**Introduction**: Obesity increases the risk of atrial fibrillation (AF), although there is uncertainty regarding whether this risk is driven through elevated fat mass, lean body mass, or both.

**Methods**: Anthropometric measures were assessed amongst 492,132 UK Biobank participants aged 40-69 years. Body mass index was subsequently derived from height and body mass measures. Body composition analysis was performed using 8-electrode biometadimpedance analysis. Body fat percentage was directly assessed, with fat mass and lean body mass subsequently computed. Physical activity was assessed using a validated questionnaire. AF incidence was identified through linkage to electronic medical records covering hospital admissions, operative procedures and death reports.

**Result**: There were 12933 AF events over 6.9 +/- 1.2 year follow-up. All anthropometric measures were associated with AF risk with evidence of non-linearity for all variables. High lean mass, remained significantly associated with AF, following adjustment for measures of adiposity (HR for 1 SD above mean 1.37, 95% CI: 1.32-1.43). Conversely, fat mass was significantly associated with AF risk following adjustment for lean mass (HR for 1 SD above mean 1.16, 95% CI: 1.11-1.20). We noted a significant interaction between lean mass and physical activity on AF risk. Greater physical activity was associated with lower AF risk only in the lower ranges of lean mass.

**Conclusion**: Both lean and fat mass are associated with AF risk, with a greater contribution from lean mass. Physical activity is associated with lower AF risk only in participants across the lower ranges of lean body mass.