

Safety of Same Day Discharge after Atrial Fibrillation Ablation

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Abstract

Introduction: It is routine practice to observe patients (pts) overnight in the hospital after atrial fibrillation (AF) ablation. We report single center experience comparing the rate of complications prior to and after implementing a strategy of same day discharge (SDD) following AF ablation.

Methods: We reviewed the charts of consecutive pts who underwent AF ablation between Jan 2005 to Dec 2015. Patients who were electively admitted to undergo AF ablation or left atrial flutter ablation (AFL) were included. Patients undergoing only right atrial flutter ablation and those admitted inpatient were excluded. In Sept 2012 SDD strategy was implemented. Complication rates were collected up to 3 months post ablation. Major complications were defined as death, pericardial tamponade, cerebrovascular accident (CVA), hematoma requiring intervention, pulmonary vein stenosis, diaphragmatic paralysis or atrioesophageal fistula formation. Minor complications were defined as hematoma not requiring intervention and procedure related readmissions. Comparisons were made using an intention to treat analysis.

Results: Group A (between Jan 2005 to Feb 2010) included 145 patients (87 males; 60.2 yrs mean age; 103 paroxysmal AF) who were observed overnight. Group B (between Mar 2010 to Dec 2015) included 426 patients (298 males; 62.3 yrs mean age; 247 paroxysmal AF) undergoing ablation following implementation of the SDD strategy. Patients in Group B were contacted by phone next day. In Group B, 51/426 (12%) pts were not discharged same day due to non-ablation related medical care (15/50 pts), ablation related complications (17/50 pts), pt preference (14/50 pts) and late cases (5/50 pts). Rate of total complications was more frequent in Group A (Group A 11.7% vs Group B 4.4%; p 0.026). Major complications occurred in 2 pts in Group A and 6 pts in Group B. None of the major complications in Group B occurred within 24 hrs of discharge. Only 1 pt in Group B had pericardial effusion drained 10 days post procedure. Most common minor complication in Group A was hematoma not requiring intervention and in Group B was procedure related readmissions.

Conclusions: Our data suggest that SDD after AF or AFL ablation can be safely implemented in majority of pts with similar outcomes as pts observed overnight.

Introduction

In appropriate patients ablation treatment for AF has rapidly become standard of care as recommended by various guidelines.¹⁻³ Several studies have shown that ablation procedure is more effective in controlling AF symptoms when compared to anti arrhythmic medications⁴⁻⁶. This has led to explosion of number of AF ablations done worldwide. Same day discharge (SDD) of patients after ablation of common arrhythmias has been shown to be safe⁷⁻⁸. It is standard of care after AF ablation to observe patients overnight in the hospital. This is mainly due to concerns regarding procedure

related complications within twenty four hours of ablation. Same day discharge is an attractive option as it results in less health care utilization, which can then potentially translate to better patient satisfaction and health care cost savings. We report single center experience comparing the rate of complications prior to and after implementing a strategy of same day discharge following AF ablation.

Methods

Patient Selection:

After obtaining IRB approval, we reviewed charts of consecutive patients who underwent AF and left atrial flutter (AFL) ablation in our institution between January 2005 and December 2015. Patients who underwent AF ablation as inpatients and standalone right sided flutter ablation were excluded from the study. In September 2012 strategy of SDD was implemented. SDD was defined as discharge home within same calendar day. All patients who had SDD were contacted next day by phone. Group A included patients who

Key Words

Atrial fibrillation, Ablation, Same day discharge, Complications.

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were observed overnight. Group B included patients following implementation of the SDD strategy.

