How effective is bipolar radiofrequency ablation for atrial fibrillation during concomitant cardiac surgery?

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Abstract

A best evidence topic in cardiothoracic surgery was written according to a structured protocol. The question addressed was whether, in patients undergoing cardiac surgery, concomitant bipolar radiofrequency ablation had an acceptable success rate to justify the additional procedure. Altogether 263 papers were found using the reported search, of which 12 represented the best evidence to answer the clinical question. The authors, journal, date and country of publication, patient group studied, study type, relevant outcomes and results of these papers are tabulated. The consensus in the literature was that bipolar radiofrequency ablation was highly successful in restoring sinus rhythm. One meta-analysis of six non-randomized studies demonstrated that 76% of patients were in sinus rhythm compared with 16% in atrial fibrillation 3 months postoperatively. One randomized controlled trial found that the sinus rhythm conversion rate for any maze procedure was highly significant compared with the control group ($P = 0.001$). Another found that Cardioblate radiofrequency ablation was significantly better at restoring sinus rhythm at 1 year (75 vs 39% control, $P = 0.019$). Prospective studies showed a similar rate of sinus rhythm return at 1 year (89%). Notably some studies demonstrated a significant reduction in the New York Heart Association class when sinus rhythm was restored compared with those remaining in atrial fibrillation ($P < 0.0001$), demonstrating the value of this procedure beyond simply restoring sinus rhythm. In another study, the investigators found that both ablation and total procedure times were shorter with bipolar compared with monopolar ablation. These authors strongly recommend bipolar radiofrequency ablation due to a shorter procedure time, ability to avoid performing a standard left atriotomy and a greater guarantee of transmurality. With the current limited evidence, we conclude that bipolar radiofrequency ablation has a higher success rate in restoring sinus rhythm as an adjunct to cardiac surgery compared with no ablation for at least 1 year. The procedure had a high survival rate. There is randomized evidence to suggest the superiority of bipolar radiofrequency ablation over microwave ablation but limited evidence to suggest the superiority of bipolar over unipolar radiofrequency ablation. Factors found to be accurate predictors of ablation failure include a larger preoperative atrial diameter, permanent vs paroxysmal atrial fibrillation and longer duration of atrial fibrillation.

Keywords: Atrial fibrillation • Radiofrequency ablation • Bipolar • Mitral • Surgery

INTRODUCTION

A best evidence topic was constructed according to a structured protocol. This is fully described in the ICVTS [1].

THREE-PART QUESTION

In [patients undergoing concomitant cardiac surgery for atrial fibrillation (AF)] is [bipolar radiofrequency ablation (RFA)] compared with [no treatment, catheter-based therapy or other sources of energy] an effective procedure for returning the patient to [sinus rhythm (SR)].

CLINICAL SCENARIO

You have under your care a 57-year old patient with mitral regurgitation and paroxysmal AF. You would like to treat your patient’s AF during the procedure. You usually use a bipolar RF device to perform pulmonary vein isolation, but a colleague suggests that RF vein does not have acceptable success rates with regard to SR restoration. You resolve to check from the literature whether or not bipolar ablation is acceptable.

SEARCH STRATEGY


SEARCH OUTCOME

Two hundred and sixty-three papers were found using the reported Medline search. Major exclusion criteria included
studies using only unipolar ablation or other energy modalities [such as microwave (MW) or cryoablation], studies where the ablation technique was ambiguous or not directly specified and papers with highly variable or undisclosed follow-up time. From the search, 12 papers were identified that provided evidence addressing the specific question. These are presented in Table 1.

RESULTS

Chiappini et al. [2] performed a meta-analysis that identified 6 non-randomized studies that included 451 AF patients undergoing cardiac surgery with concomitant RFA. The overall survival rate was 97.1% with 76% freedom from AF at a mean follow-up period of 13.8 months.

