

## **Hypertension, Atrial Fibrillation and Aldosteronism A Study of Interplay, Predictors and Outcome**

Akademisk avhandling

Som för avläggande av medicine doktorsexamen vid Sahlgrenska Akademin,  
Göteborgs Universitet kommer att offentligens försvaras i R-Aula,  
Sahlgrenska Universitetssjukhuset/Mölndal  
Fredagen den 13 april 2018 kl 09.00

av Georgios Mourtzinis

Fakultetsopponent:

Professor Anders Gottsäter  
Klinisk kärlforskning, Lunds universitet

### **Avhandlingen baseras på följande delarbeten**

- I Mourtzinis G, Ebrahimi A, Gustafsson H, Johannsson G, Manhem K. Aldosterone to renin ratio as a screening instrument for primary aldosteronism in a middle-aged population with atrial fibrillation.  
*Horm Metab Res* 2017; 49: 831–837.
- II Mourtzinis G, Schiöler L, Kahan T, Bengtsson Boström K, Hjerpe P, Hasselström J, Manhem K. Antihypertensive control and new-onset atrial fibrillation: Results from the Swedish Primary Care Cardiovascular Database (SPCCD).  
*Eur J Prev Cardiol.* 2017;24(11):1206-1211.
- III Mourtzinis G, Adamsson Eryd S, Rosengren A, Björck L, Adiels M, Johannsson G, Manhem K. Primary aldosteronism and thyroid disorders in atrial fibrillation: A Swedish nationwide case-control study.  
*Eur J Prev Cardiol.* 2018. doi: 10.1177/2047487318759853.
- IV Mourtzinis G, Kahan T, Bengtsson Boström K, Schiöler L, Cedstrand Wallin L, Hjerpe P, Hasselström J, Manhem K. Relation Between Lipid Profile and New-Onset Atrial Fibrillation in Patients with Systemic Hypertension (From the Swedish Primary Care Cardiovascular Database [SPCCD])  
*Submitted.*

**SAHLGRENSKA AKADEMIN  
INSTITUTIONEN FÖR MEDICIN**



# Hypertension, Atrial Fibrillation and Aldosteronism A Study of Interplay, Predictors and Outcome

Georgios Mourtzinis

Department of Molecular and Clinical Medicine, Institute of Medicine,  
Sahlgrenska Academy, University of Gothenburg, Sweden, 2018

## Abstract

*Background:* Atrial fibrillation (AF) is the most common significant arrhythmia, affecting almost 3% of the adult population in Sweden. Although AF is associated with increased risk of lower quality of life, heart failure, stroke and mortality, the therapeutically options are still limited. Hypertension is a common cardiovascular disease affecting approximately one third of the adult population, and is the underlying cause for more AF cases than any other disease. Almost 10% of the hypertension cases may be due to primary aldosteronism, a condition that can be treated by a specific therapy. Little is known regarding the prevalence of primary aldosteronism in the general population and in the AF population. Moreover, current data suggest that AF is overrepresented among hypertensive patients with primary aldosteronism.

*Major research question:* The present thesis aims to evaluate the possibility of screening for primary aldosteronism in the AF population, and to estimate the prevalence of primary aldosteronism in the AF population. Furthermore, this thesis aims to assess the role of blood pressure levels and lipid profile in preventing new-onset AF in the hypertensive population.

*Methods:* In Study I, 149 AF patients < 65 years were screened for primary aldosteronism by using the aldosterone to renin ratio. In the case-control Study III, all AF cases in Sweden between 1987 and 2013 (N=713,569) were identified by using the Swedish Patient Register. An age, sex and place of birth matched control-cohort without AF was randomly selected from the Swedish Total Population Register with a case to control ratio of 1:2 (N=1,393,953). The prevalence of primary aldosteronism for the individuals alive on 31 December, 2013 in both cohorts was calculated through linkage to the Swedish Patient Register. Studies II and IV utilized the primary care hypertensive population in the Swedish Primary Care Cardiovascular Database (SPCCD). Approximately 50,000 hypertensive patients without AF were followed-up between 2002 and 2008, and dichotomized according to AF development or not. The in-treatment blood pressure and lipid profile were compared between the new-onset AF group and the no-AF group.

*Results:* Four individuals (2.6%) of the screened AF population were found to have undiagnosed primary aldosteronism. The prevalence of primary aldosteronism in December 2013 was 0.056% in the AF cohort and 0.024% in controls. Besides, lower in-treatment systolic blood pressure was found to be associated with lower risk of new-onset AF. Paradoxically, total cholesterol and low-density lipoprotein cholesterol were found to have an inverse association with new-onset AF.

*Conclusions:* Assessment of aldosterone to renin ratio can be useful for identification of underlying primary aldosteronism in patients with diagnosed AF and hypertension. This recommendation is strengthened by the finding of a doubled risk for primary aldosteronism in the AF population compared to matched controls without AF. Moreover, successful blood pressure control in hypertensive patients may reduce the risk of new-onset AF. Finally, the underlying mechanism regarding the dyslipidemia paradox in AF development is unclear.

ISBN: 978-91-629-0454-8 (PRINT)  
ISBN: 978-91-629-0455-5 (PDF)

<http://hdl.handle.net/2077/54954>