The Blanking Period after atrial fibrillation ablation: An European Heart Rhythm Association Survey on contemporary Definition and Management

Short Title: EHRA survey on BP

What´s new

- We report details on duration, frequency and management of early recurrences of atrial tachyarrhythmia (ERAT) in the largest physician-based survey focusing on the blanking period (BP) after AF ablation.
- ERATs are perceived to occur in 25% of patients, more often in persistent AF than paroxysmal AF patients.
- Late recurrences are perceived to occur in a median of 50% of patients with ERAT.
- Most respondents use a 90-day BP, although almost a fourth would recommend shortening the BP in patients with paroxysmal AF.
- Early re-ablation during the BP is most often performed in patients with multiple episodes of ERATs and in those with organized atrial tachyarrhythmias.

ABSTRACT

Background: The use a of a blanking period (BP) after an atrial fibrillation (AF) ablation procedure is a common practice, but recent data questions the benign nature of early recurrences of atrial tachyarrhythmias (ERATs).

Methods: A physician-based survey was carried out by the European Heart Rhythm Association (EHRA) to investigate the current definition and applicability of BP and ERAT management. An online questionnaire was sent to clinical and interventional electrophysiologists (EPs).

Results: 436 respondents (88% interventional EPs) reported observing ERATs in 25% (IQR 15-35) of patients, less commonly in paroxysmal AF (PAF) compared to persistent AF (persAF). The median reported duration of the BP used by respondents was 90 days, with 22% preferring a shorter BP duration for PAF patients compared to persAF. Half of patients with ERATs are expected to also experience late recurrences (LR). Isolated episodes of ERATs are treated conservatively by 99% of respondents, but repeat ablation is preferred by 20% of EPs in case of multiple ERATs and by 16% in patients with organized atrial tachyarrhythmias.

Conclusions: ERATs are commonly observed after AF ablation, particularly in persAF patients, and are perceived as predictors of LRs by half of respondents. A general adherence to a 90-day BP duration was observed. During this time period, ERAT are mainly treated conservatively, but repeat ablation during the BP is occasionally offered to patients with multiple ERATs and those with organized atrial tachyarrhythmias.

Introduction

Atrial fibrillation (AF) is the most common sustained arrhythmia and its incidence is increasing with the ageing of the population[1]. Catheter ablation of AF has emerged as an effective therapeutic option once a rhythm control strategy is chosen[2].

Early recurrence of atrial tachyarrhythmia (ERATs) within 90 days after an AF ablation procedure is a recognized phenomenon. However, the long-term clinical significance of ERATs remain unclear. ERATs may be caused by transient pro-arrhythmogenic ablation-induced inflammation, but many other mechanisms (transient ischemia, oxidative stress, edema, proliferative tissue repair, autonomic imbalance, interruption of antiarrhythmic drugs) may be involved[3,4].

The observation that atrial arrhythmias may transiently occur in the first few months after ablation led to a consensus in using an arbitrary 90-day window, defined as the blanking period (BP), where ERAT is not considered as treatment failure[5]. However, recent studies questioned the clinical significance of ERATs and what the duration of the BP should be, suggesting a role of ERAT in predicting late arrhythmic recurrences[6,7].

The aim of this physician-based survey performed by the Scientific Initiatives Committee (SIC) of the European Heart Rhythm association (EHRA) was to assess the physician's perception on the rate of ERATs during the BP, the appropriate duration of the BP and the current management of early recurrences.

Methods

This survey consisted of 26 multiple-choice questions or sliders for numerical inputs.

The survey was mainly distributed among EHRA members, disseminated among members of European national rhythm groups and promoted through social media by the EHRA President and

the members of the SIC. The document including the full questionnaire can be found in supplemental material 1.

The survey was structured in four parts. The first section aimed to define the respondent's background and experience, with questions regarding the volume of interventions performed in the center and by the operator, as well as additional questions assessing the preferred strategy for ablation of paroxysmal (PAF) and persistent AF (persAF). In the second part of the survey, duration of the BP and incidence of early recurrences were asked. Digital sliders were preferred to numerical entries to detect small differences in the suggested duration of the BP and in the rate of recurrences. In the third section, we aimed to investigate the management of ERATs with focus on re-ablation, medical treatment and use of antiarrhythmic drugs (AAD). The fourth section addressed the respondents` opinions on explanations for BP recurrences or late cure.

The questionnaire aimed to highlight the general perception on the rate of ERATs, their meaning and management. An analysis of correlation among the different sections was pre-specified to highlight differences in BP duration and ERAT interpretation among operators with different experience or different preferred ablation strategy.

Statistical analysis

After testing results for normality (Shapiro-Wilk test), continuous variables with normal distribution are presented as mean ± standard deviation, otherwise as median (interquartile range- IQR). These variables were compared with the Student T test or the Mann Whitney test, as appropriated. Categorical variables were compared using the Chi Square. All analysis were performed using Graphpad Prizm 8 or SPSS statistic software version 28.

Three sub-analyses were predefined: a comparison of the BP duration between high volume (HV; ≥50) and non-high volume operators (nHV; <50 AF Ablations per year - operators were classified

according to procedural volume on the basis of available guidelines[8]); a comparison between operators using radiofrequency current (RFC) preferentially versus the cryoballoon (CB); and a comparison between ablation strategies including only pulmonary vein isolation (PVI) versus PVI associated with additional left atrial lesions (PVI +). The results are presented separately for both PAF and persAF.

