

# Bioprosthetic Heart Valves: Can they be Anticoagulated with NOACs?

## Abstract

Bioprosthetic heart valve thrombosis is very rare. In fact, bioprosthetic valve dysfunction has been established that can be present by means of early valve thrombosis or late prosthetic leaflets degeneration. While early anticoagulant therapy with anti-vitamin K agents in bioprosthetic heart valves is justified, there is no unified standards about the long-term anticoagulation regimen among the several practice guidelines. When AF is present, current indication is a long-term anti-vitamin K agents treatment. The wide-spread use of non-vitamin K antagonist oral anticoagulants (NOACs) in cases of "non-valvular" AF has been evident in the last years. However, they have only been restricted for cases with "non-valvular" AF in the current disposable trials. In cases undergone bioprosthetic replacement or valve repair with postoperative "valvular" AF, anti-vitamin K agents are indicated. "Valvular" AF is a formal indication for long-term anti-vitamin K agents therapy. Involved mechanisms in cloth formation among "valvular" AF, "non-valvular" AF and bioprosthetic seems to be subtly different. Left atrial appendage is the main emboli source of the heart, principally in cases with AF. The actual proposal here is the use of non-vitamin K antagonist oral anticoagulants (NOACs) as anti-thrombotic long-term regimen in cases undergoing bioprosthetic heart valve replacement or valve repair plus left atrial appendage removal with postoperative "valvular" AF.

**Keywords:** Anticoagulation therapy; Anti-vitamin K agents; Atrial fibrillation; Heart valve bioprosthetic; Valve repair; NOACs

## Mini Review

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## Introduction

According to current American College of Chest Physicians Evidence-Based Clinical Practice Guidelines for antithrombotic therapy and prevention of thrombosis, after the third postoperative month, all patients with mitral or aortic valve biological replacement, or valve repair in sinus rhythm can be treated without AVK therapy, in the absence of any other thrombogenic condition. By contrast, if "valvular" AF is present, AVK long-term therapy is indicated [1]. There is no clear consensus about the term "valvular" AF. The American College of Chest Physicians AF guidelines define "valvular" AF as concomitant with mitral stenosis or prosthetic heart valve [2]. The European Society of Cardiology (ESC) guidelines on AF define "valvular" AF as related to rheumatic valvular disease (often mitral stenosis) or prosthetic heart valves [3]. The 2014 American Heart Association/American College of Cardiology/Heart Rhythm Society AF guidelines define "valvular" AF related to rheumatic mitral stenosis, a mechanical or bioprosthetic heart valve or mitral valve repair [4].

The pathogenesis of thrombosis between mechanical prosthesis and other forms of "non-valvular" AF is substantially distinct. Currently, there is no doubt about patients with AF and a mechanical heart valve should be treated with AVK therapy [1]. However, after bioprosthetic heart valve replacement or after valve repair with AF, it seems that the risk of thromboembolism is not markedly different from other forms of "non-valvular" AF. This is especially true after the third postoperative month, once

endothelium has covered all the dacron cuff of the bioprosthesis. The incidence of thromboembolism in these patients has been reported from 0.37 % [5] up to 6% [6], which is very similar to that found in age-matched AF population with risk factors. The attributable risk for stroke in AF goes from 1.5% for those aged 50-59 years to 23.5% for those aged 80-89 years [7]. Even when possible subclinical leaflet thrombosis in TAVR has been reported in cases non-treated with AVK agents [8], we need more data to answer a list of major questions raised by this preliminary study [9].

Non-vitamin K antagonist oral anticoagulants (NOACs) have only been restricted for cases with "non-valvular" AF in the current disposable trials. Only very few patients with mitral bioprosthesis have been enrolled in the ARISTOTLE and ENGAGE-AF-TIMI48 trials [10,11]. In the current year, Duares et al. have compared the use of dabigatran against warfarin after bioprosthesis valve replacement for the management of atrial fibrillation postoperatively. They found that the use of dabigatran appears to be similar to warfarin in preventing the formation of intracardiac thrombus [12].

Left atrial appendage is the main emboli source of the heart [13]. When left atrial appendage has been surgically removed and a bioprosthesis implanted, major efforts must be focused on treating AF. Moreover, it could be considered NOACs as anticoagulant therapy after the first 90 postoperative days. There is not enough evidence about NOACs in "valvular" AF. More studies comparing NOACs and VKAs in this setting are needed.

In fact, The American College of Chest Physicians AF guidelines recommend only aspirin as anti-thrombotic long-term therapy for aortic/mitral bioprosthesis and mitral valve repair after the third postoperative month in absence of any other thrombogenic condition, including AF [1]. So, it seems reasonable that in a case such as exposed above (left atrial appendage resection and bioprosthetic replacement or valve repair) NOACs may be useful in the treatment for concomitant AF after 3 months following surgery. Trials double-blind, placebo-controlled studies validating its effectiveness are needed.

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