

# WEIGHING IN THE EVIDENCE: LIFESTYLE MODIFICATION IN THE TREATMENT OF ATRIAL FIBRILLATION

**Kathryn Hong**

*Kathryn Hong completed her MSc in Biomedical and Molecular Sciences (Kingston, ON) and is now a Clinical Researcher with the Schulich Heart Centre at Sunnybrook Hospital (Toronto, ON).*

## A Global Epidemic

Imagine if you suddenly felt your heart “jumping out of your chest” – this is the case for an estimated 1 in 4 Canadians who experience this rapid and chaotic heartbeat characteristic of atrial fibrillation (AF).

The healthy heart works continuously to beat regularly under the control of electrical impulses originating from the sinoatrial (SA) node, the heart’s natural pacemaker. In AF, electrical impulses do not originate in the SA node, but rather, from a different part of the atrium or in nearby pulmonary veins. These abnormal electrical signals become rapid and disorganized, radiating throughout the atrial walls in an uncoordinated manner. This can cause the walls of the atrium to quiver, or fibrillate, which results in irregular electrical transmission from the atria to the ventricles. A normal heart rate at rest should be between 60-100 beats per minute at rest, but in AF, it can be considerably higher than 140 beats per minute<sup>1</sup>.

Affecting more than 33 million individuals worldwide, AF is the most common sustained irregular heart rhythm encountered in clinical practice<sup>2</sup>. The progression and maintenance of AF results in adverse events, including an increase in hospitalizations and a five-fold increase in the risk of stroke<sup>3</sup>. Given this evidence and anticipated increases in life expectancy within the next several decades, there are clear public health implications for the aging Canadian population.

## The Evidence is Heavy

Over the years, I have witnessed a paradigm shift in the treatment of AF. I recall being first exposed to the field more than 5 years ago when AF management focused largely on highly invasive surgery and oral anticoagulation or “blood thinners”. In many cases, these treatment options may be the closest to a “cure” for patients. However, there has been considerable evidence to suggest that a stocked medicine cabinet or an abundance of sophisticated technical equipment may not necessarily be the solution.

With each patient that arrived to clinic, I began to notice a pattern of symptoms and conditions. These patients often presented with existing conditions, such as hypertension and diabetes, and precipitating lifestyle habits, such as excessive smoking and alcohol consumption. Not only do these conditions and habits lead to the incidence and worsening of AF, but significantly increase a patient’s risk of stroke. In fact, nearly 60% of AF can be attributable to these so-called modifiable risk factors<sup>4</sup>.

For these reasons, we hypothesized that treating the development of AF may require early identification of these modifiable risk factors so that we can intervene before patients worsen and require invasive treatment.



## Our Aims

From years of working with these patients, I have come to realize that a key focus in AF management is not simply targeting the physiological symptoms, but their psychology as well. Understanding how the patient feels as well as how to improve their overall psychosocial well-being is critical to their treatment.

In designing a scalable, reproducible, and economical lifestyle modification program, it is also of critical importance that we evaluate the impact of lifestyle practices on patient symptoms. Taken together, these results may have significant clinical and socioeconomic implications for the aging population worldwide if shown to effectively treat the progression of AF. AF is one of the higher cost chronic conditions in the Canadian health care system and early interventions may contribute to reducing rates of AF-related hospitalizations through primary stroke prevention. Additionally, there are numerous stroke risk factors, which independently contribute to the initiation of AF. Just to name a few – hypertension (HTN), diabetes mellitus (DM), obesity, and obstructive sleep apnea (OSA).

There have been several lifestyle modification strategies that have shown to be feasible in the treatment of AF. For example, there is overwhelming evidence to suggest that dietary changes may prevent the progression of impaired glucose tolerance to diabetes. Specifically, adherence to a diet characterized by a high consumption of fruits and vegetables, and a low consumption of red meat products, may have beneficial effects for cardiovascular health<sup>5</sup>. Previously, studies have correlated the traditional Mediterranean diet to reductions in heart disease, which may be attributable to lower levels of low oxidized low-density lipoprotein (LDL). LDL is often referred to as “bad cholesterol” as it

contributes to buildup in the arteries and ultimately, narrowing of the arteries. Elevated levels of LDL are associated with increased risk of atherosclerosis, however the exact role of diet on cardiovascular disease events remains somewhat unknown which may be an important consideration when creating diet prescriptions for AF patients.

