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Sharm El Sheikh

Predictors Of Success In AF Ablation

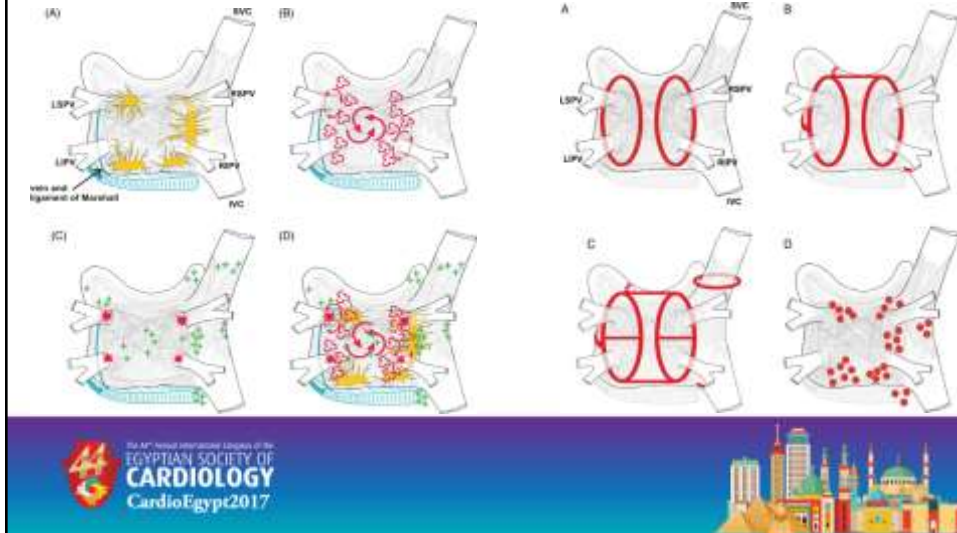
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Introduction

- Catheter ablation of AF has emerged as an effective tool to treat symptomatic patients with drug-refractory AF.
- Success is usually measured as stability of sinus rhythm in multiple Holter-ECGs after an initial blanking period.
- Success rates varies 40-90 %!!!!



It is Complicated...!



- Success rates differ widely depending on patient selection, experience of the operators and follow-up.
- Variety of patients with different stages of AF disease and therefore, success rates may vary widely
- Recurrences after ablation may include
 - 1- Recurrent AF
 - 2- Atrial tachycardia

It is all about...

- **Choosing the right patient**
- **Doing the right thing**
- **Performing adequate follow up**

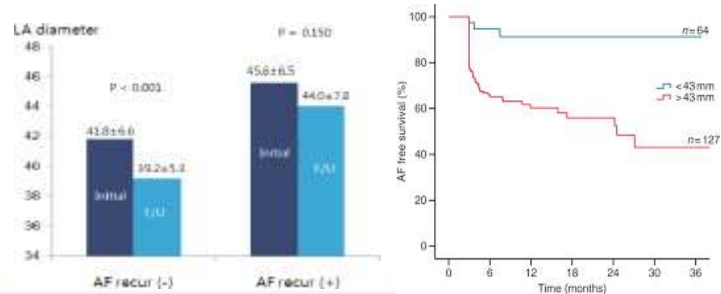


1. Pre-Procedural Factors

- **Left Atrial Dimensions**
- **Duration of Persistent AF**
- **Hypertension**
- **Structural Heart Disease/LVFunction/CHF**
- **Age and Sex**
- **Serum Markers**
- **Atrial Fibrosis**

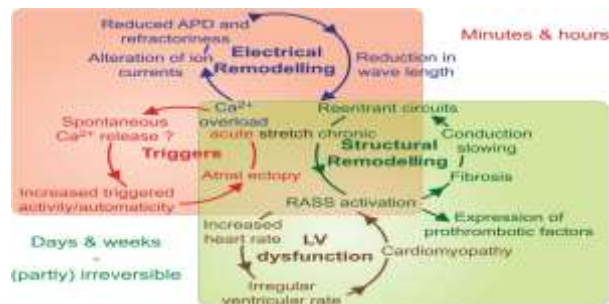


- Left atrial size was found to be a major determinant for recurrence
- LA diameter > 43mm significantly influences 1- and 2-year AF free survival rates (54% at 1 year, 51% at 2 years compared to 91% for 1 and 2 year AF free survival in patients with left atrial diameters < 43mm)

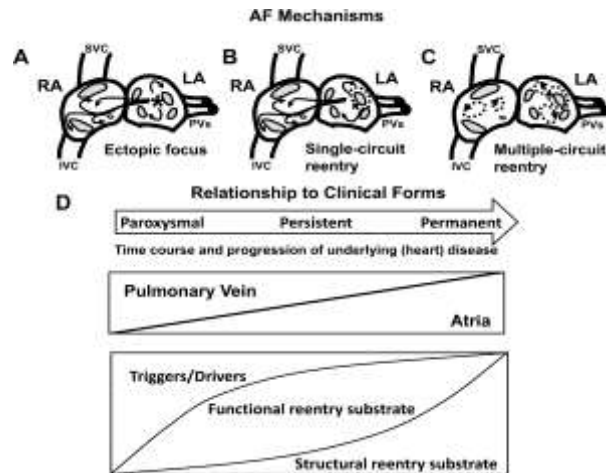


Duration of AF

- Long persistence of AF (> 6 months prior to ablation) negatively influences recurrence of AF after ablation



Principal atrial fibrillation (AF)–maintaining mechanisms.