Results

Four-hundred-thirty-six physicians participated in the survey. Details on respondents are summarized in table 1: 78% declared performing AF ablation as primary operator, 10% as secondary operator and 12% are non-interventional electrophysiologists. Seventy percent of respondents are working in high-volume centers (>100 AF ablations per year) and 53% are performing more than 50 AF ablations per-year. A total of 81% are independent electrophysiologists, including 60% with more than 5 years of experience in interventional EP.

When asked to indicate the preferred ablation strategy in PAF, 95% of subjects chose a PVI-only strategy: 57% with RFC and a 3D mapping system, 42% using the CB, 1% using other single shot devices. Five percent of respondents declared performing substrate modification (with additional lines or electrogram-based ablation) even during the first procedure for PAF. For persAF ablation, the rate of respondents indicating PVI-only procedures decreased to 54% (61% with RFC, 37% with the CB, 2% with other devices), with the rate of operators performing substrate modification rising to 46%. Overall, 63% of participants declared initiating or continuing antiarrhythmic drug (AAD) therapy after ablation, but more than half of these (57%) used AADs for the duration of the BP only.

Duration of the BP and observed rate of ERAT

The definition of BP duration was not uniform throughout centers, with 32% of respondents reporting different definitions used by different operators in the same center.

The reported median rate of ERATs during the BP was 25% (IQR 15-35), with persAF patients perceived as experiencing ERAT more often compared to PAF patients (30% (IQR 20-40) vs. 20% (IQR 10-30), p<0,001 - Figure 1). Across all respondents, the indicated BP duration had a median value of 90 days [IQR 60-90]. Although the median used BP duration was identical between PAF and persAF patients, 22% of interviewed electrophysiologists indicated a shorter BP for PAF patients compared to those with persAF, resulting in a wider distribution in the former (PAF 90(60-90) days vs persAF 90(89-90) days; figure 2).

Thirty-six percent of operators declared screening asymptomatic patients for BP recurrences by serial ECG or Holter ECG, while 34% actively screened for ERAT in symptomatic patients only and 29% did not perform any screening during the BP.

Perception of the clinical significance of ERATs

According to this survey, 90% of respondents consider ERATs to be associated with late recurrences. In fact, any ERAT, ERATs after ≥4 weeks and ERATs after ≥8 weeks were indicated as possible predictors of late recurrence (LR) by 28%, 34% and 28% of respondents, respectively. Respondents declared that, in general, 50% (IQR 30-65) of patients with a BP recurrence are expected to experience a LR (Figure 1).

Management of ERAT

The preferred management of first AF recurrences, multiple AF recurrences, or recurrences of atrial tachycardia and typical atrial flutter is shown in Figure 3.

An electrical cardioversion with additional (re)-introduction of AAD was the preferred strategy, declared by 62%, 70%, and 55% of respondents in case of 1, 2 or >2 ERATs recurrences, , respectively. A repeat AF ablation procedure during the BP was reported as being very rarely used in patients with a single AF recurrence (1%), with an increase to 19% in case of multiple ERATs. Atrial tachycardia (excluding typical flutter) was reported as being treated with catheter ablation during the BP by 16% of interviewed operators. In case of typical atrial flutter, catheter ablation was the strategy of choice for 71% of operators (of whom 28% checked for PV reconnection). Most of respondents chose flecainide and propafenone as AAD of choice for BP recurrences (73%), while 22% declared using amiodarone; sotalol or dronedarone were less used (2.5% each). Anti-inflammatory medication such as colchicine was used by only 13% of respondents, while 77% did not considered anti-inflammatory drugs as having any role in reducing BP recurrences.

Looking at anticoagulation therapy beyond the usual 8-week post-ablation period in patients at low risk for stroke (CHAS2DS2-VASc 0 in males or 1 in females), one fourth of operators considered modifying the anticoagulation strategy but only in patients with history of persistent AF or significantly enlarged atria, while an additional 30% modified their anticoagulation strategy if an electrical cardioversion was required.

Possible explanations of the pathophysiological mechanisms of ERATs

The inflammation theory (inflammation leading to recurrences even in the presence of sustained PVI) received the highest rate of preference (41%) as a possible explanation for recurrences during the BP, followed by the theory of “AF begets AF” (according to which atrial remodeling may require time after restoring SR - 21% of respondents).

Additional hypotheses included early PV reconnection leading to recurrences but edema impeding ReDo ablation (17%), transient sympathetic/parasympathetic imbalance after ablation

(15%), the possibility of missing a late PV reconnection leading to a delay in the repeat procedure (6%).

For 62% of respondents, the BP should be applied to AF ablation procedures only, whereas 20% considered extending its applicability to all complex ablation procedures including VT. Finally, only 58% of operators were aware that no specific recommendation about BP recurrences were given in the last European guidelines.

