

# Epidemiological and evolutionary characteristics of heart failure in patients with left bundle branch block – A Moroccan center-based study



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**Background:** In patients with heart failure, left bundle branch block (LBBB) seems to be associated with an increased risk of cardiovascular mortality.

**Purpose:** The purpose of this study is to determine the in-hospital outcome of congestive heart failure patients with LBBB versus those without.

**Methods:** We conducted a prospective observational study at the Department of Intensive Care and Rhythmology at the Mohammed V Military Hospital of Rabat, where 330 patients were admitted for heart failure between January 2008 and September 2012. Screening out patients with missing data yielded a cohort of 274 patients. Among the 274 patients, only 110 had LBBB and a left ventricular ejection fraction lower than 50%. We randomly selected a subset of 110 patients diagnosed as non-LBBB to ensure a significant statistical comparison between LBBB and non-LBBB patients. We therefore considered two groups in our analysis: 110 heart failure (HF) patients with LBBB and 110 HF patients without LBBB. Patients with incomplete records were excluded.

**Results:** Male gender was dominant in both groups (82.7% vs. 66.7%,  $p = 0.005$ ). Patients with LBBB had a higher prevalence of idiopathic dilated cardiomyopathy (39.1% vs. 4.8%,  $p < 0.001$ ); and a higher prevalence of previous hospitalization for heart failure (64.5% vs. 23.3%,  $p < 0.001$ ). The left ventricular ejection fraction was significantly lower in the group with LBBB (25.49% vs. 39.53%,  $p < 0.001$ ). Age, cardiovascular risk factors, rhythmic and thromboembolic complications did not significantly differ. In patients with LBBB, 61.8% received cardiac resynchronization therapy performed both during the index hospital stay (50.9%) and previously (10.9%). Hospital outcome was marked by 20 in-hospital deaths in the group with LBBB and eight deaths in the group without LBBB ( $p = 0.008$ ).

**Conclusion:** Our analysis emphasizes increased in-hospital mortality and higher disease severity, over a short period of stay, in heart failure patients with left bundle branch block.

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## Introduction

The prevalence of heart failure (HF) in the western world is known to be 1–2% [1,2], and the incidence approaches 5–10 per 1000 persons per year [3]. However, due to the lack of a national or regional registry of heart failure, this incidence is not valid for Africa [4], especially North Africa. Morocco features only one published monocentric study that included 1578 patients admitted for heart failure [5].

Approximately one-third of patients with heart failure present with conduction disturbances that result in a QRS greater than 120 ms. Most commonly (in approximately 25% of HF patients), this disturbance is exhibited as a left bundle branch block (LBBB) pattern [6]. This percentage is significantly higher than the estimated 1.5% prevalence of LBBB in the general patient population [7]. LBBB is associated with an increased risk of cardiovascular morbidity and mortality in patients with heart failure. The electrical dispersion of ventricular depolarization and conduction delay, which is manifested by QRS elongation, reflects the severity of the electrical, structural and mechanical dysfunction of the left ventricle. LBBB can be mitigated by cardiac resynchronization therapy (CRT) in patients with moderate to severe HF and left ventricular systolic dysfunction function (LVSD). Many studies have shown left ventricular reverse remodeling after cardiac resynchronization therapy for heart failure, particularly in non-ischemic dilated cardiomyopathy.

The aim of the present study was to estimate the morbidity and mortality of congestive HF patients with LBBB versus those without LBBB on an in-hospital basis.

## Methods

### Study design

We conducted a prospective observational study at the Department of Intensive Care and Rhythmology of the Mohammed V Military Hospital in Rabat, where 330 patients were admitted for heart failure between January 2008 and September 2012. However, the data for many patients were incomplete. After excluding patients with missing data, we obtained a cohort of 274 patients. Among these, only 110 presented with LBBB and a left ventricular ejection fraction lower than 50%. We randomly selected a subset of 110 patients diagnosed with non-LBBB to ensure a significant statistical comparison between LBBB and non-LBBB patients. Therefore, the two groups in our

### Abbreviations

LBBB	left bundle branch block
CRT	cardiac resynchronization therapy
LVSD	left ventricular systolic dysfunction function
LVEF	left ventricular ejection fraction
CHF	congestive heart failure
DCM	dilated cardiomyopathy
EDD	end-diastolic diameter
CAD	coronary artery disease
ACE	angiotensin converting enzyme
ACEI	angiotensin converting enzyme inhibitors
CRT-D	CRT-defibrillator
EFICA	Etude Française de l'Insuffisance Cardiaque Aigue

analysis consisted of 110 patients with LBBB and 110 patients without LBBB. Thus, we eliminated the need for normalizing our two groups, while still preserving the soundness of our study.

This study only included patients aged 35 years or older with clinical or echocardiographic manifestations of heart failure. Patients with a left ventricular ejection fraction (LVEF)  $\geq 50\%$  or incomplete records were not included in this study.

### Data collection

Entry into the database required that patients have a diagnosis of HF, which is clinically defined as a syndrome in which patients have typical symptoms (breathlessness, ankle swelling, and fatigue) and signs (elevated jugular venous pressure, pulmonary crackles, and displaced apex beat) resulting from an abnormality in the cardiac structure or function [8]. The main terminology used to describe HF is historical and is based on the measurement of LVEF.

Collected variables included demographic and clinical characteristics (breathlessness, orthopnea, paroxysmal nocturnal dyspnea, and peripheral edema), electrocardiographic and echocardiographic variables, nature of the underlying heart disease, information on therapy and previous hospitalizations for congestive heart failure (CHF). The main outcome was the occurrence of major adverse cardiac events. These events are defined as death (while determining the mechanism of death in each group), serious arrhythmia (ventricular tachycardia, ventricular fibrillation), thromboembolic complications, cardiogenic shock (systolic arterial pressure  $< 90$  mmHg, persistent hypotension of at least 30 min, tissue hypoperfusion: oliguria, cold extremities, confusion).

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