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Letter to the Editor

Impact of gender on outcomes after atrial fibrillation ablation

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Dear Editor,

There is no clear data on the relative efficacy of catheter ablation in women when compared to men [1,2]. We conducted this meta-analysis to compare the long-term outcomes of catheter ablation in both genders.

We searched PubMed Central and Embase databases using search terms "atrial fibrillation" and "ablation" for studies, which reported outcomes of AF ablation in adult AF patients (aged ≥ 18 years), regardless of duration or severity of symptoms. Search was conducted from the inception of the databases to May 30, 2014. We used the published strengthening Meta-analysis Of Observational Studies in Epidemiology checklist to select the studies for this review [3].

We excluded studies with ≤100 patients, <1 month blanking period, <12 months follow-up and duplicate publications. Studies were also excluded if ablation of the atrioventricular node was attempted for rate control. We assess the risk of bias of the included studies using the recommended checklist of STROBE [4].

Mix 2.0 Pro (Biostat XL) software was used to analyze the data [5]. Random-effects model (inverse variance weighting method) was applied to calculate the pooled odds ratio and 95% confidence intervals (CI). Heterogeneity between studies was assessed using the Cochrane's Q test and I^2 statistic, which describe the percentage of total variation across studies that is a result of heterogeneity rather than chance. Heterogeneity was considered significant if the p value was less than 0.1. Publication bias was assessed by the funnel and regression test of Egger. The influence of individual studies, from which the meta-analysis estimates are derived, was examined by omitting one study at a time to see the extent to which inferences depend on a particular study (sensitivity analysis). Meta-regression analysis was performed to answer the specific question whether the type of AF can predict recurrence rates. Meta-regression analysis was performed with the Open Meta analyst software (http://www.cebm.brown.edu/open_meta).

Twenty studies (N = 9968, with 2112 females (21.2%)) were selected for final analysis (Fig. 1) [1,2,6–23]. Quality and baseline characteristics of the studies included in our analysis are summarized in Tables 1 and 2. The definition of AF recurrence varies among different studies included in our analysis. In eleven studies, AF recurrence was defined as the occurrence of atrial tachyarrhythmia (including AF) lasting for more than 30 s [7,9–15,18,19,21,23]. In four studies, the maintenance of sinus rhythm with antiarrhythmic drugs was defined as treatment success [1,6,18,19].

Pooled analysis of 20 studies revealed that women have a higher risk of AF recurrence (OR 1.20, 95% CI 1.04–1.38, p = 0.01) (Fig. 2A). There was low heterogeneity across the studies (p = 0.14, I^2 = 25%) (Fig. 2B). Egger's regression test did not show any publication bias (p = 0.06).

We explored the robustness of our findings by omitting one study at a time or outlier studies and switching our meta-analysis model from a random- to a fixed-effects analysis. There was no change in summary effect with fixed effects analysis. Exclusion of any single study did not change the composite effect size (Fig. 2C). To further test whether the type of AF determines the outcomes, we performed a meta-regression analysis including the % of non-paroxysmal AF as a covariate. A trend