Relationship between ERATs and operator's experience, energy form and ablation strategy

Among interventional electrophysiologists, 60% indicated performing more than 50 AF ablation procedures per year and were defined as high volume (HV) operators. Although the median BP duration was identical between HV and nHV operators, the former more often indicated using a shorter BP in both PAF and persAF patients, resulting in a wider range compared with nHV operators (median of 90(60-90) days vs 90(89-90) days in PAF; 90(60-90) days vs 90(90-90) days in persAF).

During the BP, a small difference was observed about the perceived rate of ERAT among HV operators and non-HV operators, with HV operators reporting a median 17% (10-25) rate of ERATs in PAF patients and 30% (20-40) in persAF patients, while nHV reported a 20% (15-30) rate for non-HV operators (p=0,0019) and 35%(23-40) in persAF. Both groups of operators indicated a similar rate of late recurrences following ERAT (HV 50%(33-65) vs non-HV 50%(30-60)). These finding are summarized in the supplemental material 2.

Operators' perceptions on the BP duration was similar between operators using the CB and those performing RFC ablation. 72% of participants declared having experience in PVI with both CB and RFC, and almost half of these (47%)believe that both share the same rate of BP recurrences (with a third perceiving RFC as associating with more BP recurrences). A strategy with ablation sets

beyond PVI (PVI+) was indicated by a significant subset of operators (46%) in the case of persAF, but PVI+ operators and PVI-only operators indicated similar duration of the BP, and similar perception on the rate of ERAT and rate of late recurrences after ERAT (Supplemental material 4).

Discussion

We present the results of the first physician-based survey focusing on the definition and rationale of the BP after AF ablation and the management of ERATs during the BP. The main findings of this survey are the following: **1)** there is general adherence to the suggested 3 month-BP despite a call for a shorter BP in patients with paroxysmal AF; **2)** the perceived rate of ERAT is 25%, being higher for patients with persAF compared with PAF; **3)** 50% of patients with ERAT are perceived to experience late recurrences; **4)** electrical cardioversion and reintroduction of antiarrhythmic drugs are the preferred treatment for symptomatic ERAT during the BP; **5)** there is a lower threshold for repeat ablation during the BP if the patient presents with a well-defined non-PV ablation target (such as atrial tachycardia or typical atrial flutter).

Rationale for BP, BP duration and perceived rate of ERAT

A 3-month BP after AF ablation should be used according to the expert consensus statement when reporting AF ablation success at one year[5,9]. This suggestion is supported by the observation that not all ERAT are associated with late therapy failure[10–12].
However, new studies suggested that the distribution of ERAT in the first three months is not equally associated with late cure, particularly in the case of ERAT >4 weeks after the index procedure[6]. This association was confirmed by follow-up data from implantable loop recorders (ILR) in the the CIRCA DOSE trial[7], where ERAT later than 52 days had a 95% specificity in predicting late recurrences.

Despite the new evidence, most electrophysiologists taking part in the current survey still indicated a BP of 90 days, as proposed by the expert consensus on AF ablation, suggesting that a modification in this recommendation may be needed to change the current clinical practice. Interestingly, in the present survey we observed that some operators are inclined to consider a

shorter BP in patients treated for PAF (at least 25% selected 60 days) compared to patients initially presenting with persAF, which could be interpreted as a perception that late ERAT in PAF patients may be more predictive of late recurrences, as demonstrated by DAS and colleagues[13].

In the present survey the perceived overall median rate of ERAT is 25%, with a higher reported rate in persAF patients compared to PAF patients (30% vs 20%). However, it has to be acknowledged that the majority of respondents only screen symptomatic patients, and only 1% of operators declared to systematically use an implantable loop recorder (ILR) to detect ERATs. Recently, continuous ECG monitoring revealed that ERATs can be recorded in the majority of patients after PVI[9]: in the CIRCA DOSE trial 211/346 (61%) of enrolled PAF patients had ERATs documented in the ILR[7]. The rate of *symptomatic* ERAT was 16% (55/346), a percentage that is not far to the 20% identified through this survey in PAF patients.

Clinical significance of ERATs and management

Almost all of the interviewed operators believe ERAT are predictors of LR and approximately 50% of patients with ERAT are expected to develop LR in the follow-up. The answer to these questions somehow reflects the message of multiple publications highlighting the not so benign nature of ERAT[6,7,11,13].

The optimal management of ERAT is controversial[9]. Actually, 99% of respondents declared to adopt a more conservative strategy for patients with a first recurrence in the BP, mainly consisting of electrical cardioversion and reintroduction of AAD. According to the present survey, rate control strategies for ERAT are less preferred, in line with clinical data showing that in patients with ERAT a cardioversion should be performed as early as possible[14]. More than half of respondents keep AAD for the duration of the BP, particularly class I AAD. Continued AAD beyond

the BP in patients free of AF has been shown to improve 1-year outcomes but the value of AAD used only during the BP is limited.

Re-do ablations are performed by one fifth of operators in patients experiencing multiple ERATs Although ERAT, particularly those occurring beyond 3 weeks after ablation (PMID: 34126269), are predictors of late recurrences, the role of early re-do ablations remains debatable. Some studies suggested early re-do ablation could improve long-term results (refs 12 and 19), but with improved technologies and operator experience the rate of durable PVI has increased, raising the question of which ablation strategy and endpoint should be used when performing a re-do.

