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Late Outcome of Atrial Fibrillation Ablation Program at Unity Point Health Methodist in Peoria Illinois

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Abstract

Study Method: The objective of this study was to evaluate the long term efficacy and safety of the atrial fibrillation program at Unity Point Health Methodist in Peoria.

Methods: A retrospective analysis was performed on patients who had atrial fibrillation procedures at Unity Point Methodist from February 19 th 2010 to September 26 th 2014. Patients were enrolled and information obtained through the patient's medical records.

Results: The study consisted of 53 patients, 65 percent of patients were paroxysmal, and 35 percent had chronic or persistent atrial fibrillation. The mean age was 66 +/- 23 (45 to 89 years). The average CHADS-Vasc Score is score is 2.13. Baseline co-morbidities included 34 individuals with HTN, 10 with Diabetes, and 4 with coronary artery disease. The average EF was 55% +/-25 (30% to 70%) and the average LA diameter 41 +/-15 mm (25-56). The average number of antiarrhythmic was 1.5 prior to ablation.

After a mean follow-up of 28 ± 29 months (range, 3 to 57 months), freedom from AF was 94% overall (51 of 53 patients, including 52 were on antiarrhythmic drugs), 94% for paroxysmal AF (34 of 36 patients, including 24 of whom discontinued their antiarrhythmic drugs), and 94% for persistent AF (16 of 17 patients, including 9 no longer on antiarrhythmic drugs). 76 percent experienced a decrease in their antiarrhythmic medications of which 60 percent discontinued antiarrhythmic altogether.

Out of the 53 patients, there were three major but completely reversible transient complications. Two of the complications were related to pericardial effusion that was successfully drained with no recurrence. The last complication was phrenic nerve injury in a patient who showed complete recovery 4 month after the procedure.

Conclusions: Long-term results of atrial fibrillation ablation at Unity Point Health Methodist showed safety and efficacy of the program in the treatment of symptomatic atrial fibrillation in both paroxysmal and persistent groups.

Introduction

Catheter ablation of atrial fibrillation (AF) has become an established therapeutic modality for the treatment of patients with symptomatic AF.[1] Studies reporting outcomes of AF ablation have predominantly limited follow-up to 1 to 2 years after the index ablation procedure.[2]

Until recently, few series have presented the long-term outcomes of AF ablation at ≥3 years of follow-up. In the current study, we evaluated the long-term single- and multiple-procedure efficacy of AF ablation done at a single center (Unity Point Health Methodist in Peoria).

Our atrial fibrillation program started in January 2010, and along with electrophysiologist Dr. Adel Mina, it is supported by 6 cardiologists from Methodist Medical, 2 cardiovascular surgeons, 5 EP lab staff personnel, and 2 supportive advanced practitioner personnel with strong collaborations with anesthesia, nursing and administrative staff.

Disclosures:
None.

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Atrial fibrillation is a burden not only economically but quite burdensome to the patient's quality of life. To date approximately 16.6% of strokes are originating from atrial fibrillation due to embolic phenomena.[3] Adjusted mortality based on Framingham Heart Study is increased in patients who had atrial fibrillation.[4] Furthermore, symptoms of atrial fibrillation along with side effects from rate control and antiarrhythmic medication often negatively affect the quality of life of patient.

Unity Point Health Methodist Medical Center is the first center in Peoria to start atrial fibrillation ablation program. Initiation of program required special consideration in terms of staff training, equipment update, other logistics in terms of implementing protocols and strict patient follow up for such detailed procedures.

Methods

Patients who had atrial fibrillation ablation between February 19 th 2010 to September 26 th 2014 were analyzed via chart reviews. Statistical analysis was performed. Also Ablation protocol is mentioned.

Atrial Fibrillation Ablation Procedure

Standard venous access using three 8 French sheaths were inserted into the right common femoral vein using ultrasound guidance.

