

Commentary

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Daily atrial fibrillation issues: the view-point of a practicing surgeon

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Abstract

Atrial Fibrillation (AF) is encountered daily by the cardiac surgeon. How to deal with a patient with pre existing AF who is on anticoagulation taking into account urgency, type of anticoagulation and procedure planned are some of the daily considerations encountered. When to start anticoagulation and other pharmacotherapy after the occurrence of post-op atrial fibrillation and the use of ablative therapies in view of bleeding and other complications are daily judgement calls made by surgeons. Whom to offer combined interventions are decisions the surgeon faces daily. While guidelines help in broad strokes, there is little help for individual situations which is due to structural problems and absence of universal definitions resulting in the lack of granular data needed for practical individualized daily decision making.

Keywords: Cardiac surgery, atrial fibrillation, anticoagulation, antiarrhythmic therapy, surgical ablation, guidelines

INTRODUCTION

Atrial fibrillation (AF) is the most common dysrhythmia that a cardiac surgeon encounters. It is estimated that 0.4%-1.0% of the general population is afflicted. The presence of AF is highly linked to age and may exceed 10% in patients > 80 years^[1]. Frequency and the effect on outcomes have been studied for the past half century. Over this time we have learned that all surgical patients are at risk to experience atrial fibrillation. We have further learned that despite many technological and procedural improvements the occurrence of atrial fibrillation and particularly post-operative atrial fibrillation (POAF), has barely



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changed. Although no longer debated if it affects outcomes (it does), and despite its frequency, there remains considerable uncertainty how to deal with practical issues on a daily basis. The following are reflections from the view-point of the practicing surgeon.

QUESTIONS ASKED IN PRE-OP ATRIAL FIBRILLATION

One of the first questions to deal with in a patient deemed in need of cardiac surgery who also has AF is how to handle the anticoagulation. Most patients are either on warfarin or a novel anticoagulant (NOAC) with or without an antiplatelet agent. Interruption of anticoagulation has been studied predominantly for non-cardiac surgical procedures. A meta-analysis looking specifically at the interruption of NOAC's in patients with AF found that interruption was associated with 0.4% thromboembolic and 1.8% major bleeding events at 30 days post surgery^[2]. Guidelines for the perioperative interruption of anticoagulation particularly in cardiac surgery exist, but are buried within other categories of patients^[3,4]. Urgency and the type of procedure planned are likely to play a major role, but are less well addressed. Recommendations to questions such as how many days in advance of surgery should anticoagulants be held, are there patients who need to be converted to intra-venous Heparin, hence admitted early, what lab test and when should be obtained in order to maximize safety and avoid costly cancellations, exist^[4], but details are often institutionally protocolized^[3,5,6]. The impact of case urgency in AF patients on anticoagulation has never been evaluated.

It has been reported that AF in healthy patients without structural heart problems or other comorbidities seems not to affect longevity^[7]. This is not the case for the vast majority of cardiac patients and appears to have the most impact on patients with valvular heart disease. A study from Canada found that the prevalence of AF in patients requiring heart surgery reached from 11.3% for coronary artery bypass grafting (CABG) to 30% for valve cases and that preoperative AF was associated with decreased event free survival (adjusted hazard ratio 1.55)^[8]. An other large prospective study from Australia showed that short and long-term outcomes were worse in patients requiring valve surgery for non-rheumatic disease with 15% less survival at 10 years in AF patients. The study did not distinguish patients who did or did not receive ablative therapy^[9]. The next question in an AF patient needing heart surgery is, are there any technical considerations in the conduct of the planned operation which need to be added or altered because of AF? In other words should the AF be addressed, and if so when: before or after the planned procedure? Here we have some help from STS guidelines: *quote from the executive summary*: “Surgical ablation for AF can be performed without additional risk of operative mortality or major morbidity, and is recommended at the time of concomitant mitral operations to restore sinus rhythm. (Class I, Level A) Surgical ablation for AF can be performed without additional operative risk of mortality or major morbidity, and is recommended at the time of concomitant isolated aortic valve replacement, isolated coronary artery bypass graft surgery, and aortic valve replacement plus coronary artery bypass graft operations to restore sinus rhythm. (Class I, Level B nonrandomized). Further, it is reasonable to perform left atrial appendage excision or exclusion in conjunction with surgical ablation for AF for longitudinal thromboembolic morbidity prevention. (Class IIA, Level C limited data) At the time of concomitant cardiac operations in patients with AF, it is reasonable to surgically manage the left atrial appendage for longitudinal thromboembolic morbidity prevention. (Class IIA, Level C expert opinion)”^[9]. It is clear that surgical ablative therapy carries the highest success rates when performed in conjunction with mitral procedures. In the United States this therapy is now applied to the majority of AF patients requiring mitral procedures [$> 60\%$]. In expert hands post-op AF in these procedures, the most favorable category, has decreased by 50% at the cost of a greater likelihood of requiring a permanent pacemaker^[10]. In all other categories the likelihood of an AF patient receiving a concomitant surgical ablation is only about half of that for mitral procedures^[11,12]. The success rate seems to be lower in some studies, which is attributed to the fact that it is inherently a different procedure because the atria are

not necessarily opened and many surgeons prefer less invasive approaches^[13]. Other studies however report efficacy rates similar to mitral valve procedures. While lesion sets and the use of different energy sources are hotly debated issues, the guidelines for instance do not address when during the conduct of an operation the AF should be dealt with (before or after the index procedure, combination). The lowest denominator with some consensus for the minimal intervention seems to be to exclude the left atrial appendage with a clip or sutures and that stapling the appendage is unreliable and should not be done^[14].