There are various possible explanations for ERAT and a multifactorial origin should be considered[4]. The theory of inflammation-induced proarrhythmia was the preferred one in this survey, but interestingly most do not see a role for anti-inflammatory drugs after a PVI procedure. Colchicine reduced both ERAT and mid-term recurrences in previous studies (refs).

A subanalysis of the data showed that HV operators appear to report lower rates of ERAT in both PAF and persAF, but the perceived association between ERAT and LR remains similar for HV and nHV operators. A different sub-analysis could not clarify whether there is a difference in the perceived rate of ERAT according to the ablation technique used (CB or RFC). Data from CIRCA DOSE did not reveal any difference in ERAT burden between techniques, but a previous meta-analysis suggested results of AF ablation performed with the CB are less dependent on operator experience (ref 22).

Limitations

This EHRA survey is limited by a potential selection bias. The survey was distributed via EHRA and different social media formats such as Twitter or Siilo in order to attract as many EP physicians as possible. Country specific regulations may impact on catheter ablation and BP treatment strategies. Since responders could choose to skip specific questions, we report the percentage of given answers per each question. Of note, any survey is limited by recording perceptions and not prospective raw data. Still, given the large number of participants, this EHRA survey contributes to our understanding of knowledge gaps in the definition and management of ERAT.

Conclusions

ERATs are commonly observed after AF ablation and most often considered to predict LR. There is a general adherence to a 90-day duration of the BP, with a trend for a shorter BP in paroxysmal AF patients. ERATs are usually treated conservatively, but a fifth of operators perform repeat ablation in patients with multiple ERATs or with organised atrial arrhythmias. There is a need for randomized studies assessing the duration of the BP and management of ERAT to fill in identified gaps in evidence.

Table 1

Operators performing AF Ablation		
	Primary operator	78 %
	Secondary operator	10 %
	Not performing AF ablation	12%
Centre volume (number of AF Ablation per year)		
	0-50	10 %
	51-100	20 %
	100-400	47 %
	>400	23 %
Operator volume (number of AF Ablation per year)		
	0-25	28 %
	26-50	19 %
	51-150	37 %
	>150	16 %
Level of training		
	Cardiologist in training	10 %
	Electrophysiologist in training (fellowship)	9 %
	Electrophysiologist <5 years experience	21 %
	Electrophysiologist >5 years experience	60 %
Preferred strategy for ablation of paroxysmal AF		
	PVI only with Radiofrequency current and 3D mapping system	54 %
	PVI only with Cryoballoon	40 %
	Other single shot devices for PVI only	1 %
	PVI + substrate modification with radiofrequency current and 3D mapping system	5 %
Preferred strategy for ablation of persistent AF		
	PVI only with Radiofrequency current and 3D mapping system	33 %
	Cryoballoon PVI only	20 %
	Other single shot devices for PVI only	1 %
	PVI + substrate modification with radiofrequency current and 3D mapping system	43 %
	Cryoballoon PVI + cryo ablation of left atrial poterior wall	3 %