Ablation Technique:

All patients on the day of procedure were brought to the electrophysiology laboratory in a fasting non-sedated state. AF and AFL ablations were performed under either monitored anesthesia (MAC) or general anesthesia. Right and left femoral veins were accessed and typically four sheaths (one 8 French and three 7 French sheaths) were placed utilizing modified seldinger technique. A 6 French steerable decapolar catheter (Boston Scientific, Minnesota, USA) was placed in coronary sinus under fluoroscopic guidance. Double trans-septal puncture was performed under intra cardiac echo (Siemens, Johnson and Johnson, USA) and fluoroscopic guidance with continuous pressure monitoring using BRK transeptal needle (St Jude Medical, Minnesota, USA). Three dimensional mapping of the atria was performed using Carto mapping system (Biosense Webster, Johnson & Johnson, New Jersey, USA). Pulmonary vein isolation was performed in all patients mostly using Lasso (Biosense Webster, Johnson & Johnson, New Jersey, USA) guidance. Effort was made to confirm entrance block into and exit block out of pulmonary veins. Additional ablation (linear lesions, complex fractionated electrogram ablation) were done in individual patients based on their underlying arrhythmia as per physician discretion. For anticoagulation heparin was used during procedure, with activated clotting time (ACT) goals varying during the study period. Typical goal of ACT was to keep it between 300 to 350 during later part of study period. Oral anticoagulation was resumed same day post procedure. Peri-procedure anticoagulation regimen was not standardized but was done as per operator preference. In general use of peri-procedure lovenox was more common in Group A than Group B. As ablation technique evolved there was move towards doing ablation without interrupting anticoagulation in Group B.

Follow up:

Group B patients were monitored for at least 6 hours post ablation in cardiac monitoring unit. Prior to discharge patients received detailed written instructions. Group B patients were reassessed by the nursing staff prior to discharge including inspection of groin access sites. SDD was cancelled if patient had any ablation related complications, non-ablation related medical care or due to patient specific/social reasons. Group A patients who stayed overnight were discharged home next day by the cardiology service if patient was clinically stable. PredischARGE echocardiogram was not routinely done in either group. Post ablation electrocardiogram was obtained in all patients. Patients were instructed to follow in 2-4 weeks in office. Hospital records and outpatient electronic records up to three months post ablation were reviewed. Data collected include patient demographics, clinical history, anticoagulation status and complications. Major complications were defined as death, pericardial tamponade, stroke, hematoma requiring intervention, pulmonary vein stenosis, diaphragmatic paralysis or atriopharyngeal fistula formation. Minor complications were defined as hematoma not requiring intervention and procedure related readmissions.

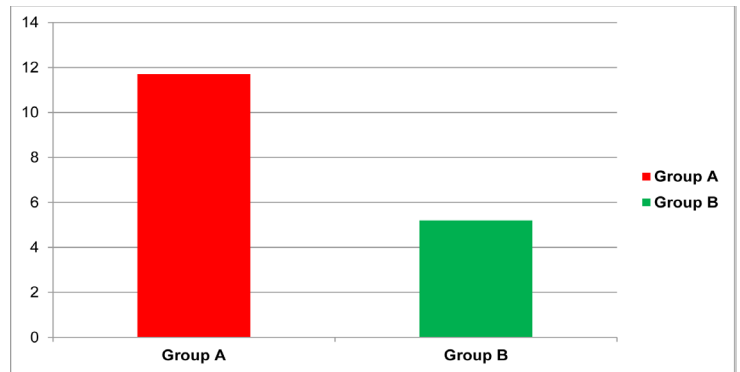


Figure 1: Total Complications in Groups A and B.

Table 1: Patient Baseline Characteristics

	Group A	Group B	P value
# patients	145 (25.4%)	426 (74.6%)	
Mean Age (yrs)	60.2	62.3	0.05
Males	86 (60%)	298 (52%)	0.06
Paroxysmal Afib	103 (72.5%)	247 (56.7%)	0.003
PVI	53 (40.5%)	162 (38.9%)	0.75

End Points:

Primary endpoint was comparison of complications rate between Group A and Group B patients.

Statistics:

Comparisons were made using intention to treat analysis.

Results

Total of 571 charts were reviewed and included in the study. Baseline characteristics of the patients in the study are shown in Table 1.