Aside from technical aspects, further considerations are how to handle antiarrhythmic drugs. Short of beta blockers which we know should not be interrupted, how to handle class III antiarrhythmics is less clear. If at all and when they should be held and if for instance amiodarone should be loaded pre or intra-op, the latter being a common practice, has not been studied well although European Association for Cardio-Thoracic Surgery (EACTS) and American College of Cardiology (ACC) have prophylaxis guidelines. Also not well studied is if a patient on pre-op amiodarone should receive an extra intra-op loading dose or just a maintenance dose or nothing due to the long half-life. Suffice it to say amiodarone is often continued for 2 to 3 months post-op^[15].

POST-OP CONSIDERATIONS IN PATIENTS WITH PREEXISTING AF

Up until recently the demonstration of a long-term survival benefit for concomitant operations for AF patients has been difficult. The amount of data showing a benefit is however increasing, although the argument made by the guidelines is still that the addition of ablative surgery is not inferior/detrimental to the patient and improves quality of life^[10,16,17]. From a practical stand-point the next question to be answered is: when should anticoagulation be reinstated and with what? The Society of Thoracic Surgeons (STS) guidelines state it is reasonable to reinstitute anticoagulation for 2 to 3 months. The perioperative management of patients on chronic oral anticoagulant therapy (now including not only Warfarin but also NOAC's) is a common but complex clinical problem with little high quality data for the practitioner^[2]. The subject is addressed in the EACTS guidelines^[4]. In the US, a common practice is to start anticoagulation after 48 to 72 hours post-op^[6]. This time point is empiric and there exists no randomized data looking at timing in this patient subset. The same is true for dosing, if the patient was on warfarin, the pre-op dose is commonly restarted. If the patient was on a NOAC it has been proposed to restart the same at 72 hours although a lot of teams would use low molecular weight heparin (LMWH) for bridging until discharge^[5]. There is data particularly from Scandinavia suggesting that dual antiplatelet therapy particularly in the case of CABG in this patient subset is not justified as increased bleeding is already recognized.

What to do with the patient who either remains in AF or goes back into AF in the early post-op phase is also unclear. The STS guidelines suggest that it is common to start the patient on amiodarone in the operating room. They further suggest that if the patient is in AF after 3 months consideration to a catheter AF ablation should be given. If for instance an attempt at cardioversion while still in the hospital or the application of additional amiodarone loading doses are reasonable in this circumstance has never been systematically looked at although we know that in the post-op de-novo AF population rhythm control has no advantage over rate control^[18].

QUESTIONS IN POAF

POAF is the most common complication after cardiac surgery. It has been reported in 20% to 40% of cases and a recent large meta-analysis found an incidence of 23.7%^[19]. As a matter of fact, it occurs so frequently that a lot of physicians don't think of it as a complication and for instance no International Classification of Diseases (ICD)-10 code is assigned to POAF. Historically it has been thought of as a nuisance which had to be dealt with, but was self-limiting. This assumption was based on the finding that POAF is predominantly

self-terminating regardless of therapeutic intervention at 6 to 12 weeks^[20]. The reasons to deal with it are discomfort/anxiety, cognitive decline, hemodynamic compromise, increased stroke risk among others, and the independent association with increased hospital stay and health care costs^[21]. Only recently has it become clear that ischemic stroke and death are increased at up to 10 years after POAF^[22]. POAF occurs early after surgery (70% between day 2 and 4, 94% by day 6). This poses a dilemma for treatment: POAF causes increased cerebrovascular events but early anticoagulation has been associated with increased cardiac tamponade and delayed pericardial bleeding. There are no controlled trials for the initiation of anticoagulation for AF after cardiac surgery. Guidelines taking this dilemma into account have suggested anticoagulation within 72 hours after AF onset as a low quality evidence recommendation^[4,20]. Guidelines do not address specifically what medication or even what group of anticoagulants to use^[23]. They do suggest LMWH as bridging agents.

Although after the cardio thoracic network trial was published in the *New England Journal* presumably settling the issue of rate control versus rhythm control after cardiac surgery, it appears that in practice many programs still try to achieve both with the use of amiodarone being a favorite^[19]. Others have protocols prescribing early cardioversion. For at least the past two decades multiple studies reflected in repeat guidelines have shown that rate control for AF is usually required and that β Blockers are very effective followed by non-dihydropyridine calcium channel blockers or amiodarone in that order for the quality of available data which is considered overall high quality evidence^[4,23]. Because of the time it takes to achieve the desired effect and because none of the medications are 100% successful the search for optimal treatment and for prophylaxis continues. Publications about POAF make up the bulk of the AF literature.

CONCLUSION

From a practical perspective, the biggest knowledge deficiency is a lack of data and guidelines on how to optimally handle anticoagulation in the perioperative period. Details matter, particularly in cardiac surgery, but also for the rest of surgery. It is astounding that despite a huge amount of work and the size of the problem so little is known about this aspect of daily practice.

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