Cost-Effectiveness and Clinical Effectiveness of the Risk Factor Management Clinic in Atrial Fibrillation
The CENT Study

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ABSTRACT

BACKGROUND Atrial fibrillation (AF) imposes a substantial cost burden on the healthcare system. Weight and risk factor management (RFM) reduces AF burden and improves the outcomes of AF ablation.

OBJECTIVES This study sought to evaluate the cost and clinical effectiveness of integrating RFM into the overall management of AF.

METHODS Of 1,415 consecutive patients with symptomatic AF, 825 patients had body mass index $\geq$ 27 kg/m$^2$. After screening for exclusion criteria, the final cohort comprised 355 patients: 208 patients who opted for RFM and 147 control subjects and were followed by 3 to 6 monthly clinic review, 7-day Holter monitoring, and AF Symptom Score. A decision analytical model calculated the incremental cost-effectiveness ratios of cost per unit of global well-being gained and unit of AF burden reduced.

RESULTS There were no differences in baseline characteristics or follow-up duration (p = NS). Arrhythmia-free survival was better in the RFM compared with control subjects (Kaplan-Meier: 79% vs. 44%; p < 0.001). At follow-up, RFM group had less unplanned specialist visits (0.19/C6 0.4 vs. 1.94/C6 2.0; p < 0.001), hospitalizations (0.74/C6 1.3 vs. 1.05/C6 1.6; p = 0.03), cardioversions (0.89/C6 1.5 vs. 1.51/C6 2.3; p = 0.002), emergency presentations (0.18/C6 0.5 vs. 0.76/C6 1.2; p < 0.001), and ablation procedures (0.60/C6 0.69 vs. 0.72/C6 0.86; p = 0.03). Antihypertensive (0.53/C6 0.7 vs. 0.78/C6 0.6; p = 0.04) and antiarrhythmic (0.26/C6 0.5 vs. 0.91/C6 0.6; p = 0.003) use declined in RFM. The RFM group had an increase of 0.1930 quality-adjusted life years and a cost saving of $12,094 (incremental cost-effectiveness ratios of $62,653 saved per quality-adjusted life years gained).

CONCLUSIONS A structured physician-directed RFM program is clinically effective and cost saving.

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Recently reported epidemiological data confirm the emergence of atrial fibrillation (AF) as a global epidemic (1). This has significant and progressive impact on health care costs because of its association with increased cardiovascular morbidity, reduced quality of life, stroke, and mortality (2–4). The incremental cost of AF in the United States is estimated to range between $60 billion and $260 billion per year (5). Hospitalization, increased medication use, and procedural requirements constitute the major contributors to the total treatment cost of patients with AF (6–9). Ageing populations are an important contributor to the growing burden of AF. Recent data have also implicated the increasing prevalence of risk factors, such as obesity, hypertension, diabetes mellitus, and obstructive sleep apnea (10,11). Therefore, there is an urgent need for improved and cost-effective primary and secondary prevention strategies to reduce the impact of this enormous health burden.

Sinus rhythm is associated with better quality of life (12). Detrimental effects of antiarrhythmic agents offset the benefit from sinus rhythm maintenance (13,14). Catheter ablation of AF has evolved as an effective therapy for drug-refractory symptomatic AF (15). However, it is resource intensive and has significant upfront costs. Furthermore, reports of long-term outcomes demonstrate attrition in success with time (16–18). The cost-effectiveness of AF ablation is greatly influenced by the number of procedures, their success rate, and procedural complications (19,20). Studies have associated cardiac risk factors with the more frequent recurrence of AF, increased risk of complications, and direct medical costs (21–24). Aggressive management of these risk factors in a dedicated physician-led clinic has been shown to reduce the burden of AF and improve the long-term success of ablation (25–27).

In the LEGACY (Long-Term Effect of Goal Directed Weight Management in an Atrial Fibrillation Cohort: A Long-Term Follow-Up Study) study, progressive weight-loss had a dose-dependent effect on long-term freedom from AF (28). However, it is not clear if a dedicated risk factor management (RFM) clinic is cost-effective. In this study, we aim to evaluate the cost and clinical effectiveness of a dedicated RFM clinic in overall management of AF.

**METHODS**

**STUDY POPULATION.** The impact of weight loss and its effects on AF outcomes from our registry were presented in the LEGACY Study (28). In the LEGACY study, all suitable patients (with body mass index ≥27 kg/m² and ≥1 risk factor) were offered RFM in a dedicated physician-directed clinic at the time of initial assessment (Figure 1). Here we compare the clinical and cost-effectiveness of a dedicated RFM clinic for long-term results of patients diagnosed with AF. Patients were dichotomized based on whether they accepted this strategy and formed the intervention group (RFM group), whereas those who declined formed the control group. The study protocol was approved by the Human Research Ethics Committee of the Royal Adelaide Hospital and University of Adelaide, Adelaide, Australia.

**RISK FACTOR MANAGEMENT.** Patients in the RFM group attended a physician-directed RFM clinic (in addition to their arrhythmia follow-up) at least every 3 months and were encouraged to use support counseling and to schedule more frequent reviews as required. Risk factors were managed according to American College of Cardiology/American Heart Association guidelines. The details of our RFM have been previously presented (28). In brief, a structured motivational, goal-directed program using face-to-face counseling was used to achieve behavioral change for weight management and increasing physical activity. Weight, hypertension, glucose intolerance, dyslipidemia, sleep apnea, and alcohol and tobacco use were

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**ABBREVIATIONS AND ACRONYMS**

- **AF** = atrial fibrillation
- **AFSS** = Atrial Fibrillation Severity Scale
- **CI** = confidence interval
- **HR** = hazard ratio
- **ICER** = incremental cost-effectiveness ratios
- **GALY** = quality-adjusted life years
- **RFM** = risk factor management

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