Figures

Figure 1

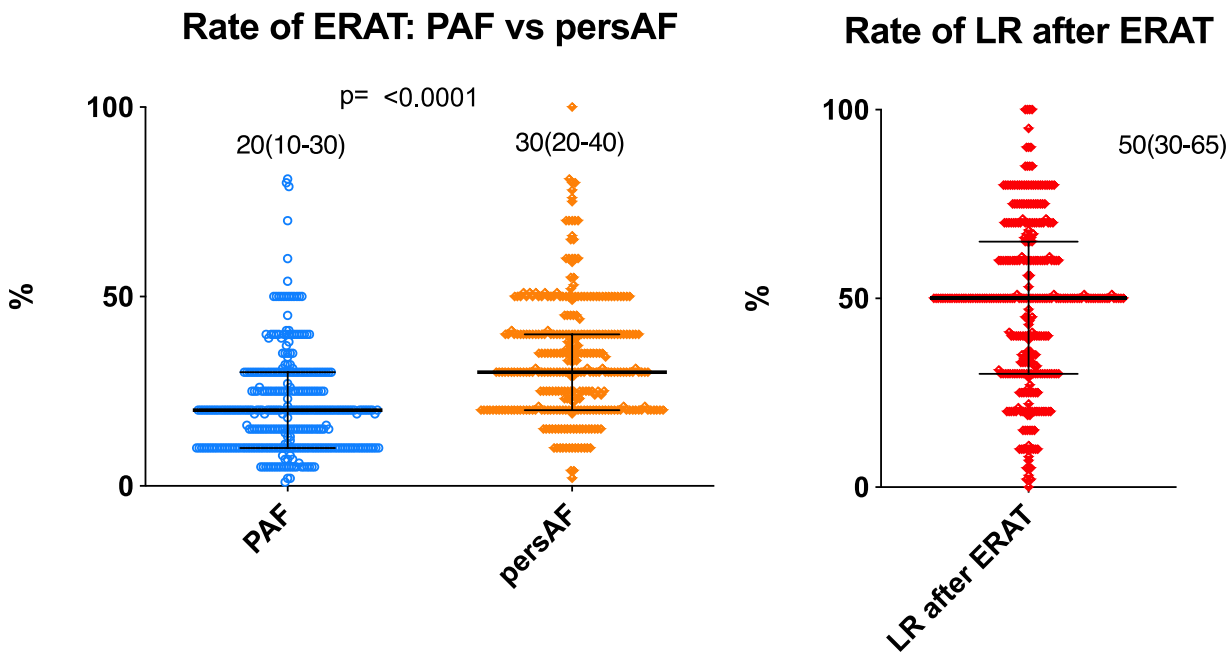


Figure 2

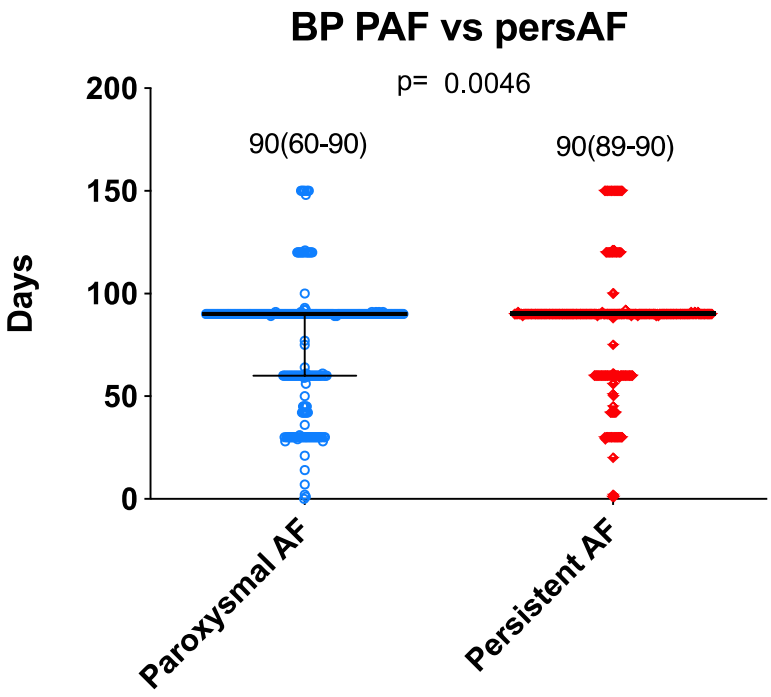
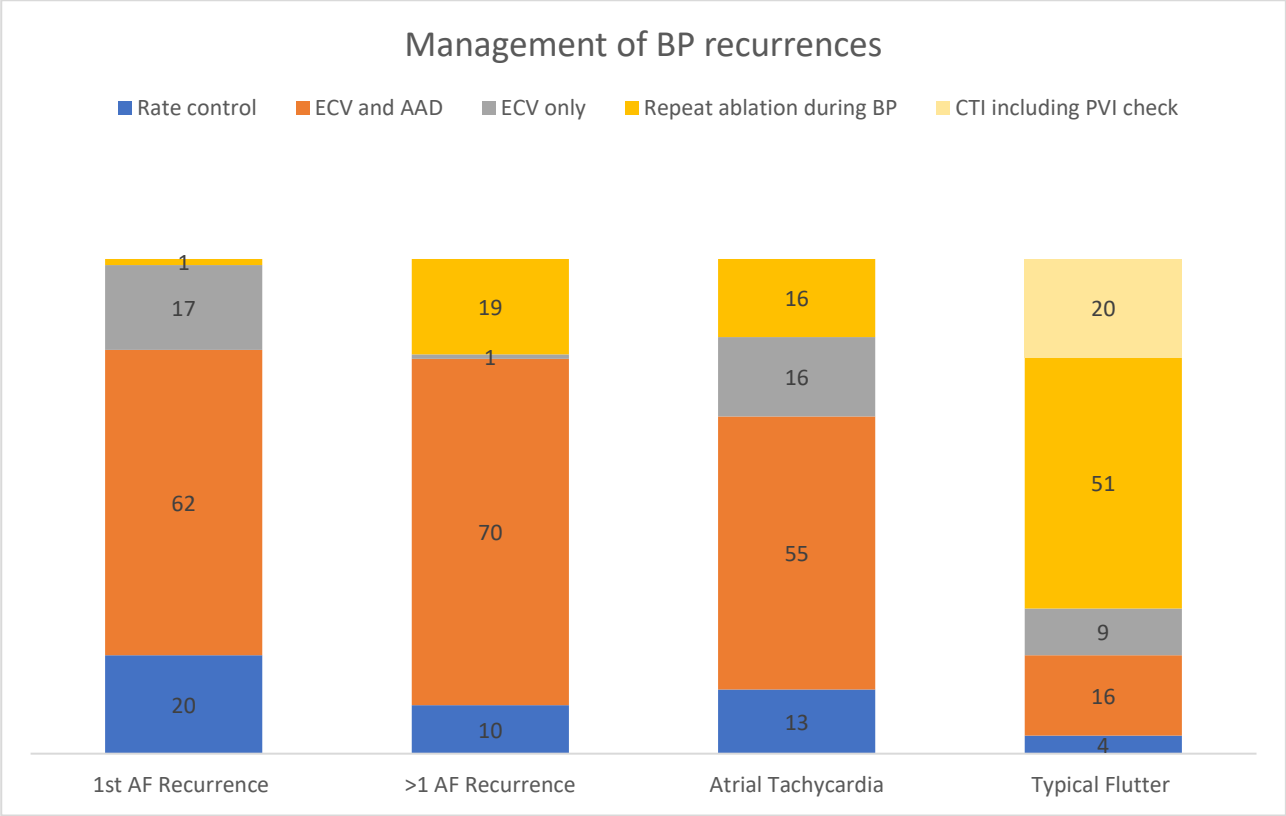