Yu-ki Iwasaki et al. *Circulation*. 2011;124:2264-2274



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Hypertension

- Hypertensive heart disease is a major risk factor for the incidence of AF
- In mixed populations with different types of AF hypertension appears to be a significant predictor of AF recurrence after ablation (Tao Wang et al)

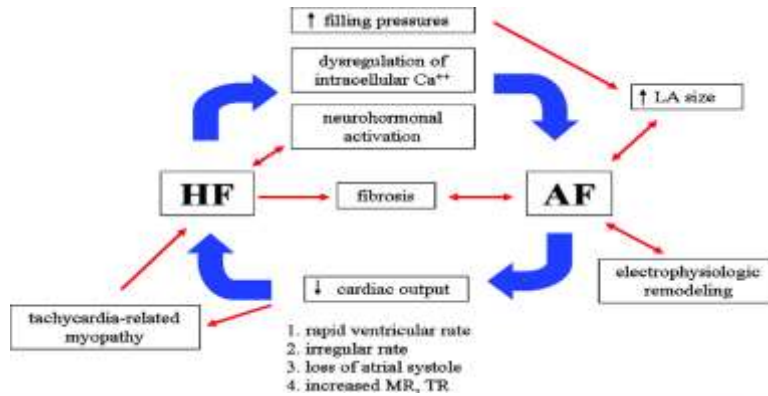
Table 4 The effect of hypertension on the outcome of AF ablation

| Patients | Ablation success | Ablation recurrence | Success rate (%) | P value |
|---------------|------------------|---------------------|------------------|---------|
| PAF | | | | 0.067 |
| Normotensive | 78 | 16 | 82.9 | |
| Hypertensive | 29 | 13 | 69 | |
| Persistent AF | | | | 0.207 |
| Normotensive | 36 | 6 | 85.7 | |
| Hypertensive | 26 | 9 | 74.2 | |
| All patients | | | | 0.095 |
| Normotensive | 114 | 22 | 83.8 | |
| Hypertensive | 55 | 22 | 71.4 | |

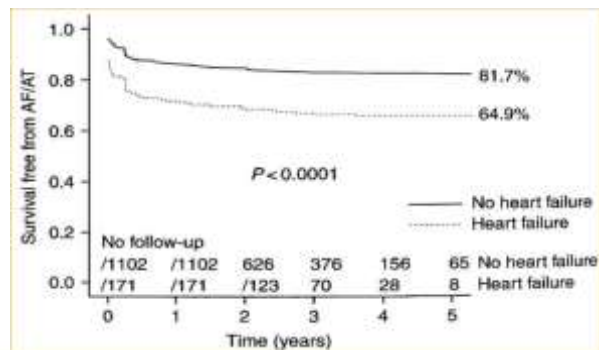
AF, atrial fibrillation; PAF paroxysmal AF.



Structural Heart Disease/Left Ventricular Function/Congestive Heart Failure

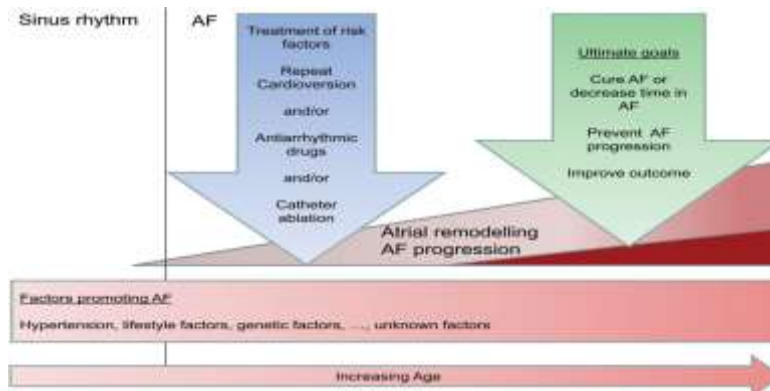


- Congestive heart failure appears to be an independent predictor of AF recurrence in patients with persistent AF as indicated in a single study on nearly 400 patients undergoing ablation in a center with high expertise (Antonio Di Monaco et al)



Age and Sex

- A study by Rostock et al indicates a higher recurrence rate in female patients after ablation of persistent AF
- A second study by Wilber et al on 1404 patients with persistent or long-standing persistent AF also documented female gender to be a predictor of very late recurrence