Srivastava et al. [3] and Von Oppell et al. [4] conducted randomized control trials. Srivastava et al. compared biatrial (BAM), left atrial (LAM) and pulmonary vein isolation maze (PVIM) procedures with a control no-maze group. The maze procedures elicited a good success rate (over 50%) of SR maintenance at 6 months. The SR conversion rate for BAM, LAM and PVIM was highly significant compared with the control group (P = 0.001) but there was no significant difference between individual maze procedures. The average extra cross-clamp time required was ~5–7 min for maze procedures.

Von Oppell et al. [4] compared groups undergoing Cardioblate RF ablation and concomitant surgery vs cardiac surgery alone in patients with persistent or permanent AF. Cardioblate ablation was significantly better at restoring SR at 1 year (75 vs 39%, P = 0.019). An average 30 min extra was required both for bypass and cross-clamp for Cardioblate operations. After performing the first six cases with bipolar only ablation, the authors state that it was difficult to ensure a confluent ablation line between the left pulmonary veins and the mitral valve anulus and the tricuspid valve anulus with the bipolar device alone without potentially injuring coronary arteries. Subsequently, a monopolar pen was used for these lines.

Raman et al. [5] and Benussi et al. [6] both studied the use of Cobra RF ablation on AF patients undergoing concomitant cardiac surgery. Raman studied 132 patients with all forms of AF across 20 centres and found an 84% SR maintenance rate at 3 months (72 of 87), 90% at 6 months (45 of 50) and 100% at 12 months (however, n = 12). These operations required 12–14 min extra cross-clamp time.

Comparatively, Benussi et al. [6] studied 90 patients with AF that was permanent or refractory to anti-arrhythmics and showed 79% maintained in SR at 3 months, 87% at 6 months and 89% at 1 year. Although the success rate appears high, the poor follow-up rates (<50% at 12 months) make conclusions drawn from these success rates potentially unreliable.

Onorati et al. [7] focused on heart failure patients undergoing mitral surgery and RF ablation. SR prevalence was good at 74, 64 and 64% at 6, 12 and 18 months, respectively. They showed that restoring SR was associated with improving heart failure. Freedom from congestive heart failure (CHF) was 94% in SR patients compared with 69% for AF patients (P = 0.018). The New York Heart Association class was also ameliorated for those in SR compared with AF at 6 months (1.4 vs 2.7) and 18 months (1.2 vs 1.9, P < 0.0001).

Martin-Suàrez et al. [8] retrospectively compared Cobra endocardial and epicardial monopolar RF ablation with bipolar ablation. The overall incidence of SR at the end of follow-up was higher using endocardial monopolar ablation or the bipolar RF ablation compared with the epicardial monopolar ablation (P = 0.01). The overall freedom from AF was significantly higher using bipolar ablation than either monopolar endocardial or epicardial ablation (P = 0.01).

Gillinov et al. [10] employed Atricure (West Chester, OH, USA) bipolar RF ablation in patients with permanent, persistent and paroxysmal AF undergoing concomitant cardiac surgery. AF recurrence was assessed using electrocardiogram follow-up at 1, 3, 6 and 12 months. The prevalence of AF peaked at 38% 2 weeks postoperatively. By 6 months, the prevalence decreased to 13% before increasing to 16% at 1 year. Comparatively, Geidel et al. [9] used either Cobra monopolar or Atricure bipolar RF ablation solely on patients with permanent AF and employed a longer follow-up but had similar results. At 3 and 30 months, the SR conversion rate was 73 and 77%, respectively. The survival rate was 96% at 30 months. Both ablation and total procedure times were shorter with bipolar compared with monopolar ablation. The authors strongly recommend bipolar RF due to the shorter procedure time, ability to avoid performing a standard left atriotomy and a greater guarantee of transmurality.

Three papers [6, 9, 10] utilized logistic regression analysis to demonstrate that permanent AF (P < 0.0001), a longer preoperative AF duration (P = 0.005) and larger preoperative left atrial size (P = 0.018) are predictive of postoperative AF recurrence.