Group A included 145 patients who underwent ablation procedure between January 2005 to February 2010 and were observed overnight. Mean age was 60.2 years, with majority of patients being male (60%). Paroxysmal atrial fibrillation (PAF) was the dominant presenting arrhythmia (72.5%). Group B included 426 patients, between March 2010 to December 2015, undergoing ablation following implementation of the SDD strategy. Mean age was 62.3 years, with male (52%) and female (48%) genders almost equally represented. PAF was again the frequent presenting arrhythmia (56%). PAF was more common in Group A compared to Group B (72.5% vs 56.7% p=0.003). Pulmonary vein isolation ablation alone was performed in 40.5% in Group A and 38.9% in Group B (p=0.75).

In Group B, 50/426 (12%) patients were not discharged same day; 15 due to non-ablation related medical care, 17 for ablation related complications and 18 due to patient preference. No follow up data was available for 15 patients in Group A and 19 in Group B.

Total complications were more frequent in Group A as shown in

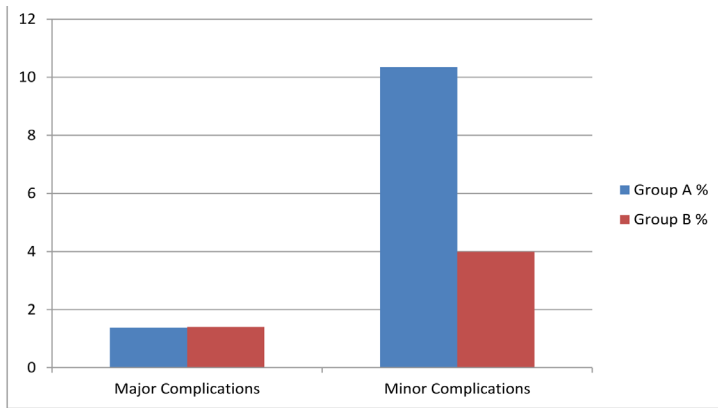


Figure 1: Total Complications in Groups A and B.

Table 2: Characteristics of patients with complications

	Group A	Group B	P value
Complications	17 (11.7%)	23 (4.4%)	p=0.026
Mean age (yrs)	65.9	64.2	p=0.66
LA size (cm)	4.3	4.5	p=0.55
Average Max ACT	331.7	325.1	p=0.69
Mean EF (%)	59.2	56.4	p=0.37
PVI only	4 (25%)	10 (47%)	p=0.15
Antiplatelet agent	7 (38.9%)	4 (18.2%)	p=0.14
DM	4 (22%)	8 (36%)	p=0.32
HTN	12 (66.6%)	11 (50%)	p=0.28
CAD	4 (22%)	1 (12.5%)	p=0.08

Figure 1 (Group A 11.7% vs Group B 4.4%; p 0.026).

Procedural characteristics of patients with complications in Group A & B are presented in Table 2.

In Group A, 17 total complications occurred while 23 total complications were seen in Group B. Major complications occurred in 2 patients (1.37%) in Group A, who had significant bleeding post procedure requiring blood transfusions (Figure 2).

In Group B major complications occurred in 6 patients (1.4%); 3 had pericardial effusion requiring drainage, 2 had transient ischemic attacks without residual sequelae and 1 required blood transfusion. None of the major complications in Group B occurred within 24 hours of discharge. Only one patient in Group B had pericardial effusion drained 10 days post procedure. Minor complications were common in Group A compared with Group B (10.3% versus 3.9%). Most common minor complication in Group A was hematoma not requiring intervention and in Group B was procedure related readmissions.

Discussion:

Our study shows that it is safe and feasible to discharge patients same day after atrial fibrillation ablation procedure. None of the patients discharged home same day had significant complications within twenty four hours of discharge. In fact total complications

occurred more often in Group A patients who were observed overnight, suggesting operator inexperience and peri-procedure anticoagulation management as possible explanation.

