Heart Science and Heart Surgery Journal

Chembio Publishers
Right Choice for Researchers

Research Article *Volume 2; Issue 1*

A Retrospective Study on Determinants of Successful Electrical Cardio version in Our Lady of Lourdes Hospital, Single Center Study

Tahilyani A*, Paul K, Murphy N, Carmel H, Grace G, Hina A, Lucy M, Nicola F, PS Iqbal, Mansur A and Pasha N

Department of Cardiology, East Surrey Hospital, UK

***Corresponding author:** Dr. Ashok Tahilyani, Specialty, Fellow Cardiology, East Surrey Hospital Red hill, London, UK, Email: ashoktahilyani@yahoo.com

Received Date: December 04, 2018; **Published Date:** January 08, 2019

Abstract

Aim: To investigate the determinants of successful cardioversion in selective group of patients admitted electively for electrical cardioversion (DCCV) in our center.

Method: Charts of patients admitted for DCCV in CCU at our center were audited. Total of 58 patients underwent DCCV during our study period. Variable used were age, gender, comorbidities such as HTN, DM, COPD, CKD, anemia, IHD, CVA or TIA. We calculated CHA2DS VASC and HAS Bled Score. We looked through their echo study including their EF, L a size, RVD, any valvular disease.

Results: A total of 58 patient charts were studied, age group and their comorbidities were recorded. The common comorbidity was HTN 68.9%, followed by obesity 39.6%, IHD 22.41%. COPD in 12.06%. DM and CKD were of equal prevalence - 6.89%. Anemia, CVA or TIA were noted in 3.44% and 1.7% patients respectively. CHA2DS VASC and HASBLED score was also recorded. Echocardiogram findings are as below. EF of 20-30% was noted in 6 patients, 35-45% in 5 patients, 45-55% in 15 patients and >55% in 27 patient. Echo was not done in 5 patients. Poor images noted in 2 patients. LA size was reported as normal in 21 patients, 12 patients had mild enlargement of LA while others had moderate to severely enlarged (>5.0cm) LA. The LA size in 9 patients could not be assessed accurately.

Conclusion: There is no historical data available to report on individual determinants of success of DCCV. We observed that normal LA size is an independent decisive factor in successful restoration of SR from AF followed by optimal blood pressure control and obesity. In another subset of this, we also noted that two or more medical comorbidities with moderately enlarged LA had difficulty in restoration of SR with DCCV.

Keywords: Electrical cardioversion; Chronic kidney disease; Patients

Abbreviations: AF: Atrial Fibrillation; DCCV: Direct Cardioversion; LA: Left Atrium; CAD: Coronary Artery Disease; ECG: Electrocardiogram; IHD: Ischemic Heart Disease; ECG: Electrocardiogram; EF: Ejection Fraction

Introduction

Atrial fibrillation (AF or A-fib) is an abnormal heart rhythm characterized by rapid and irregular beating of atria. Often it starts as brief periods of abnormal beating

Citation: Tahilyani A, et al. A Retrospective Study on Determinants of Successful Electrical Cardio version in Our Lady of Lourdes Hospital, Single Center Study. Heart Sci Heart Surg J 2019, (1): 180005.

which become longer and possibly constant over time. Often episodes have no symptoms. Occasionally there may be heart palpitation, fainting, light headedness, shortness of breath and stroke [1-4]. The disease is associated with an increased risk of heart failure, dementia and stroke [3]. It is a type of supraventricular tachycardia [5]. Atrial fibrillation is the most commonly sustained arrhythmia and is associated with troublesome symptoms and mortality rate is almost double in match control. In addition A. Fib is responsible for 23.5% of stroke in those aged 80- 89 yrs [6]. Restoration of sinus rhythm is associated with improvement in exercise capacity, haemodynamic parameters and atrial size.

The pathophysiology of AF is complex and incompletely understood, but atrial remodelling and fibrosis seem to play a key role [7-9]. The left atrium (LA) has a reservoir and conduit functions, and is an important regulator of left ventricular filling. It also reflects an important electrophysiological substrate and has neurohumoral properties by releasing natriuretic peptides. Those factors are closely related to left ventricular systolic and diastolic function [8]. LA enlargement itself is an important risk factor for incident AF [10] and is related to an increased stroke risk. LA size is also a key determinant for the success of rhythm control strategies in patients with AF [8,9]. In the general population without established cardiac diseases, various factors influencing the LA volume have been described, including age, body size, body mass index and elevated blood pressure [8-12].

Atrial fibrillation is a very common clinical problem. Often it is a frequent cause of hospitalization for patient admitted via emergency department or through acute medical assessment unit. There common symptoms of presentations are palpitation, dyspnea, chest pain, dizziness etc. These patients are often treated optimally with appropriate anticoagulants and heart rate control therapy. Eventually, they undergo electrical cardioversion (DCCV). Despite of appropriate treatment regimen, patient has recurrence of atrial fibrillation. A very little is known about the medical comorbidities and function status of these patients. There is therefore an important paucity of the data indicating the prognosis, recurrence and failure or success of electrical DCCV.

