

Biomarkers and clinical factors associated with atrial fibrillation in the Russian population

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Introduction

Risk factors for atrial fibrillation (AF) have been characterized in Western European and Northern American populations but have not been well studied in other populations. The aim of the present study was to investigate the association of prevalent AF with conventional biomarkers and comorbidities in a population-based Russian cohort study.

Material and Methods

- The population-based Stress, Aging and Health Study in Russia (SAHR) included 1800 Muscovite men and women aged 55 and older (68 ± 8 y, 47% men) who attended baseline examinations 2006-2009.

Table 1. Clinical characteristics of subjects with and without atrial fibrillation on Holter ECG at baseline

| | Prevalence / Average (SE) | | P-value |
|-------------------------------|---------------------------|--------------------|---------------|
| | No AF, n=1635 | AF, n=100 | |
| Age, years | 67.92 (0.19) | 73.11(0.75) | <0.0001 |
| Male gender, n (%) | 0.46 (0.01) | 0.51(0.05) | 0.1741 |
| Total cholesterol, mol/L | 6.00 (0.03) | 5.51 (0.14) | 0.0008 |
| LDL cholesterol,mmol/L | 4.09 (0.03) | 3.75 (0.13) | 0.0090 |
| Triglycerides, mmol/L | 1.37 (0.02) | 1.16 (0.05) | 0.0006 |
| Interleukin-6,pg/L | 1.47 (0.13) | 2.32 (0.38) | 0.0187 |
| CRP,mg/L | 3.23 (0.13) | 3.98 (0.45) | 0.0550 |
| Fasting glucose, mmol/L | 6.06 (0.04) | 6.34 (0.28) | 0.1663 |
| HbA1c, % | 6.02 (0.02) | 6.25 (0.12) | 0.0315 |

- Participants underwent physical examination, detailed interviewing, 24-h Holter ECG monitoring and measurement of plasma biomarkers including lipid profile, inflammation markers, fasting glucose and HbA1c.
- 24-hr Holter ECG was reviewed for AF episodes longer than 30s. Finally good quality Holter data were not available for 65 individuals, correspondingly related analyses were performed on a sample of 1 735 subjects.

Results

Atrial fibrillation prevalence

The prevalence of AF detected by Holter monitoring at baseline was 5.8% (n=100, age 73 ± 7 years, 51% men), of whom 78% also were self-reported. AF persisted during the entire Holter recording in 74 individuals and was intermittent in the remaining 26. AF prevalence was 6.3% in men and 5.3% in women ($p > 0.05$), and increased with age by 8.6% per year (5.8%-11.5%, $p < 0.05$).

Blood lipids and atrial fibrillation

AF was strongly and inversely associated with total and LDL cholesterol and positively associated with glucose, HbA1c and interleukin-6 (Table 2).

No association was observed with HDL cholesterol, hypertension, diabetes or BMI ($p > 0.05$). Adjustments for glucose, HbA1c and interleukin-6 did not affect the association of cholesterol with AF.

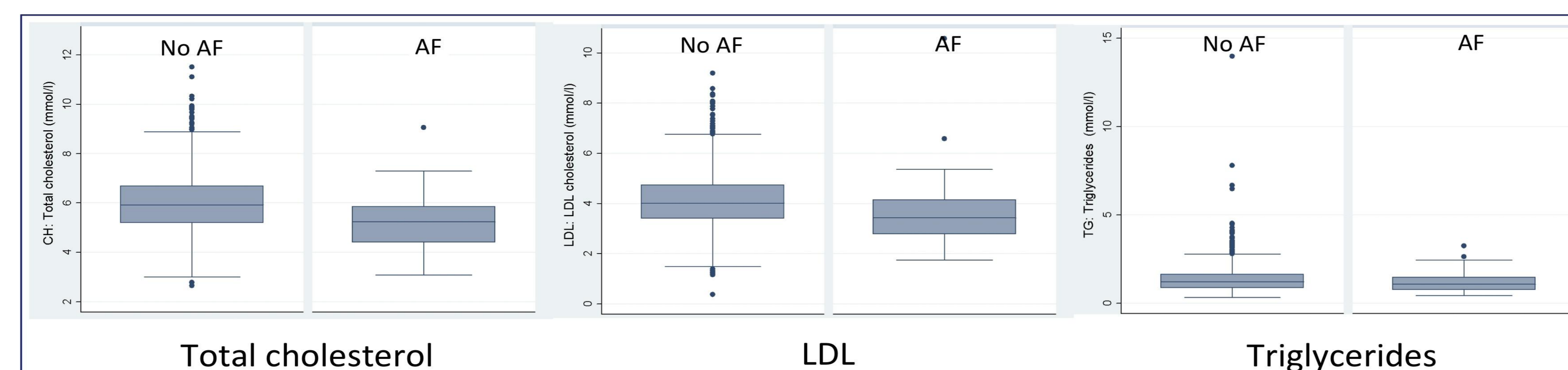
Table 2. Age- and sex-adjusted odds ratio for association between biomarkers and atrial fibrillation at baseline Holter ECG

| | Age- and sex-adjusted OR (95%CI), p-value relative to the lowest category |
|---------------------------------|---|
| Total cholesterol 4.6-6.8 mol/L | 0.39(0.23-0.66), <0.001 |
| Total cholesterol >6.8 mmol/L | 0.30 (0.14-0.61), 0.001 |
| LDL cholesterol 3.0-4.9 mmol/L | 0.49 (0.29-0.80), 0.004 |
| LDL cholesterol >4.9 mmol/L | 0.40 (0.20-0.80), 0.010 |
| Triglycerides 0.8-1.1mmol/L | 0.52 (0.32-0.84), 0.008 |
| Triglycerides >1.1mmol/L | 0.51 (0.29-0.97), 0.038 |
| Interleukin-6 ≥ 2 pg/L | 1.75 (1.11-2,72), 0.015 |
| Glucose per 1 mmol/L (linear) | 1.11 (1.0-1.22), 0.03 |
| HbA1c per 1 % (linear) | 1.21 (1.02-1.44), 0.02 |

Conclusion

Apart from anticipated associations of AF with markers of inflammations and metabolic disorders, a strong and independent inverse associations of total and LDL cholesterol with AF was observed in the Russian population. These findings replicate those made in Japan earlier¹ and suggest etiological heterogeneity for AF across populations.

Figure 1. Box plots illustrating total cholesterol, LDL and triglycerides in patients with and without AF



References:

- Annoura M, Ogawa M, Kumagai K et al. Cholesterol paradox in patients with paroxysmal atrial fibrillation. *Cardiology* 2000;92(1):21-27



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