Tekumit et al. [11] found SR conversion rates of 75, 78 and 79% at 3, 6 and 12 months, respectively. They concluded that LA bipolar RFA did not add significantly to the cardiopulmonary bypass time and one had no major complications from the procedure itself. They further suggested that a partial lesion as opposed to the traditional Cox-maze III complete lesion could still be effective in treating AF. Benussi et al. [12] further found that performing the mitral line with bipolar RFA is safe and cost effective. They compared their bipolar only RFA group with a control group that had the mitral line carried out using unipolar RFA. There was no significant difference in the SR recovery rate but there was a major cost difference (per patient cost of ablation devices €2403 in the control group vs €1245 in the study group; P < 0.0001).

Lin et al. [13] conducted a prospective trial in which patients were randomized to either undergo MW (n = 94) or RF (n = 93) ablation. At all follow-up time points ranging from discharge to 24 months, there was a significant difference in the numbers of patients remaining in SR, which favoured RF over MW ablation. The authors stated that the uncertainty in transmurality and the continuity of the lesions might have contributed to the inferior success rates of MW relative to RF ablation.

CLINICAL BOTTOM LINE

Bipolar RFA has a higher success rate in restoring SR as an adjunct to cardiac surgery compared with no ablation for at least 1 year. On average, this requires 15 min of additional cross-clamp time. The procedure had a high survival rate. While one prospective trial has provided evidence of an advantage of using bipolar RFA over MW, there is limited evidence to suggest the superiority of bipolar over unipolar RFA. In the UK, NICE guidelines have concluded that RF ablation is ‘safe enough and works well enough for use in the NHS’.
Table 1: Best evidence papers

<table>
<thead>
<tr>
<th>Author, date and country</th>
<th>Study type</th>
<th>Patient group</th>
<th>Outcomes</th>
<th>Key results</th>
<th>Comments</th>
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</table>
| Chiappini et al., 2004, Asian Cardiovasc Thorac Ann, Italy [2] | Meta-analysis (level 2a) | Six non-randomized studies were identified between 1997 and July 2003 that included 451 patients | Rhythm at 3 months: | 76% (325/426) in SR, 4% (17/426) in atrial rhythm, 16% (67/426) in AF | None of the studies were completely randomized. All were retrospective observational studies of cohorts of consecutive patients with concomitant RF ablation and open heart surgery. The overall freedom from AF was 76.3% at a mean follow up follow-up of 13.8 months. The RF ablation came at the cost of an average 12 minutes of extra ischaemic time.

- Additional ischaemic time for RF ablation: 11.8 ± 3.6 min
- Complications: Repeat thoracotomy (19), Low cardiac output requiring an intra-aortic balloon pump (7), Sternal wound infection (2), Pneumothorax (2), Endocarditis (1), Stroke (1), GI bleed (1), Implantation of dual chamber pacemakers (4)

| Srivastava et al., 2008, Heart Lung Circ, India [3] | Single blind randomized prospective study (level 1b) | 160 patients with rheumatic valvular disease in chronic AF underwent either biatrial maze (BAM), left atrial maze (LAM), pulmonary vein isolation maze (PVIM) or no maze (NM) procedures between April 2000 and September 2005 | SR at discharge: | NM: 22.5% | This RCT showed that all 3 studied maze procedures provide an improved return to SR and a decreased number of patients in AF at all time points compared to with NM. This was at the expense of ~5–7 minutes of extra cross-clamp (CC) time.

- SR at 6 months: NM: 22.5%, BAM: 57.5%, LAM: 52.5%, PVIM: 50%
- SR at mid-term follow-up: NM: 20%, BAM: 62.5%, LAM: 57.5%, PVIM: 67.5%
- Complications: Early mortality: 2 in NM, 4 deaths in BAM, 3 in LAM, 4 in PVIM

Cryoacllation was applied at the AV junction and coronary sinus for LAM and BAM.