Weight management has also been shown to have significant implications for patients with elevated body mass indexes (BMI) and AF. In the LEGACY trial conducted by Pathak and colleagues<sup>6</sup>, patients with a known history of AF underwent intentional, goal-directed weight loss as defined by a  $\geq 10\%$  reduction in their baseline weight. This group of patients experienced a 6-fold greater probability of arrhythmia-free survival as compared to those with little- to no-weight change. In another study, adherence to guideline recommendations of 150 min/week of exercise led participants to experience a 22% lower risk of death or major adverse cardiac events<sup>7</sup>.

Finally, although previous studies have attempted to establish the optimal diet and weight management strategies for patients with AF, these interventions have failed to achieve the desired results through long-term adherence. The administration of dietary advice and exercise prescriptions may in fact, be heavily influenced by psychological factors and therefore, could be enhanced through the use of positive reinforcement techniques. This is strengthened by prior evidence demonstrating that lifestyle behaviour change services delivered in a hospital setting is indeed feasible, with the appropriate techniques<sup>8</sup>. Therefore, adopting a holistic approach to patient management and treatment, which integrates positive reinforcement while addressing the social determinants of health and behavioural change, may facilitate the translation of these lifestyle practices into long-term habit.



Atrial fibrillation is a global epidemic of the 21<sup>st</sup> century and the delivery of early lifestyle interventions has the potential to revolutionize treatment and avoid the need for invasive surgical treatment altogether. At our institution, we are eager to implement these strategies and have recently commenced our own lifestyle modification program. This is part of our team's overall goal of discovering innovative treatment options for this difficult condition. Other exciting work by our team includes performing the *first* hybrid catheter ablation in the nation - a safer and more tailored procedure for patients with severe forms of AF.

## References

1. NHS Inform. <https://www.nhsinform.scot/illnesses-and-conditions/heart-and-blood-vessels/conditions/atrial-fibrillation>. [May 2, 2018]
2. Sumeet, S et al. Worldwide Epidemiology of Atrial Fibrillation: A Global Burden of Disease 2010 Study. *Circulation*. 2014;129(8):837-847.
3. Albertsen, IE; Rasmussen, LH; Overvad, TF; Graungaard, T; Larsen, TB; Lip, GY. Risk of stroke or systemic embolism in atrial fibrillation patients treated with warfarin: a systematic review and meta-analysis. *Stroke*. 2013;44(5):1329-36.
4. Van Wagoner, DR et al. Progress toward the prevention and treatment of atrial fibrillation: A summary of the Heart Rhythm Society Research Forum on the Treatment and Prevention of Atrial Fibrillation, Washington, DC, December 9-10, 2013. *Heart Rhythm*. 2015;12(1):e5-e29.
5. Ros, E; Martinez-González, MA; Estruch, R; Salas-Salvadó, J; Fitó, M; Martínez, JA; Corella, D. Mediterranean diet and cardiovascular health: Teachings of the PREDIMED study. *Adv Nutr*. 2014;5(3):330S-6S.
6. Pathak, RK et al. Long-Term Effect of Goal-Directed Weight Management in Atrial Fibrillation Cohort: A Long-Term Follow-Up Study (LEGACY). *J Am Coll Cardiol*. 2015;65(20):2159-69.
7. Elliott, AD; Maatman, B; Emery, MS; Sanders, P. The role of exercise in atrial fibrillation prevention and promotion: Finding optimal ranges for health. *Heart Rhythm*. 2017;14(11):1713-1720.
8. Gate, L; Warren-Gash, C; Clarke, A; Bartley, A; Fowler, E; Semple, G; Sterlitz, J; Dutey, P; Tookman, A; Rodger, A. Promoting lifestyle behaviour change and well-being in hospital patients: a pilot study of an evidence-based psychological intervention. *Journal of Public Health*. 38(3):e292-e300.