Previous studies have shown that it is safe to discharge patients same day after common supraventricular arrhythmia ablation procedure. We believe this is the first study that has looked at the issue of same day discharge after AF ablation. Kalbfleisch et al studied 100 cases who underwent outpatient radiofrequency catheter ablation of accessory atrioventricular connections and found that only 2 patients had late femoral artery pseudoaneurysm requiring surgical repair⁹. Similarly in our study in Group B one patient had pericardial effusion that was drained 10 days post ablation, when he presented with persistent chest pain and shortness of breath. Pericardial effusion is one of the most feared early complication that can occur after AF ablation, especially as all these patients undergo trans septal procedure and require anticoagulation during ablation. Majority of these tend to happen during the procedure¹⁰. It was reassuring to see that none of our patients who went home same day had pericardial effusion within 24 hours after their discharge. Our study suggests that if patients have no pericardial effusion at end of procedure as visualized on intra-cardiac echocardiogram and are hemodynamically stable for 6 hours post ablation, their risk of developing pericardial effusion within 24 hours of discharge is very low. We did not require routine echocardiogram prior to discharge in the same day patients, as all our ablations are done utilizing intracardiac echocardiogram.

Since arterial cannulation is not routinely required during atrial fibrillation ablation, late vascular complications tend to be rare. Hematoma formation requiring no intervention was more common in Group A suggesting either anticoagulation regimen (frequent peri-procedure use of lower molecular weight heparin) or less experience as possible contributing factor. None of the patients, in either groups, required blood transfusion or intervention for vascular complication after discharge.

Other serious complications unique to AF ablation, like pulmonary vein stenosis and atriopharyngeal fistula formation, tend to present days or weeks later¹¹⁻¹², hence early discharge will not determine outcomes due to these issues.

Early discharge can lead to improved patient satisfaction at same time reducing health care utilization. Delivering safe and cost effective health care has become the corner stone of all health care policies. Same day discharge after AF has potential for cost savings. Though we have not yet analyzed the cost saving data in our study, prior studies utilizing same day discharge strategy after electrophysiology procedures have shown cost benefits¹³. Since AF ablation is fast becoming the most common ablation procedure done by electrophysiologist around the world, potential cost savings associated with same day discharge after this procedure can have significant impact on our health care delivery system.

Our study is not without limitations. It was a single center, retrospective study. Retrospective nature of the study clearly is the main limitation of the study even though main characteristics of the patients in both the groups were similar as shown in Table 2. Confounding cannot be excluded despite intention to treat analysis.

Over period of time, the ablation technique, technology and operator experience also changed. These factors can obviously influence outcomes. Clearly, as operators become more experienced the risk of complications tend to get lower, which can explain lower complication rate in Group B. Historically, use of Enoxaparin has been associated with significant peri procedural bleeding complications. Higher incidence of minor bleeding complications is probably related to that. One has to realize AF ablation is a complex procedure and should not be trivialized in terms of post procedural care. Overnight observation still provides a very high level of post-operative care, patient education and comfort that is of paramount important in taking care of these highly complex patients. The complexity of AF ablation has evolved over the years. Operators are ablating more extensively utilizing general anesthesia more often than otherwise. This imposes a higher level of morbidity mandating a closer and intense post-operative care. The decision to discharge a patient on the same day after AF ablation should be adjudicated on a case by case basis. This process should not be generalized and create a false sense of confidence for less experience operators.

In addition, ablations were performed in a high volume center by experienced electrophysiologist. These data may not be applicable to low volume centers or less experienced electrophysiologist. There was no pre-specified ablation strategy and peri-procedure anticoagulation regimen was not uniform through-out the study period. Some studies have used preset criteria to determine same day discharge after electrophysiology procedures. It would be reasonable to follow these criteria by individual electrophysiologist in their practices. None of these patients underwent ablation using cryoballoon technology. Hence these data cannot be extrapolated to patients undergoing AF ablation using cryoballoon technology.

Conclusions:

Our study suggests that same day discharge after AF ablation may be feasible in highly selected cases. Further multicenter or randomized studies are needed before routine implementation of this strategy.

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