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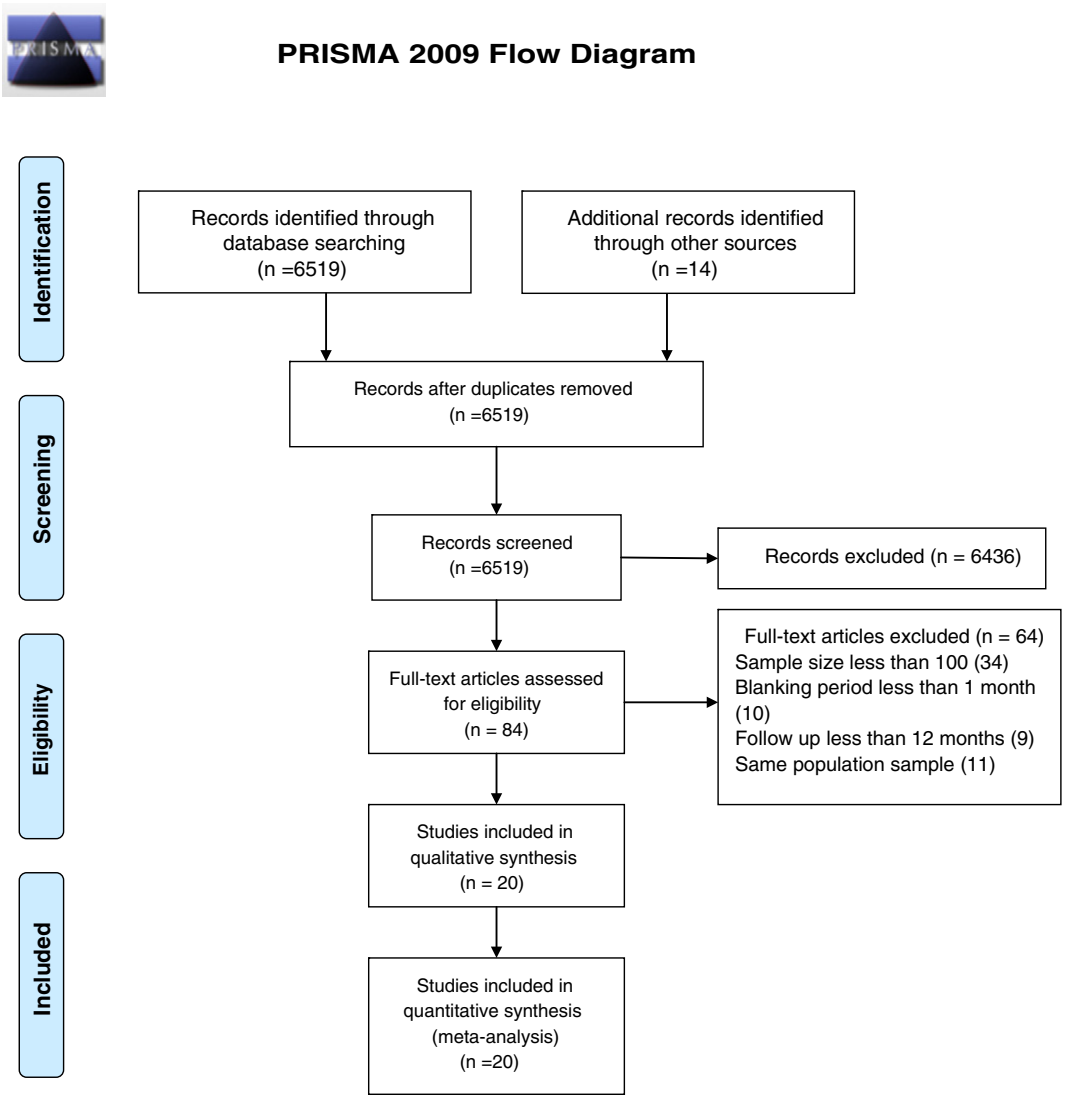

Fig. 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow sheet.

Table 1
Quality of included studies.

Name of the study	State specific objectives of the study	Present key elements of study design	Gives the eligibility criteria	Clearly explains the characteristics of both sexes	Clearly explains recurrence rates	Explains how loss to follow-up was addressed	Score	Quality
Tang (2009)	1	1	1	0	1	0	4	Intermediate
Montefusco (2010)	0	1	1	0	1	0	3	Intermediate
Cai (2011)	0	1	1	0	1	0	3	Intermediate
Hu (2012)	1	1	1	0	1	0	4	Intermediate
Tokuda (2010)	1	0	0	0	1	0	2	Low
Park (2012)	1	1	1	0	1	0	4	Intermediate
Den Ujil (2011)	1	0	0	0	1	0	2	Low
Blanche (2012)	1	0	0	0	1	0	2	Low
Forleo (2007)	1	1	1	1	1	0	5	High
Patel (2010)	1	1	0	1	1	0	4	Intermediate
Mulder (2012)	0	0	0	0	1	0	1	Low
Pokushalov (2012	1	1	1	0	1	0	4	Intermediate
Mohanty (2011)	1	1	1	1	1	0	5	High
Themistoclakis (2008)	1	0	0	0	1	0	2	Low
Dixit (2008)	1	1	1	0	1	1	5	High
Gertz (2011)	1	1	1	0	1	1	5	High
Naruse (2011)	1	0	0	0	1	0	2	Low
Yagashita (2011)	0	0	0	0	1	0	1	Low
Shim (2011)	1	1	1	0	1	0	4	Intermediate
Winkle (2011)	1	0	0	1	1	0	3	Intermediate