The manuscript did not state the manufacturer for the device used to create the ablation set.

- Extra CC time required: 6.85 ± 1.37 min
- LA: 7.1 ± 1.57 min
- PVIM: 5 ± 1.72 min

The RA part of BAM was done with the CC removed during the reperfusion time.
<table>
<thead>
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<tr>
<td>Von Oppell et al., 2009, Eur J Cardiothorac Surg, UK [4]</td>
<td>Single blind randomized prospective study (level 1b)</td>
<td>Between January 2004 and November 2006, 49 patients were randomly assigned to Cardioblate RF ablation in addition to cardiac surgery (n = 24) or only planned cardiac procedure (n = 25)</td>
<td>SR at 1 year</td>
<td>Cardioblate group: 75% Control group: 39% ( P = 0.019 )</td>
<td>Although study groups appear small, they were powered appropriately under the assumption of that 55% in Cardioblate and 20% in control would convert to SR</td>
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<td>Raman et al., 2003, J Thorac Cardiovasc Surg, Australia [5]</td>
<td>Prospective cohort study (level 2a)</td>
<td>Initially, the ablation pattern was made only with the bipolar device in six 6 patients. However, concerns as to the completeness of the mitral annular line led us to use both the monopolar and bipolar Cardioblate devices in the subsequent 18 patients. The device used was a Medtronic CardioblateW Surgical Ablation System (Medtronic Inc., Minneapolis, MN, USA)</td>
<td>CC and bypass time (CPB)</td>
<td>Cardioblate group</td>
<td>Authors note that it is difficult to ensure a confluent ablation line between the left pulmonary veins and the mitral valve annulus and the tricuspid valve annulus with the bipolar device alone without potentially injuring coronary arteries, and they felt it advisable to use the monopolar pen for these lines for subsequent procedures</td>
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<td>Benussi et al., 2005, J Thorac Cardiovasc Surg, Italy [6]</td>
<td>Prospective study (level 2a)</td>
<td>90 patients with AF (&gt;6 months or refractory to anti-arrhythmic medications) between February 2003 and March 2004 RF was performed concomitant to cardiac surgery with a novel bipolar RF ablation system (Cobra Bipolar, Boston Scientific, San Jose, CA, USA)</td>
<td>SR</td>
<td>At discharge: 53/89 (60%; 95% CI: 49%–70%) Proportion with recovered SR: At 3 months: 79% (95% CI: 68%–87%) At 6 months: 87% (95% CI: 75%–95%) At 1-year: 89% (95% CI: 65%–99%)</td>
<td>Bipolar RF devices may not consistently produce complete transmurality depending upon the presence of epicardial fat</td>
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<td>Extra CC time</td>
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<td>12–14 min once surgeons had passed the learning curve</td>
<td>There was no significant difference between the treatment outcome and the Cardioblate device used, i.e. between bipolar device only and both monopolar and bipolar devices</td>
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<td>Mortality</td>
<td></td>
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<td>1 due to rectus muscle haematoma causing acute renal failure and respiratory insufficiency</td>
<td>Authors conclude that surgical RFA radiofrequency ablation can be performed safely as an adjunct to conventional cardiac surgery</td>
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*This paper showed very high level of SR recovery which even improved with time up to one year. Recurrences of AF were treated by improving the medical treatment and when this failed they had at least 1 attempt of DC shock*
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</table>
| Onorati et al., 2009, J Heart Valve Dis, Italy [7] | 45 patients with heart failure and longstanding AF (>5 years) | Complications | 2 major complications 1 permanent pacemaker in patient with sick sinus syndrome | The main focus of the study was traditionally poor candidates—heart failure patients who had AF and were undergoing mitral surgery |}

Prospective cohort study (level 2b)

