Volume 3 • Number 6 • 2000
VALUE IN HEALTH

Second Line Pharmacological Management of Paroxysmal and Persistent Atrial Fibrillation in France: A Cost Analysis

Karen Moeremans, MD,[1] Etienne Aliot, MD,[2] Christian de Chillou, MD,[2]
Lieven Annemans, PhD, MMan, MSc,[1,3] Claude Le Pen, PhD,[4] Peter de Jong, MD[5]

[1]HEDM (Health Economics and Disease Management), Meise, Belgium, [2]Hôpital Central, Nancy, France, [3]Free University of Brussels, Brussels, Belgium, [4]Clp santé, Paris, France, [5]J & J Medical NV (Biosense Webster), Waterloo, Belgium

ABSTRACT

Objectives: Despite optimal pharmacological treatment a large proportion of patients with atrial fibrillation (Afib) are not arrhythmia-free, and remain at risk for complications such as stroke and cardiac morbidity. If first-line treatment fails, most patients receive second-line pharmacological treatment. The emergence of new technologies aimed at restoring and maintaining sinus rhythm, such as catheter ablation techniques, has increased the interest in the economic aspects of second-line pharmacological treatment. The objective was therefore to calculate the 5-year direct medical costs of second-line pharmacological management of paroxysmal and persistent Afib in France.

Methods: The analysis was based on clinical and economic literature and the input of cardiologists-electrophysiologists. The analysis included probabilities of stroke, sudden cardiac death, other cardiac and noncardiac death, direct medical costs of drugs, follow-up and complications from the healthcare payer's perspective. Included treatment strategies were (1) rhythm control with class Ic and III antiarrhythmics and (2) rate control, consisting of digoxin combined with a beta-blocker or calcium antagonist. Both strategies included aspirin or anticoagulation therapy.

Results: The average total 5-year cost of Afib was 16,539 Euro (FF 108,486) per patient. The result was stable to sensitivity analysis on incidence of stroke and type of stroke prevention. The main cost drivers were follow-up visits and hospitalizations and the cost of congestive heart failure. Both items being subject to some variation, they were submitted to sensitivity analysis showing minimal 5-year costs still over 14,483 Euro (FF 95,000).

Conclusions: Afib management places high demands on medical resources mainly through its complications and comorbidity.

Keywords: analytical model, atrial fibrillation, cost analysis, pharmacological treatment.

Introduction

Atrial fibrillation is the most frequently encountered arrhythmia in clinical practice [1], with a prevalence increasing with age to approximately 5% over the age of 60 years. Not only does it cause symptoms prompting patients to seek medical care, it also carries long-term risks. It predisposes the patient to embolic stroke, impaired cardiac function and cardiac mortality [2]. Furthermore, approximately 50% of patients [3] with atrial fibrillation also suffer from congestive heart failure, which has been suggested to enhance the risk of stroke [3,4] and mortality [5].

Address correspondence to: Lieven Annemans, Brusselsesteenweg 91 B–1860, Meise, Belgium. E-mail: lieven.annemans@hedm.be

Atrial fibrillation merits medical as well as economic attention given: 1) the high prevalence of the disease; 2) the remaining controversies regarding optimal medical management; and 3) the emergence of new technologies, which may have different effects on health but also different economic characteristics [6].

Apart from treating symptoms, the ultimate goal of treating atrial fibrillation is to prevent long-term medical risks associated with atrial fibrillation. The currently available antiarrhythmic drugs can reduce symptoms, but in the majority of patients they fail to completely control the arrhythmia and subsequent long-term medical risks.

With most antiarrhythmic drugs, a recurrence rate of 50% at one year is observed. With programmed serial administration of antiarrhythmic drugs, up to 63% of patients with chronic atrial fibrillation have been reported to be free of arrhyth-

 1098-3015/00/$15.00/407 407–416

mia at 2 years [7]. However, a large proportion of patients continue to carry the long-term risk of complications associated with disturbed atrial function [4]. This proportion may be even larger when taking into account asymptomatic episodes that occur in significant numbers of patients, even when clinically controlled with antiarrhythmic drugs [8].

