Abstract ID: 000378

Electrophysiological findings in patients undergoing surgical cryo-ablation for treatment of atrial fibrillation

Background / Study Objective

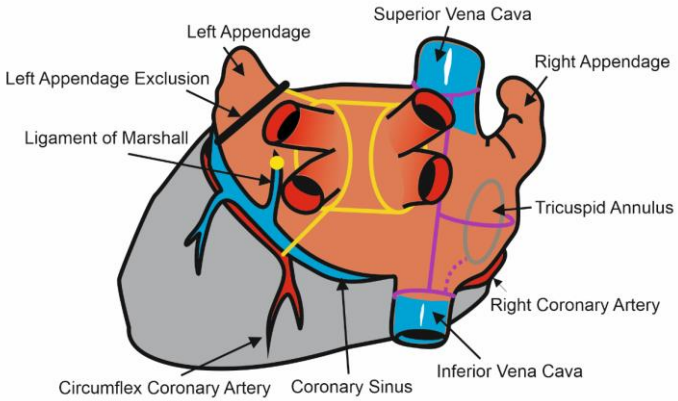
- Current recommendations support surgical treatment of atrial fibrillation (AF) in patients indicated for cardiac surgery
- These procedures are referred to as concomitant and may be carried out using radiofrequency energy or cryo-ablation
- This study aimed to assess the electrophysiological findings in patients undergoing concomitant cryo-ablation of persistent AF

Patients

- Patients ≥18 years with non-paroxysmal AF who were indicated for cardiac surgery (coronary artery bypass grafting, valve surgery, or a combination of both) were screened
- They were eligible for the trial if suitable for the concomitant CryoMaze procedure based on expert consensus statements
- Exclusion criteria comprised AF secondary to a reversible cause, left atrial diameter >55 mm, previous surgical or catheter ablation for AF, chronic kidney disease (stage ≥4), contraindication to systemic anticoagulation, estimated life expectancy <1 year, and inability to mentally/physically comply with all trial requirements

Methods

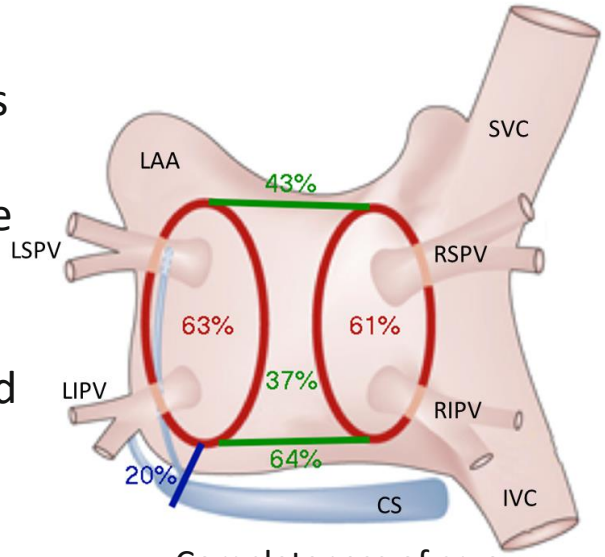
- Patients in the trial were randomly assigned in a 1:1 ratio to (i) **the Hybrid Group** or (ii) **the Surgery Group**
- Patients randomized to the Surgery Group were treated conservatively after cardiac surgery
- Patients randomized to the Hybrid Group were admitted for a staged catheter ablation 90±20 days after the surgical procedure
- Dense electroanatomic mapping of the LA and RA was performed using a CARTO3 navigation system in combination with multipolar circular mapping catheter to provide information about the location of the cryo-lesions



Scheme of surgical cryo-lesions

Results 1

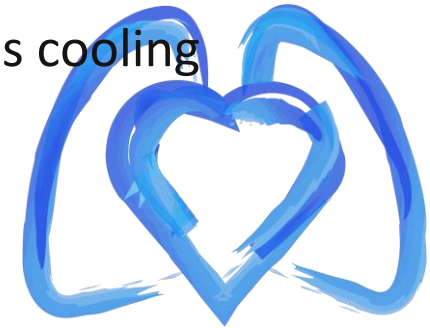
- We analyzed 103 patients who underwent RFCA 105±35 days after CryoMaze surgery
- Seventy-five of 103 patients (72.8%) presented with SR at the beginning of the RFCA procedure
- **Pulmonary veins (PVs):**
  - Left and right pulmonary veins (PVs) were found isolated in 65 (63.1%) and 63 (61.2%) patients, respectively
  - All 4 PVs were surgically isolated in 49 patients (47.6%).
- **Linear lines:**
  - The LA posterior wall isolation and mitral isthmus conduction block were found in 38 (36.9%) and 18 (20.0%) patients, respectively
- **The complete left atrial lesion set** (i.e., PV isolation complemented by the box lesion and mitral isthmus block) was achieved in only 19 patients (18.4%)



Completeness of cryo-thermal ablation lines after the left CryoMaze procedure

Results 2

- Electrical reconnections (gaps) in the left PVs were more often localized superiorly than inferiorly (57.9% vs. 26.3%, P=0.005) and anteriorly than posteriorly (65.8% vs. 31.6%, P=0.003)
- Gaps in the right PVs were more equally distributed antero-posteriorly but dominated in superior segments (72.5% vs. 40.0%, P=0.003)
- There was a higher number of gaps on the roof line compared to the inferior line (131 (67.2%) vs. 67 (42.2%), P <0.001)
- Compared to epicardial cryo-ablation, endocardial was more effective in creating PVs and LA posterior wall isolation (P <0.05)
- Cryo-ablation using nitrous oxide (N_20) or argon (Ar) gas as cooling agents was similarly effective (P=NS)



Conclusion

- The effectiveness of surgical cryo-ablation in achieving transmural and durable lesions in the left atrium is surprisingly low
- Gaps are located predominantly in the superior and anterior portions of the PVs and on the roof line (important feed-back for the surgeon!)
- As expected, endocardial cryo-ablation is more effective than epicardial ablation, irrespective of the cooling agent used
- Proper training is needed for AF surgery, and the surgical community should take AF treatment more seriously and perhaps, make it a specialty with dedicated surgeons as with other surgical procedures.