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<tr>
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</table>
| Martin-Suárez et al., 2007, Interact CardioVasc Thorac Surg, Italy [8] | 183 patients with permanent or persistent AF underwent cardiac surgery and one of three RF ablation procedures (A = endocardium monopolar [n = 40], B = epicardial monopolar [n = 33] or C = bipolar [n = 110]) between May 2001 and December 2005 | SR at the end of follow up | A = 75% (42.8 ± 18.9 months) B = 67.7% (32.5 ± 14.1 months) C = 79.4% (17.4 ± 10 months) | The main aim of this paper was to compare different forms of RF ablation. All three modalities showed an excellent restoration of SR even beyond one year |}

Retrospective study (level 2b)

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| Gillinov et al., 2005, J Thorac Cardiovasc Surg, USA [10] | 513 patients underwent AF ablation with bipolar RF using the Atricure (West Chester, OH, USA) bipolar RF system | Prevalence of AF | 2 weeks: 38% (CL 35%–41%) 6 months: 13% (CL 12%–15%) | This study demonstrated that RF bipolar ablation is excellent at reducing AF recurrence, since this peaks within 2 weeks and then diminishes over a year to just 16% |}

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<th>Author, date and country</th>
<th>Study type (level of evidence)</th>
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<td>Geidel et al., 2008, Thorac Cardiovasc Surg, Germany [9]</td>
<td>Prospective study (level 2a)</td>
<td>80 patients with permanent AF for at least 6 months underwent either monopolar (n = 20) or bipolar (n = 60) endocardial RF ablation concomitant to CABG and/or AV surgery between February 2001 and April 2006</td>
<td>SR</td>
<td>3 months: 73% (57/78) 30 months: 77% (59/77)</td>
<td>Monopolar SR conversion rate was 74% vs 78% in the bipolar rate. However, small population sizes and the heterogeneity of study populations did not permit formal comparison. Authors strongly recommend bipolar modality due to a shorter procedure time, ability to avoid performing a standard left atriotomy and greater guarantee of transmurality. The study was limited by a heterogeneous group of patients and operations and unreliable monitoring of SR—only one 24-hour ECG, no Holter monitoring.</td>
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<td>Tekumit et al., 2010, Cardiovasc J Afr, Turkey [11]</td>
<td>Prospective study (level 2a)</td>
<td>95 patients with mitral valve disease and persistent AF underwent mitral valve surgery and LA bipolar RFA radiofrequency ablation between October 2006 and July 2009</td>
<td>SR</td>
<td>3 months: 75% 6 months: 78% 12 months: 79%</td>
<td>Patients with AF and SR did not differ significantly in terms of the left atrial diameter, left ventricular end-diastolic and end-systolic diameter, ejection fraction, pulmonary artery pressure and left ventricular end-diastolic pressure. The increased left atrial diameter in patients with persistent AF did not reach statistical significance. Preoperative functional capacity, type and aetiology of the mitral valve lesion, presence of coronary artery disease, ablation technique, presence of hypertension or the type of mitral intervention did not affect the success of the ablation procedures. The authors noted the increased ease of the procedure and the decreased time needed with bipolar RFA.</td>
</tr>
<tr>
<td>Retrospective study (level 2b)</td>
<td>This was concomitant to another cardiac operation between November 2001 and January 2004</td>
<td>Complications</td>
<td>1 year: 16% (CL 13%–19%)</td>
<td>Stroke 2% TIA 1% Reoperation for bleeding 5%</td>
<td>This report documents early results with the application of bipolar RF to facilitate AF ablation in cardiac surgical patients. Key findings are the at following (1) the prevalence of AF peaks early after surgical intervention, and which then decreases to 16% at 1 year; (2) freedom from ablation failure is 72% at 12 months, and (3) recurrence of AF is influenced by the type and duration of AF, the choice of lesion set in permanent AF, and left atrial size.</td>
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Table 1:  Continued