Table 1: Baseline Patient Characteristics

Total Number of Patients	53
Mean AGE	66.22+/- 10.8
MALE	33
FEMALE	20
Hypertension	34
Diabetes	10
CAD	4
Left Atria AP diameter (mm)	41 +/-5
LVEF %	55%+/-8
CHA2DS2VASC Score	2.13
Number of Prior Drugs Failed	
0	1
1	33
2	14
3	4
Failure more than 1 Antiarrhythmic	14
Efficacy Failed AF drugs	
Flecainide	5
Propafenone	2
Sotalol	36
Dofetalide	1
Amiodarone	23
Multaq	9
Anticoagulation >3 months Post Procedure	
Coumadin	25
ASA	17
Pradaxa	6
Eliquis	3
Xarelto	4

Likewise, a 9 French sheath into the left common femoral vein and a 7 French sheath into the right internal jugular vein.

Transesophageal echocardiogram had been done prior to the procedure as well as a 64 slice CAT scan. Anatomy obtained from both modalities was integrated with electroanatomical mapping anatomy obtained from EnSite Velocity System.

Anticoagulation was done by keeping patients on Coumadin. Target INR between 2 and 3 before the procedure, as well as after the procedure for at least 3 months. Periodic INRs were done before and after the procedure.

General anesthesia with hemodynamic monitoring was done in all patients with the anesthesia team. Arterial lines were inserted through the femoral arteries to confirm hemodynamic stability.

AcuNav intracardiac echocardiogram 8 French was inserted into the left common femoral vein and placed into the right atrium, it was used to monitor transeptal puncture as well as confirming catheter stability and position, it was also used to evaluate contact of catheter during ablation and to provide safety guards for early detection of complications.

Duodecapolar catheters were inserted through the right internal jugular vein into the coronary sinus with the proximal poles in the high right atrium. Right ventricular quadripolar catheter inserted into the right ventricle.

Two transseptal punctures were done using Across system. This was done under intracardiac echo as well as fluoroscopy guidance. This was also continued to be monitored with hemodynamic guidance. SafeSept wire was used to avoid through and through punctures.

A spiral catheter was used to obtain electroanatomical mapping of the left atrium which was later merged with CT imaging anatomy.

Esophageal temperature probe was advanced into the esophagus and intermittently repositioned in close proximity to the ablating catheter. This was important to evaluate change in temperature during ablation. Any significant rise of more than 0.5° was enough to consider lowering the wattage output, as well as moving to another area. Power was titrated at 20 watts with an irrigation catheter in areas close to the esophagus.

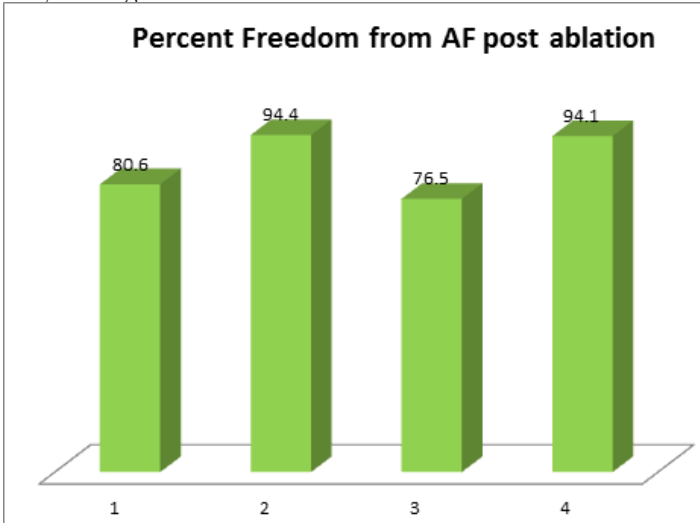
All patients had pulmonary vein antral isolation isolation, care was taken to insure entrance and exit block from the pulmonary viens, later during the last year care was also given to achieve delayed signal into the veins prior to complete isolation. Multiple substrate modifications including left atrial roof line, mitral annular line and cavotricuspid isthmus line, other lines and complex fractionated atrial electrograms were also targeted in patients with persistent or long lasting persistent atrial fibrillation.