BP PAF vs persAF
p= 0.0046
90(60-90)
90(89-90)
200
150
100
50
0
Days
Paroxysmal AF
Persistent AF

Figure 3


Management of BP recurrences
Rate control
ECV and AAD
ECV only
Repeat ablation during BP
CTI including PVI check
1
17
62
20
19
1
70
10
16
16
55
13
20
51
9
16
4
1st AF Recurrence
>1 AF Recurrence
Atrial Tachycardia
Typical Flutter

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Supplemental Material 1

Questionnaire

EHRA
Blanking Period Survey

Who is answering the survey?

1. How many AF ablation per year are performed on average in your center?
   1.1. 0-50
   1.2. 51-100
   1.3. 100-400
   1.4. >400

2. How many AF ablation per year are you performing as primary operator on average?
   2.1. 0-25
   2.2. 26-50
   2.3. 51-150
   2.4. >150

3. What is your actual level of training?
   3.1. Cardiologist in training
   3.2. Electrophysiologist in training (fellowship)
   3.3. Electrophysiologist <5 years experience
   3.4. Electrophysiologist >5 years experience

4. What is your standard strategy for catheter ablation of paroxysmal AF?
   4.1. Radiofrequency current and 3D mapping system → PVI only
   4.2. Cryoballoon PVI only
   4.3. Other single shot devices for PVI only
   4.4. Radiofrequency current and 3D mapping system → PVI + substrate modification (lines or electrogram based ablation)

5. What is your standard strategy for catheter ablation of persistent AF?
   5.1. Radiofrequency current and 3D mapping system → PVI only
   5.2. Cryoballoon PVI only
   5.3. Other single shot devices for PVI only
   5.4. Radiofrequency current and 3D mapping system → PVI + substrate modification (lines or electrograms and/or Marshall)
   5.5. Cryoballoon PVI + cryo ablation of left atrial poterior wall

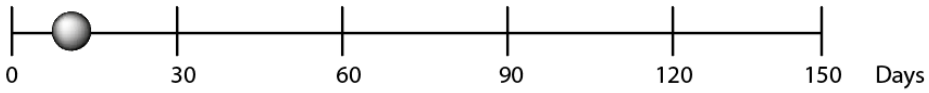
6. Do you immediately stop antiarrhythmic drugs (AAD) after an apparently successful AF Ablation procedure?
   6.1. Almost always
   6.2. Only in paroxysmal form of AF
   6.3. I leave ADD just for the blanking period
   6.4. Almost never

How long should be the blanking period?

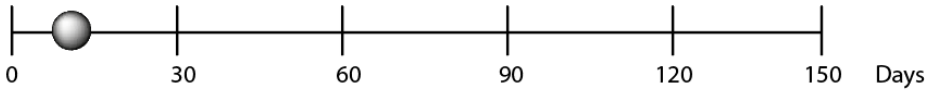
7. Do you have in your center an institutional agreement on the duration of the blanking period after a successful AF Ablation procedure?
   7.1. Yes, uniform
   7.2. No
   7.3. No, depends on operator
   7.4. No, depends on patient characteristics

8. How long should the blanking period be after ablation of paroxysmal AF?

   8.1.



9. How long should be the blanking period after ablation of persistent AF?
   9.1.



10. How do you screen your patients for recurrecnes in the blanking period?
    10.1. ECG and/or Holter during the blanking period only in symptomatic patients
    10.2. ECG and /or Holter during the blanking period even in asymptomatic patients
    10.3. Implantable loop recorder
    10.4. Wearables ECG monitoring
    10.5. No screening during the blanking period

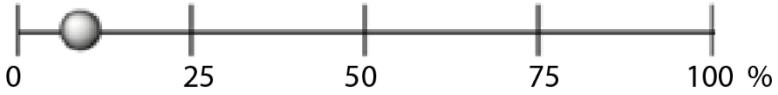
11. What kind of symptoms trigger an active screening during the blanking period in your center?
    11.1. Palpitations, irrespective of duration
    11.2. Palpitations >30 seconds
    11.3. Regular but accelerated heart rate at rest
    11.4. I do not screen during blanking

12. In your experience, what is the percentage of patients with recurrence of atrial tachyarrhythmias in the blanking period after ablation for paroxysmal AF?
    12.1.

13. In your experience, what is the percentage of patients with recurrence of atrial tachyarrhythmias in the blanking period after ablation for persistent AF?
    13.1.

14. Do you think a recurrence in the blanking period is predictive of long term recurrences?
    14.1. Yes, any recurrence in the blanking period is a predictor of ablation failure
    14.2. Yes, if it happens in the mid or late blanking period (>4weeks)
    14.3. Yes, if it happens in the late blanking period (>8weeks)
    14.4. No

15. In your experience, how many patients with a documented recurrence in the blanking period are also experiencing a recurrence in the long term follow up?
    15.1.