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<tr>
<td>Benussi et al., 2008, Eur J Cardiothorac Surg, Italy [12]</td>
<td>From May 2005 to March 2007, 70 consecutive patients with permanent or persistent AF underwent concomitant AF treatment with bipolar RF</td>
<td>SR-experimental group</td>
<td>Discharge: 64% (45/70) 95% CI: 53–75% 6 months: 84% (56/67) 95% CI: 75–93%</td>
<td>compared to with Cox-maze III but did not quantify this</td>
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<td>A control group of 33 patients underwent concomitant ablation of AF using both bipolar and unipolar RFA during open-heart surgery from September 2004 to November 2006</td>
<td>SR-control group</td>
<td>Discharge: 55% (18/33) 95% CI: 38–72%</td>
<td>Permanent AF patients had a lower success rate at 6 months than those with persistent AF ($\chi^2 = 6.73; P = 0.009$)</td>
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<td>Cobra bipolar (Estech Inc., Camino Ramon, CA, USA) for 38 patients</td>
<td>CC and bypass time</td>
<td>Cardiopulmonary bypass: 98 ± 23 min.</td>
<td>There was no significant difference between bipolar RFA alone and control groups with regards to intra- and postoperative clinical variables</td>
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<td>BP2 (Medtronic Inc., Minneapolis, MN, USA) for 21 patients</td>
<td></td>
<td>Aortic CC: 76 ± 21 min</td>
<td>Cost per patient of the ablation devices was nearly doubled: €2403 ± 17 in the control group versus vs €1245 ± 50 ($P &lt; 0.0001$)</td>
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<td>Isolator (Atricure Inc., Cincinnati, OH, USA) for 11</td>
<td>Mortality and morbidity</td>
<td>No deaths. 2 patients were implanted with a permanent pacemaker for AV block</td>
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<td>Unipolar RFA used for the mitral line only in the control group</td>
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<td>No significant difference was found in the SR recovery rate between the two study groups indicating that bipolar RFA can be used effectively for the whole procedure</td>
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<tr>
<td>Lin et al., 2011, Thorac Cardiovasc Surg, China [13]</td>
<td>94 patients randomized to receive microwave MW ablation(MW) prior to valve surgery between 2006 and 2009. 93 patients were randomized in the other arm to receive RFA. The study used an MW ablation system to create overlapping endocardial lesions (Guidant, Afx, Inc., Fremont, CA, USA).</td>
<td>Patients in SR at discharge</td>
<td>MW: 66.7% (60/90) RF: 80.2% (73/91) $P = 0.039$</td>
<td>The authors concluded that bipolar RFA radio-frequency ablation is superior to microwave MW ablation for the treatment of permanent AF in patients undergoing valve surgery</td>
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<td>Patients in SR at the 3-month follow-up</td>
<td>MW: 72.2% (65/90) RF: 85.7% (78/91) $P = 0.026$</td>
<td>The freedom from AF recurrence was significantly higher in the radio-frequency RF group than in the MW microwave group at all time points</td>
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<td>Patients in SR at the 6-month follow-up</td>
<td>MW: 73.3% (66/90) RF: 87.9% (80/91) $P = 0.013$</td>
<td>The authors state that the continuity and transmurality of lesions is essential to ablation success and that transmurality in particular is harder to ensure with MW ablation</td>
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<td>Patients in SR at the 9-month follow-up</td>
<td>MW: 68.9% (62/90) RF: 84.6% (77/91) $P = 0.012$</td>
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<td>Patients in SR at the 12-month follow-up</td>
<td>MW: 67.8% (61/90) RF: 84.6% (77/91) $P = 0.008$</td>
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<td>Patients in SR at the 18-month follow-up</td>
<td>MW: 71.2% (42/59) RF: 88.7% (47/53) $P = 0.022$</td>
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<td>Patients in SR at the last month of follow-up</td>
<td>MW: 65.6% (58/90) RF: 81.3% (75/91) $P = 0.016$</td>
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Conflict of interest: none declared.