Anticoagulation was done with heparin bolus, as well as drip to maintain ACT more than 350 and less than 400, frequent ACTs were checked every 15 minutes, and heparin readjusted until ACTs remained stable.

Left atrial pressure, as well as patient's inputs and outputs were continuously monitored throughout the procedure. Ablation done using saline irrigation catheters with power of 35 watts except for areas close to the esophagus or inside the veins it was titrated to 20 watts. Care was done to avoid ablation inside veins and rather to isolate veins just outside the os.

After ablation, if the patient continued to have atrial fibrillation, DC cardioversion was done.

Isuprel started in all patients with decremental atrial pacing down to cycle length of 200. Patients with inducible atrial fibrillation or



1=PAF single procedure success rate
2= PAF multiple procedures success rate
3=Persistent AF single procedure success rate
4=Persistent AF multiple procedures success rate

Figure 1: Freedom form AF for both paroxysmal and persistent groups after single and multiple procedures

Table 2: Adverse Events

Procedure Adverse Events	N=53
Stroke	0
TIA	0
Tamponade	2
MI	0
Hemorrhage Requiring transfusion	0
New Atrial Flutter	0
Esophageal Fistula	0
Death	0
Phrenic Nerve Injury	1
Areteriovenous Fistula	0
Pseudoaneurysm	0
Pulmonary Vein Stenosis	0

flutter received further ablation when appropriate.

Protamine 30 to 40 mg was given, and catheters were removed at the end of the procedure. Hemostasis achieved by manual pressure at venous access sites.

Patients stayed overnight and typically sent home the second day. Average lengths of hospital stay 2.4 days. Most common reason to extend hospital stay is for patient to achieve therapeutic INR.

Postablation Management

After ablation, all patients were placed on anticoagulant therapy and observed with telemetry monitoring for 24 to 48 hours. For persistent or long lasting persistent AF patients who had resistant and long-lasting arrhythmia, we thought that antiarrhythmic drugs could improve the likelihood of modifying atrial electrical remodeling and maintaining sinus rhythm. Therefore, such patients were discharged with 1 drug that, in the past, seemed to be well tolerated although unable to prevent AF.

Patient with Paroxysmal atrial fibrillation antiarrhythmic medication were discontinued 5 days prior to the procedure and were restarted if patients experienced recurrence or have multiple comorbidities. Patients on amiodarone were discontinued > 1 month prior to procedure.

Attempts were made to remove antiarrhythmics after 3 months in the absence of AF recurrence, unless other risk factors were present. Other medications, including digitalis, β-blockers and calcium antagonists, were prescribed when indicated.

All patients were followed up periodically with a periodic Holter monitor done every 3 months 1st year, as well as EKGs to evaluate for recurrence if the patient maintained sinus rhythm. Patients with pacemakers had device interrogation every 3 months. All patients had periodic cardiology visits and EKGs every 3-6 months thereafter and if symptomatic repeated holter or 30 day event monitors (Ambulatory Cardiac Telemetry) were performed.

The procedure was considered successful if no recurrences of AF lasting >30 s were present post blanking period (3 months post procedure).

Results

Baseline Patient Characteristics

The study consisted of 53 patients 33 of which were male and 20 were female (table 1). 65 percent of patients were paroxysmal, and 35 percent had chronic or persistent atrial fibrillation. The mean age was 66 +/- 23 (45 to 89 years). The average CHA2DS2VASC Score is score is 2.13. Baseline co-morbidities included 34 individuals with HTN, 10 with Diabetes, and 4 with coronary artery disease. The average EF was 55% +/-25 (30% to 70%) and the average LA diameter 41 +/-15 mm (25-56). The average number of antiarrhythmic was 1.5 prior to ablation.

Clinical Outcome

After a mean follow-up of 28 ± 29 months (range, 3 to 57 months), freedom from AF was 94% overall (51 of 53 patients, including 52 were on antiarrhythmic drugs), 94% for paroxysmal AF (34 of 36 patients, including 24 of whom discontinued their antiarrhythmic drugs), and 94% for persistent AF (16 of 17 patients, including 9 no longer on antiarrhythmic drugs) Figure 1.

