has been modified would better reflect the concept of intention-to-treat, independently of whether the patient has actually been detected and registered by the program. Consequently, evaluating indicators of robust results, such as death or readmission, in all exposed patients is more likely to reflect the efficacy of an intervention in a real world practice setting than the controlled framework of a traditional clinical trial.[10] This type of evaluation of experiences in pragmatic implementation has been referred to as a natural experiment.[11]

Thus, the objectives of the present study were to describe the organizational structure and content of an integrated hospital-primary care program for HF management, developed since 2005, in a real world practice setting in an urban integrated health area and to determine the efficacy of its implementation in reducing mortality and readmissions in high-risk patients with HF.

METHODS

Study Design and Criteria for the Selection of the Study Population

To evaluate the efficacy, in a real world practice setting, of a nurse-led multidisciplinary program for the management of patients with HF, integrating hospital and community resources in an urban integrated health area, we designed a population-based natural experiment that included all the patients admitted to the hospital with HF in Catalonia, Spain, between 2005 and 2011. The population-based impact on mortality and readmissions of the patients exposed to the program was evaluated, with all of the patients in the rest of the health areas of the *Servei Català de la Salut* (CatSalut, Catalan Health Service) constituting the control group. For the analysis, we included all consecutively admitted patients with HF who had been discharged alive in all the hospitals in Catalonia between January 2005 and June 2011, and analyzed clinically-related readmissions and survival up to September 2011. For the index admission and successive clinically-related readmissions, we considered only unplanned acute admissions of more than 24 hours' duration. The primary outcome variable of the study was the time until the first clinically-related readmission. Secondary outcome variables were time until the first admission for HF and time to death.

A description of the data sources and the coding criteria for the study are provided in Table 1. For both the diagnosis of HF and clinically-related admissions, we used the criteria recommended in the Chronic Condition Indicator of the Agency for Healthcare Research and Quality.[12]

Organizational Context of the Integrated Program for Heart Failure Management in the Barcelona Litoral Mar Integrated Health Care Area

Since its conception in 2005, the integrated HF management program (IHFP) is structured as a nurse-based multidisciplinary approach that arose from the amalgamation and coordination of existing health care processes and services in primary and hospital care (hospital-based multidisciplinary HF unit coordinated by the Cardiology Department) for HF patients in the Barcelona Litoral Mar Integrated Health Care Area.

In its structural and content design, an attempt was made to develop the conceptual framework provided by the chronic care model[4] and to include the components proposed in the literature and CPG[5–7,13]: encouraging patient empowerment through promotion of self-management and self-efficacy; changing the way in which care is provided from the conventional form to a more proactive approach, with interventions based on new nursing roles (specialized in HF and as case managers), cardiologists specialized in HF, and other multidisciplinary contributions; flexible health