

## Accumulation of metabolic derangements and increased risk of atrial fibrillation

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**Background/Aims:** The metabolic syndrome (MetS) itself and certain components of MetS are associated with the development of atrial fibrillation (AF). However, there is a paucity of information on the time-burden of MetS and the risk of AF. We aimed to investigate the impact of the longitudinal burden of MetS on the development of AF.

**Methods:** We included 2 885 189 individuals without AF who underwent four serial health examinations from 2009 to 2013. Based on the definition provided by the National Cholesterol Education Program Third Adult Treatment Panel (NCEP-ATP III), we evaluated the presence of MetS at each health examination (0 to 4 times). Also, we counted the number of meeting the individual components of MetS at each health examination and added up the count in every participant (0 to a maximum of 20 counts).

**Results:** During a mean follow-up of 5.3 years, 1 800 268 (62.4%), 428 143 (14.8%), 250 073 (8.7%), 188 847 (6.5%), and 217 858 (7.6%) met the diagnostic criteria of MetS 0, 1, 2, 3, and 4 times, respectively. Compared to the non-MetS group, the risk of AF increased according to the number of MetS presence; hazard ratios (HR) with 95% confidence intervals (CI) of groups meeting the diagnostic criteria of MetS 0, 1, 2, 3, and 4 times were 1.18 (1.13-1.24), 1.31 (1.25-1.39), 1.46 (1.38-1.55) and 1.72 (1.63-1.82) with P for trend < 0.0001. For each of the five components of MetS, incremental associations between the frequency of meeting individual criteria and the risk of AF were independently demonstrated. Furthermore, as the metabolic components were repeatedly satisfied from 0 to 20 counts, the risk of AF also gradually increased.

**Conclusions:** In our large Asian cohort, subjects who are diagnosed as MetS more frequently showed a higher risk of AF compared to a consistently metabolically healthy population. Furthermore, the risk of AF became higher as the number of meeting MetS components increased. It would be important to minimize the burden of MetS to reduce the risk of AF.

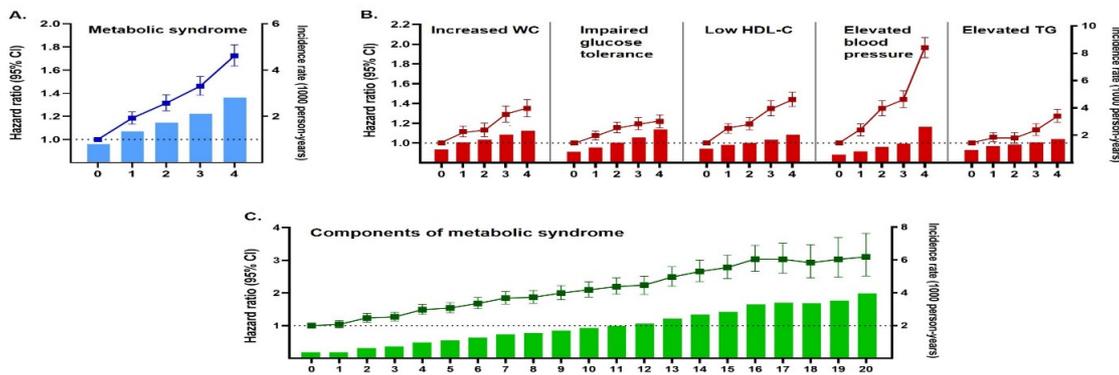


Figure 1. Hazard ratios with 95% confidence intervals and incidence rate of atrial fibrillation according to the number of meeting metabolic syndrome definition (A), the number of meeting each parameter (B), and total number of accumulated individual parameters of metabolic syndrome during 4 health examinations (C).

\* Abbreviation: CI, confidence interval; WC, waist circumference; HDL-C, high-density lipoprotein cholesterol; TG, triglycerides.