



Preoperative atrial fibrillation portends poor outcomes after coronary bypass graft surgery: A systematic review and meta-analysis


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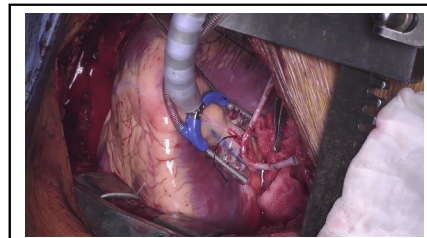
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Atrial fibrillation (AF) is the most common abnormal cardiac rhythm, with an estimated prevalence of 4% in the Australian population older than the age of 30 years.¹ The incidence of AF steadily increases with age; the prevalence in those older than 80 years is up to 15%.² The loss of coordinated atrial activity by AF predisposes patients to thrombus formation and, subsequently, embolic stroke.³ Moreover, chronic AF has been associated with a 2-fold increase in the risk of premature death.³

The demographic profile of patients undergoing coronary artery bypass graft (CABG) surgery has significantly changed in the past 2 decades as the result of an increased use of coronary stents and the aging population of developed countries. Increasingly, older patients with a greater incidence of comorbidities including valvular disease, diabetes, and impaired ventricular function are undergoing CABG.⁴⁻⁶ These factors are all associated with an increased risk of AF.⁷ Hence, it is imperative to understand the clinical implications of preoperative atrial fibrillation (preAF) for patients undergoing CABG. Some cohort studies have demonstrated that preAF may be an independent risk factor for poorer perioperative outcomes and reduced long-term survival.⁸⁻¹² However, there has only been a limited evaluation of preAF in the context of CABG surgery, and the EuroSCORE has not recognized preAF as a risk modifier. Moreover, the impact of preAF on clinical outcomes according to revascularization strategy (on-pump or off-pump CABG) remains largely unexplored.



Off-pump coronary artery bypass graft (OPCAB) surgery of the inferior wall.

Central Message

Preoperative atrial fibrillation portends poorer outcomes in patients undergoing CABG, regardless of revascularization strategy.

Perspective

Atrial fibrillation (AF) is present in up to 10% of patients undergoing CABG surgery. There is uncertainty about the prognostic implications of AF in patients undergoing CABG. Our study demonstrates, through a meta-analysis, that AF portends poorer early and late outcomes after CABG.

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The primary aim of this of this meta-analysis was to evaluate the impact of preAF on short- and long-term outcomes after CABG surgery. As a secondary outcome, the impact of preAF on clinical outcomes depending on revascularization strategy (on-pump vs off-pump) was explored. Our hypothesis is that preAF has a negative impact on early and late outcomes after CABG surgery.

METHODS

This systematic review and meta-analysis was conducted and presented in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.¹³ The study was approved by the local ethics committee.

Search Strategy and Study Selection

Electronic searches were performed with Ovid Medline, Embase, and Cochrane Central Register of Controlled Trials from their dates of inception to January 2016. The search terms “coronary artery bypass”

TABLE 1. Summary of study characteristics

	Study Period	Institution	Type of CABG Surgery	Study design	Follow-up, y	Number of patients		
						AF	No AF	Total
Ad and colleagues, 2009 ¹⁷	2002-2003	Society of Thoracic Surgeons National Adult Cardiac Surgery Database	ONCABG	Retrospective OS	Perioperative	15,755	265,814	281,569
Al-Sarraf and colleagues, 2012 ⁹	2000-2008	St James's Hospital	ONCABG	Retrospective OS	Perioperative	413	3364	3777
Attaran and colleagues, 2011 ¹⁰	2000-2010	Liverpool Heart and Chest Hospital	ONCABG + OPCABG	Retrospective OS	10*	477	9984	10,461
Banach and colleagues, 2008 ¹⁸	2000-2004	Department of Cardiac Surgery, Medical University Lodz, Poland	ONCABG	Retrospective OS	3*	174	2826	3000
Boning and colleagues, 2015 ¹⁹	2008-2011	Multicenter	ONCABG + OPCABG	Retrospective OS	Perioperative	232	2071	2303
Bramer and colleagues, 2010 ²³	1998-2007	Catharina Hospital, Eindhoven	ONCABG	Retrospective OS	4.6 ± 2.9	221	8630	8851
Fukahara and colleagues, 2010 ²⁰	2000-2005	University of Toyama, Japan	OPCABG	Retrospective OS	3.3 ± 2.7	26	487	513
Ngaage and colleagues, 2007 ⁸	1993-2002	Mayo Clinic College of Medicine	ONCABG	Retrospective OS	6.7*	257	269	526
O'Neal and colleagues, 2013 ²¹	2002-2011	East Carolina Heart Institute	ONCABG	Retrospective OS	4.2 [1.85-6.55]	263	5175	5438
Quader and colleagues, 2004 ²²	1972-2000	The Cleveland Clinic Foundation	ONCABG	Retrospective OS	12.6 ± 7.3	451	46,533	46,984
Rogers and colleagues, 2006 ¹²	1996-2002	Patient Activity Tracking System Database	ONCABG	Retrospective OS	5*	125	4917	5042
Saxena and colleagues, 2015 ¹¹	2001-2009	Australasian Society of Cardiac and Thoracic Surgeons	ONCABG	Retrospective OS	3.08†	1312	20,222	21,534

Data presented as mean ± standard deviation or median [interquartile range], unless otherwise stated. CABG, Coronary artery bypass graft surgery; AF, atrial fibrillation; ONCABG, on-pump coronary artery bypass graft surgery; OS, observational study; OPCABG, off-pump coronary artery bypass graft surgery. *Median. †Mean.

OR "CABG" were combined with "atrial fibrillation" AND ("baseline OR "pre-operative") as key words and Medical Subject Headings terms. This was supplemented searching the reference lists by hand of key reviews and all potentially relevant studies.

Two reviewers (A.S., S.A.V.) independently screened the title and abstract of records identified in the search. Full-text publications were subsequently reviewed separately if either reviewer considered the manuscript as being potentially eligible. Disagreements regarding final study inclusion were resolved by discussion and consensus.

Eligibility Criteria

Eligible studies were those reporting on clinical outcomes of isolated CABG according to the presence or absence of baseline AF. Both

randomized controlled trials and observational studies were eligible for inclusion. Noncomparative studies lacking a control group of patients without preAF were excluded. Studies presenting mixed data for different cardiac surgeries were only included if clinical outcomes for the isolated CABG cohort were separately reported. Studies reporting outcomes of patients undergoing concomitant AF surgery were excluded.

All publications were limited to those involving human subjects and written in English. Abstracts, case reports, conference presentations, editorials, and expert opinions were excluded. Studies with fewer than 100 patients in either arm were also excluded. Review articles were omitted because of potential publication bias and duplication of results. When institutions published duplicate studies with accumulating numbers of patients or increased lengths of follow-up, only the most complete reports were included for quantitative assessment.

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