Given the limited efficacy of antiarrhythmic drugs to restore and maintain sinus rhythm, an alternative strategy, rate control, is often applied. This consists of solely controlling ventricular rate and accepting the atrial arrhythmia. This alternative approach is effective in symptom reduction and cardiac function improvement.

To address the embolic risk, present in both strategies, anticoagulation or aspirin therapy is recommended in combination with the antiarrhythmic and/or rate-controlling drugs.

In summary, two main treatment strategies can be considered: 1) rhythm control, with class Ic and III antiarrhythmics; and 2) rate control with digoxin therapy in combination with a beta-blocker or a calcium antagonist. Both strategies are supplemented with either aspirin or anticoagulation therapy.

Considering the morbidity and mortality associated with atrial fibrillation despite currently available therapies, and the long-term, often multiple-drug treatment, atrial fibrillation results in a significant burden on health care budgets. For instance, atrial fibrillation causes more days of hospitalization in the United States than all ventricular arrhythmias combined [9]. In addition, the hospitalizations for late complications, such as stroke, need to be taken into account.

Currently, the cost of second-line pharmaceutical treatment of atrial fibrillation (i.e., as from recurrence after first line drugs) is unknown. Yet, given the complex patient risk profile, this is an area of concern for clinicians. Alternatives to the second-line pharmacological treatment of atrial fibrillation, such as catheter ablation techniques, are emerging and the economic impact of second-line pharmacological management of atrial fibrillation may become of interest in relation to these new techniques. In such a situation, incidence based cost-of-illness models are of use, since they can serve as a reference for later comparison of new interventions.

The purpose of this analysis was therefore to calculate the total direct health care costs associated with second line pharmacological treatment of paroxysmal and persistent atrial fibrillation, from the health care payer's perspective. France was chosen as the country of interest.

Methods

The Cost Analytical Model

A 5-year decision analytical model [10] reflecting second-line pharmacological rhythm control as well as pharmacological rate control in patients with paroxysmal or persistent atrial fibrillation was developed. Paroxysmal atrial fibrillation was defined as self-terminating episodes and persistent atrial fibrillation as episodes requiring cardioversion.

The model simulates the natural history of atrial fibrillation, taking into account the risk of stroke, which depends on the administration of anticoagulation or antiaggregation therapy, the risk of sudden cardiac death which increases with the use of some antiarrhythmics [11], and the risk of other cardiac and noncardiac mortality depending on comorbidity. Such a model allows inclusion of all relevant outcomes, together with the time to events. The time horizon of five years was selected because it is sufficiently long for incorporating the relevant outcomes. Longer time horizons would be subject to more uncertainty with regard to the future medical management in these patients.

The direct costs implemented in the model include costs of pharmacological treatment, costs of medical follow-up and costs of preventing or treating complications such as stroke or major hemorrhage, all from the health care payer's perspective (Sécurité Social).

The model calculates the estimated average costs of second-line pharmacological management of atrial fibrillation, and is shown in Fig. 1. The clinical probabilities in the model are discussed in next paragraph.

At baseline, a distinction was made between two subgroups: patients with decreased cardiac function (NYHA class 2 or more), and patient with normal cardiac function (NYHA class $\leqslant 1$), due to the different prognosis and medical management.

In the current analysis a combination of class Ic and class III antiarrhythmic drugs, the most frequently cited therapy by French cardiologists (see further), was applied as rhythm control strategy. Rhythm control was cited by an expert consensus panel (see further) as the most common practice (71.4%).

For rate control, based on recent recommendations [5,9,12], digoxin was applied combined with beta-blocker or calcium antagonist therapy depending on cardiac performance. Furthermore, it was assumed that once second-line antiarrhythmic