The effect of body mass index on clinical outcomes in patients with newly diagnosed atrial fibrillation in the GARFIELD-AF registry

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Introduction: Higher body mass index (BMI) is associated with a higher risk of atrial fibrillation (AF). However, previous evidence has suggested an inverse association between BMI and risk of AF outcomes.

Purpose: To explore the association between BMI and outcomes in those with newly diagnosed AF in the GARFIELD-AF registry.

Methods: GARFIELD-AF is an international registry of consecutively recruited patients aged $\geq$18 years with newly diagnosed AF and $\geq$1 stroke risk factor. Data were collected prospectively on 52,080 patients. Participants with missing or extreme BMI values and those without two-year follow-up were excluded. Cox proportional hazard models were used to estimate the effect of BMI on the risk of outcomes. Models were adjusted for age, sex, ethnicity, smoking, alcohol, and $\geq$moderate chronic kidney disease. Where appropriate participants were divided into groups based on BMI. Restricted cubic splines were used to assess non-linear relationships.
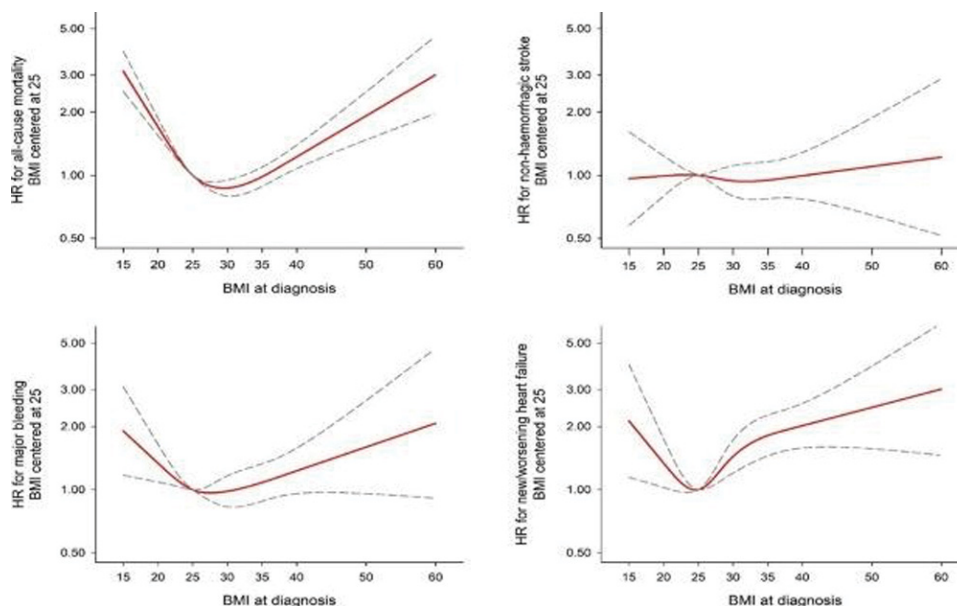
Results: BMI and outcome data were available for 40,495 patients. Those with higher BMI were generally younger, and more likely to have pre-existing hypertension, diabetes, or vascular disease (Table). Underweight patients received anticoagulation less often than those in other groups (60.3% vs 67.9%, respectively). During follow-up, 2,801 participants (6.9%) died and 603 (1.5%) had new/worsening heart failure. Following adjustment for potential confounders, a U-shaped relationship was seen between BMI and all-cause mortality and new/worsening heart failure (Figure). For all-cause mortality, the lowest risk was at 30kg/m^2. Below this level, there was an 8% higher risk of mortality (95% confidence interval (CI) 6 to 9%) per 1kg/m^2 lower BMI. Above 30kg/m^2, there was a 5% higher risk of mortality per 1kg/m^2 higher BMI (95% CI 4 to 7%). For new/worsening heart failure, the lowest risk was at 25kg/m^2. Above this level, 1kg/m^2 higher BMI was associated with an 5% higher risk (95% CI 13 to 6%).

Conclusions: BMI was an important risk factor for both all-cause mortality and new/worsening heart failure in AF. Those at both extremes of BMI are at higher risk.

Baseline characteristics

	Underweight (<18.5kg/m²)	Normal (18.5 to <25kg/m²)	Overweight (25 to <30kg/m²)	Obese (30 to <35kg/m²)	Very Obese (≥35kg/m²)	p value
Participants	703	13098	15050	7564	4080	
Male, n (%)	275 (39.1)	7230 (55.2)	9281 (61.7)	4199 (55.5)	1907 (46.7)	<0.001
Age, median (IQR)	77 (68–84)	73 (64–80)	71 (62–78)	69 (61–76)	66 (59–73)	<0.001
Diabetes, n (%)	69 (9.8)	2099 (16.0)	3192 (21.2)	2240 (29.6)	1591 (38.9)	<0.001
Vascular Disease, n (%)	147 (21.0)	2961 (22.8)	3881 (25.9)	2182 (29.0)	1106 (27.3)	<0.001
Hypertension, n (%)	388 (55.2)	8946 (68.3)	11820 (78.5)	6494 (85.9)	3602 (88.3)	<0.001

BMI and selected outcomes