REFERENCES


eComment. Bipolar radiofrequency ablation for atrial fibrillation during concomitant cardiac surgery

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Structural heart disease is very often accompanied by atrial fibrillation (AF) and can worsen the patient’s condition perioperatively by haemodynamic in-adequacy and low cardiac output. Since its introduction in 1987 by James Cox, the surgical maze procedure became a “gold standard” in terms of restoration of sinus rhythm. Efforts to reduce surgical risk brought about new approaches to the problem with the use of different types of energy to perform transmural and linear lesions in the atria. Bipolar radiofrequency ablation is most effective in this respect according to data in the literature [1]. Within the period May 2010 to May 2012, 63 patients with concomitant heart pathology underwent bipolar radiofrequency ablation using the Atricure system (West Chester, OH, USA) due to persistent or long-standing persistent AF. Besides AF, other pathologies were treated: three left atrial myxomas, 12 mitral valve annuloplasties, 41 mitral valve replacements, and seven aortic valve replacements. In all 63 cases, the maze IV procedure was performed without significant influence on intervention and cross-clamping times (mean time of additional surgical ablation was 18 ± 3 minutes). During the acute period post surgery, no major surgical complications were observed. Two patients (3%) required dual-chamber pacemaker implantation because of sick sinus syndrome. All patients received amiodarone, if tolerated, or sotalol perioperatively and after discharge as the main anti-arrhythmic drug. The postoperative atrial tachycardia (PAAT) rate was assessed using repetitive 4-hour Holter monitoring at 3 (after blanking period), 6, 12, 18 and 24 months respectively. Paroxysm was considered significant if lasting more than 30 seconds. At 2-year follow up, most recurrences of PAAT were observed from 6 to 12 months after surgery (14–16%); from 12 to 24 months we observed a 12% recurrence rate. Basi et al. [1] include a strong statement arising from their meta-analysis that bipolar RFA is highly successful in restoring sinus rhythm and, as a result, improving heart failure [2]. There is also clear evidence that additional surgical ablation does not significantly affect postoperative morbidity and mortality and has an advantage in terms of transmurality and cost-effectiveness versus unipolar ablation and other sources of energy [3]. According to our data, bipolar RFA has a short learning curve, is simple to use in the operating theatre and is effective. It can be used in any case of concomitant heart surgery. In some cases, such as isolated AF refractory to antiarrhythmic drugs and multiple percutaneous attempts, bipolar RFA can also be recommended to patients through thoracotomy or thorascopy.

Conflict of interest: none declared

References

[1] Basi et al. [1] include a strong statement arising from their meta-analysis that bipolar RFA is highly successful in restoring sinus rhythm and, as a result, improving heart failure [2]. There is also clear evidence that additional surgical ablation does not significantly affect postoperative morbidity and mortality and has an advantage in terms of transmurality and cost-effectiveness versus unipolar ablation and other sources of energy [3]. According to our data, bipolar RFA has a short learning curve, is simple to use in the operating theatre and is effective. It can be used in any case of concomitant heart surgery. In some cases, such as isolated AF refractory to antiarrhythmic drugs and multiple percutaneous attempts, bipolar RFA can also be recommended to patients through thoracotomy or thorascopy.

eComment. Surgery to treat atrial fibrillation: Which technique is the best?

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I read with interest the article by Basu et al. [1]. There is no doubt that bipolar radiofrequency (RF) ablation is better than unipolar RF ablation to cure the atrial fibrillation (AF) because of the full transmurality achieved almost exclusively by the bipolar RF. I have discussed this matter previously [2,3]. The presumed basis of successful AF ablation is production of myocardial lesions that block the propagation of AF wave fronts from a rapidly firing triggering source or modification of the arrhythmogenic substrate responsible for re-entry. Successful ablation depends upon achieving lesions that are reliably transmural. The hypothetical scenario with the patient described by Basu et al. [1] corresponds to a Class IIa indication with supporting evidence graded as level C for concomitant surgical ablation of AF, the patient described by Basu et al. [1] corresponds to a Class IIa indication with supporting evidence graded as level C for concomitant surgical ablation of AF.