76 percent experienced a decrease in their antiarrhythmic medications of which 60 percent discontinued antiarrhythmic altogether.

Patients with and without AF recurrence are compared in Table 3. Subgroups did not differ in age, LA diameter, but ejection fraction was significantly lower (P= 0.00028) in paroxysmal AF patients with unsuccessful ablation first procedure.

Out of the 53 patients there were three total major but completely reversible transient complications. Two of the complications were related to pericardial effusion that was successfully drained with no recurrence. The third complication was phrenic nerve injury in a patient who showed complete recovery 4 month after the procedure (Table 2).

The average fluoroscopy time during procedures was 6.4 minutes.

Discussion

The present study confirmed the high success rate (94%) of circumferential PV ablation in a small cohort of patients with paroxysmal AF. It also confirmed a high success rate (94%) of circumferential PV ablation followed by multiple substrate modifications with persistent AF. Although most patients were free from structural heart disease we were able to still achieve good results in patients who are elderly and has multiple comorbidities.

Table 3: Clinical Outcome in correlation with baseline characteristics

Clinical Variables	Paroxysmal AF(36 patients)				Persistent AF (17 patients)			
	No Recurrence	Single Procedure Recurrence	Multiple Procedure Recurrence	P	No Recurrence	Single Procedure Recurrence	Multiple Procedure Recurrence	P
Number of Patients	29	7	2		13	4	1	
Mean Age	68	63	77	NS	66	68	79	NS
Left Atrial AP Diameter(mm)	40	44	43	NS	40	42	56	NS
LVEF %	57	51	51	0.00028	51	54	55	NS

P = P value comparing patients with no recurrence to single procedure recurrence in both paroxysmal and persistent groups. P<0.05 was considered significant. NS= Not-significant

Left atrial size did not seem to influence the outcome in paroxysmal AF patients or persistent AF patients may be related to small sample size and patient selection as most patients had no significant left atrial enlargement. Patient with lower ejection fraction were more likely to have recurrence in the paroxysmal group.

There were no significant difference in atrial size, age or ejection fraction between patients with paroxysmal and persistent atrial fibrillation. Patients with persistent AF were more likely to go for a second ablation than patients with paroxysmal AF, most of them related to atypical flutters that needed further substrate modifications.

Compared with other studies,[5,6] the patients done at Unity Point Health Methodist were a somewhat older population. Despite the age difference, late outcome was highly favorable. Our long term success rate with single and multiple procedures in both paroxysmal and persistent AF patients are better than those reported in other long term follow up studies.[5,6] This could be related to better patient selection, better technique, or smaller population sample.

Also our number of procedures per patient is 1.32 lower compared with 1.51 or 1.75 averages in other centers.[6,7] Our fluoroscopy use is below other reported studies.[8] We also had five patients who had their ablation procedure performed without use of any fluoroscopy.

Compared with our early outcome for atrial fibrillation ablation we noticed decrease in fluoroscopy time, improved success and lower rate of complications.[9] These findings strengthen the development for new organized, well-structured atrial fibrillation ablation programs in underserved areas. Continued assessment and evaluation of the program will be essential to have continued success of maintaining the best outcome.

Limitations

There are some limitations of this study including, it is a single center experience with limited number of patients. There was potential for atrial fibrillation recurrence to be missed as the tools available to monitor the patient (Holters and event monitors) only allow for short windows of monitoring.

Conclusion

The data presented in this study showed encouraging rates of success at long-term follow-up with catheter ablation of AF. Long-term freedom from atrial arrhythmia was achievable in the majority of patients in our center.

Atrial fibrillation ablation program at Unity Point Health Methodist in Peoria is safe and effective for treatment of symptomatic atrial fibrillation. Our outcomes are favorable and comparable with other centers of excellence for AF ablation.

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