16. After a PVI only procedure, which ablation energy/technique does lead to higher recurrences in the blanking period?
    16.1. Radiofrequency > Cryo-energy
    16.2. Radiofrequency < Cryo-energy
    16.3. Radiofrequency = Cryo-energy
    16.4. I have experience with only one technology and I cannot compare

How do you manage recurrences in the blanking period?

17. How do you treat a first AF recurrence in the blanking period?
    - 17.1. Rate control and wait for spontaneous conversion
    - 17.2. Cardioversion and AAD
    - 17.3. Cardioversion, no AAD
    - 17.4. Re-Ablation

18. How do you treat a second (or >) AF recurrence in the blanking period?
    - 18.1. Rate control and wait for spontaneous conversion
    - 18.2. Cardioversion and AAD
    - 18.3. Cardioversion, no AAD
    - 18.4. Re-Ablation

19. How do you treat a recurrence of atrial tachycardia (excluding typical atrial flutter) in the blanking period?
    - 19.1. Rate control and wait for spontaneous conversion
    - 19.2. Cardioversion and AAD
    - 19.3. Cardioversion, no AAD
    - 19.4. Re-Ablation

20. How do you treat a recurrence of typical atrial flutter in the blanking period?
    - 20.1. Rate control and wait for spontaneous conversion
    - 20.2. Cardioversion and AAD
    - 20.3. Cardioversion, no AAD
    - 20.4. CTI ablation only
    - 20.5. CTI Ablation including PVI Check

21. Which AAD do you prefer for the treatment of recurrences during the blanking period? (in patients without structural heart disease)?
    - 21.1. Flecainide/Propafenone
    - 21.2. Amiodarone
    - 21.3. Sotalol
    - 21.4. Dronedarone

22. Do you think anti-inflammatory drugs may play a role in reducing blanking recurrences?
    - 22.1. Yes, all anti-inflammatory drugs
    - 22.2. Yes, colchicine only
    - 22.3. No

23. In patients at low stroke risk (CHADSVASC 0 in man, 1 in women), is a recurrence in the blanking period changing your strategy regarding discontinuation of oral anticoagulation? (select any that apply)
    - 23.1. No
    - 23.2. Yes if the patient needs cardioversion
    - 23.3. Yes if the patient has persistent AF
    - 23.4. Yes if the patient has enlarged atria

What do we really know about the blanking period?

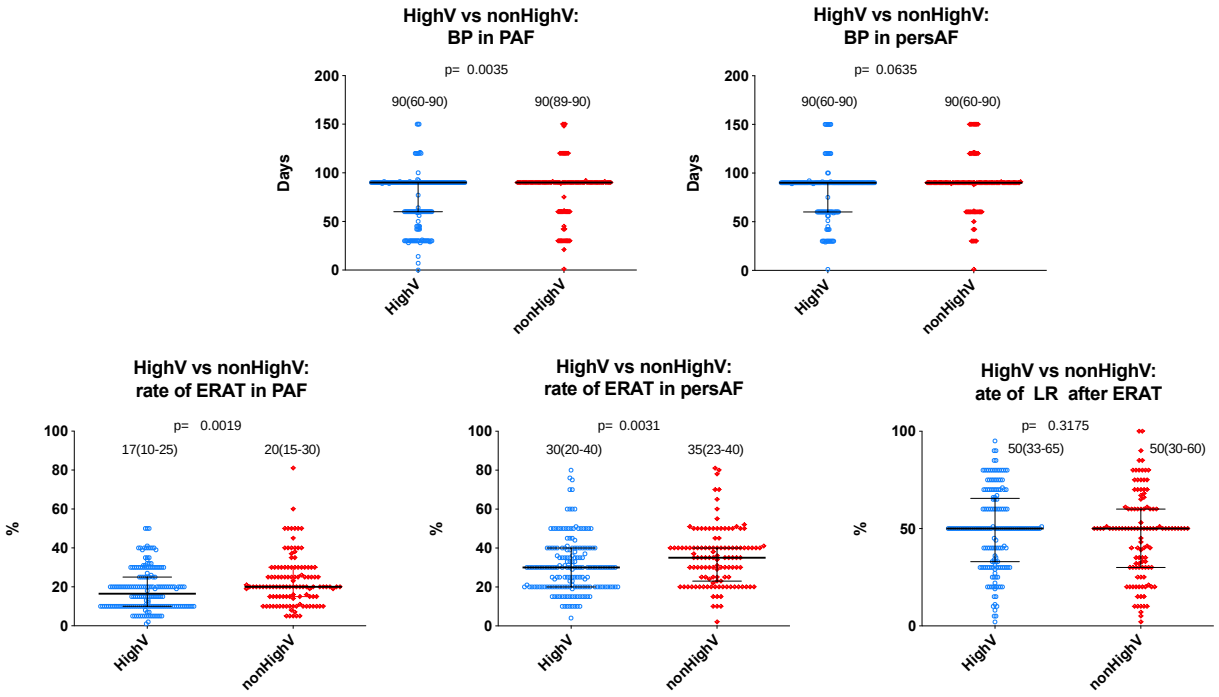
24. In your opinion, why do we need a 3 month blanking period after an AF ablation procedure? (select any that apply)
    - 24.1. Inflammation after ablation may lead to AF recurrences even in the presence of sustained PVI
    - 24.2. PVs are probably reconnected but edema after PVI may impede safe and effective reablation
    - 24.3. PVs require 3 months to show reconnection
    - 24.4. Cardioneuroablation may lead to sympathetic/parasympathetic imbalance early after ablation and may resolve spontaneously
    - 24.5. Since AF begets AF it may take time to restore a stable sinus rhythm after ablation and reverse the atrial remodeling linked to AF