Serum Markers

- **The extent of structural remodelling and brain natriuretic peptide (BNP) levels may be related and therefore higher pre-procedural BNP levels may indicate more extensive structural abnormalities.**



Atrial Fibrosis

- **Atrial structural remodelling leads to substrate formation for perpetuation of atrial fibrillation.**
- **Atrial myopathy in these cases includes different degrees of fibrotic replacement which appears to be related to the duration of ongoing AF**
- **Higher stages of atrial fibrosis were related to higher recurrence rate independent to AF type.**




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Who are the best candidates for curative AF ablation?


| | Best candidate | Good candidate | Marginal candidate |
|----------------|------------------|--------------------------|------------------------|
| Symptom status | Very symptomatic | Symptomatic | Minimal or no symptoms |
| Age | Younger | ≤70 years | >70 years |
| AF pattern | Paroxysmal | Paroxysmal or persistent | Chronic |
| LA size | ≤4.5 cm | ≤5.0 cm | >5.0 cm |

The best candidates for antiarrhythmic drug maintenance of sinus rhythm are the same

Slide courtesy of Gerald V. Naccarelli, MD



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2. The Procedure...

- **Safety :**

Experience center and operator

Transeptal puncture

Anticoagulation

Management of complications

- **Efficacy:**

Extent of ablation and way of ablation

End points



Efficacy:

- PVI is the cornerstone of current catheter ablative therapies for AF, with the highest efficacy in patients with paroxysmal AF
- In patients with persistent and long-standing persistent AF, PVI alone has been associated with lower success rates.
- Studies have suggested a marginal but concrete incremental benefit of extensive linear ablation strategies and atrial debulking with CFAE ablation, at the expense of increased risk of organized atrial arrhythmias, such as atrial tachycardia or flutter.
- Recent studies have highlighted the importance of targeting AF focal sources, such as rotors or additional non-PV trigger sites (e.g., ligament of Marshall, left atrial appendage).
- Further large randomized studies are warranted to better evaluate the benefits (and risks) of such adjunctive ablation strategies.



Some tips...

- The first ablation lesion is the most important
- try to resist moving to a new site prematurely as local edema provoked by ablation might prevent delivering an effective lesion.
- Unnecessary ablation lines should be avoided.
- It is imperative to confirm block across all ablation lines to avoid creating corridors of reentry in order to prevent macroreentrant tachycardia.
- Complete pulmonary vein disconnection should be confirmed at completion.



Fire and Ice...

Table 2. Efficacy End Points.*

| End Point | Radiofrequency Group (N=376) | Cryoballoon Group (N=374) | Hazard Ratio (95% CI)† | P Value |
|---|------------------------------|---------------------------|------------------------|-----------|
| Primary efficacy end point — no. of patients (%)‡ | 143 (35.9)§ | 138 (34.6)§ | 0.96 (0.76–1.22) | <0.001¶ |
| Components of the primary efficacy end point — no. of patients | | | | |
| Recurrent atrial arrhythmia | 87 | 80 | — | — |
| Antiarrhythmic drug treatment | 49 | 51 | — | — |
| Repeat ablation | 7 | 7 | — | — |
| Secondary efficacy end points | | | | |
| Death from any cause — no. of patients | 0 | 2‖ | — | 0.25** |
| Death from arrhythmia — no. of patients | 0 | 0 | — | — |
| Total procedure duration — min | 140.9±54.9 | 124.4±39.0 | — | <0.001†† |
| Left atrial dwell time — min‡‡ | 108.6±44.9 | 92.3±31.4 | — | <0.001††† |
| Total fluoroscopy time — min§§ | 16.6±17.8 | 21.7±13.9 | — | <0.001††† |
| Rehospitalization for cardiovascular causes — no. of patients (%) | 55 (13.5)§ | 44 (9.4)§ | 0.78 (0.53–1.16) | 0.28** |



3. Post-procedural Factors

- Early recurrence of AF :
- Occur in 35% to 46% of patients and may be due to the transient unstable atrial remodelling processes after left atrial ablation including inflammatory response
- around 50% of these patients do not have AF recurrences during longer follow-up
- In the STAR-AF trial ERAF was significantly predicting failure of ablation.



Type of recurrent arrhythmia

- AF or regular macro-, micro-reentry of focal atrial tachycardia
- These regular atrial tachycardias may account for 20 to up to 50% of recurrent arrhythmia
- **Antiarrhythmic Drug Treatment After Ablation**
 - Data from the 5A-Study antiarrhythmic medication in the early phase after ablation may stabilize atrial rhythm in the early post-interventional phase but the long-term beneficial effect remains unclear



Final remarks....

- Ablation of AF is associated with a wide variety of success rates mostly due to the wide range of patients and disease spectrum.
- Choice of the candidate is the key point in predicting the AF free interval post ablation.
- Procedural Safety and Efficacy are of outmost important
- When to choose Cryo Vs Radiofrequency ablation
- Post ablation arrhythmia identification and how to manage .