25. Do you apply a blanking period for recurrences after all catheter ablation procedures?
    - 25.1. Yes, after ablation of any arrhythmia (supraventricular or ventricular)
    - 25.2. Yes, after ablation of any arrhythmia (supraventricular or ventricular) but with different duration
    - 25.3. No, only for atrial fibrillation ablation procedures
    - 25.4. No, only for complex ablation procedures (AF or VT, other SVT are excluded)

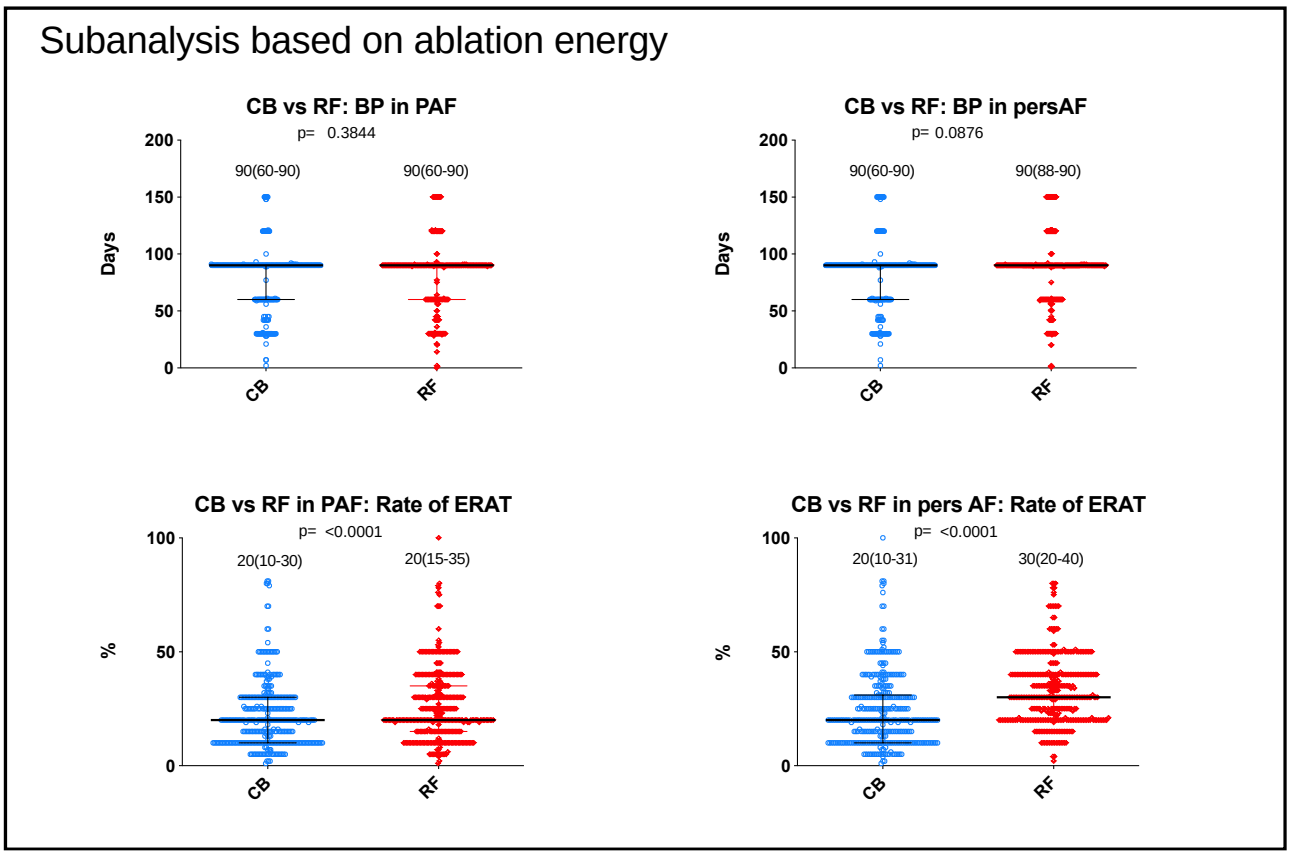
26. Which level of evidence (LOE) report the latest EHRA AF guidelines for the recommendation on the blanking period after AF ablation?
    - 26.1. LOE A
    - 26.2. LOE B
    - 26.3. LOE C
    - 26.4. I am not aware of a specific recommendation on blanking period in the last EHRA AF Guidelines

Supplemental material 2

Subanalysis based on High Volume Operators Vs non High Volume Operators



Supplemental material 3



Supplemental material 4

Subanalysis based on ablation strategy in persistent AF