Aim

We sought to investigate the determinants of successful cardioversion in selective group of patients who were admitted electively for electrical cardioversion (DCCV) in Our Lady of Lourdes hospital six months i;e from 1st Jan 2017 to 30th June 2017.

Method

We audited the charts of the patient admitted electively for electrical cardioversion in our coronary care unit at Our Lady of Lourdes Hospital. Total of 58 patients had undergone electrical cardioversion during our study period in last six months, i: e from January 2017 to June 2017. We retrospectively reviewed the case notes of all those patients with atrial fibrillation. Variable used were age, gender, medical comorbidities such as Hypertension, diabetes, chronic obstructive pulmonary disease, chronic kidney disease, anemia, ischemic heart disease, cerebrovascular accident or transient ischemic attacks. We calculated CHA2DS VASC score, HAS Bled Score. We looked through their echo study in detail including their ejection function, Left atrial size, Right ventricular dysfunction, and any significant valvular disease.

Results

A total of 58 patients charts were studied (40 were males and 18 were females). With age group 45yrs -55yrs (12males, 1 female) 55yrs -65yrs (6males, 1female) 65yrs -75yrs (10males, 9 females) 75yrs -85yrs (13males, 7 females) (Figure 1). Their comorbidities (Table 1) were recorded.

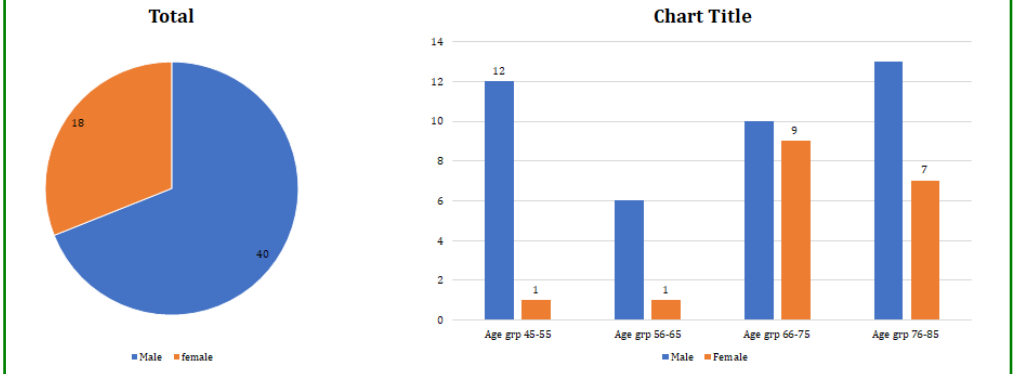

Figure 1: Total number of patient & their distribution age category, gender wise.

Hypertension	40 patients	68.9%
Obesity	23 patients	39.6%
IHD	13 patients	22.41%
COPD	7 patients	12.06%
DM	4 patients	6.89%
CCD	4 patients	6.89%
Anemia(Hb<9.0)	2 patients	3.44%
CVA	1 patient	1.7%

Table 1: Comorbidities noted in our study group.

The commonest medical comorbidity was hypertension 68.9% (n40), followed by obesity 39.6 %(n23) and then ischemic heart disease 22.41 %(n13). Chronic obstructive pulmonary disease in 12.06 %(n7). Other less frequent medical comorbidities were diabetes and chronic kidney disease, which has equal prevalence of 6.89 %(n4). Anemia and cerebrovascular accident or transient ischemic attacks were noted in 3.44% and 1.7% patients respectively (Figure 2). CHA2DS VASC Score was recorded in all patients (Figure 3). Likewise, HAS BLED score was also charted (Table 2). A very detailed echocardiogram finding were charted as below. Ejection function of 20-30% was noted in 6 patients, 35-45% in 5 patients, 45-55% in 15 patients and >55% in 27 patients (Figure 4). Echo was not done in 5 patients and limited quality images noted in 2 patients. Left atrial size was reported to be normal in 21 patients (<3.8cm). 12 patients have mild enlargement of left atrium (4.0-4.5 cm) and 8 and 8 patients have moderately enlarged (4.6-5.0 cm) and severely enlarged (>5.0cm) left atrium respectively (Figure 5). In 9 patient left atrium size cannot be assessed accurately.

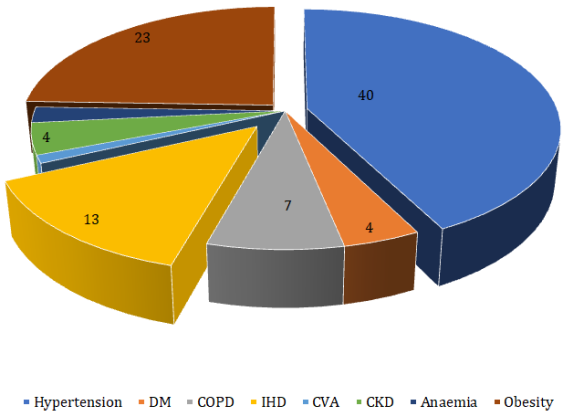

Figure 2: Comorbidities (3 majors are Hypertension, Obesity and IHD).

HAS BLED Score 0	14
HAS BLED Score 1	19
HAS BLED Score 2	18
HAS BLED Score 3	6

Table 2: HAS BLED Score.

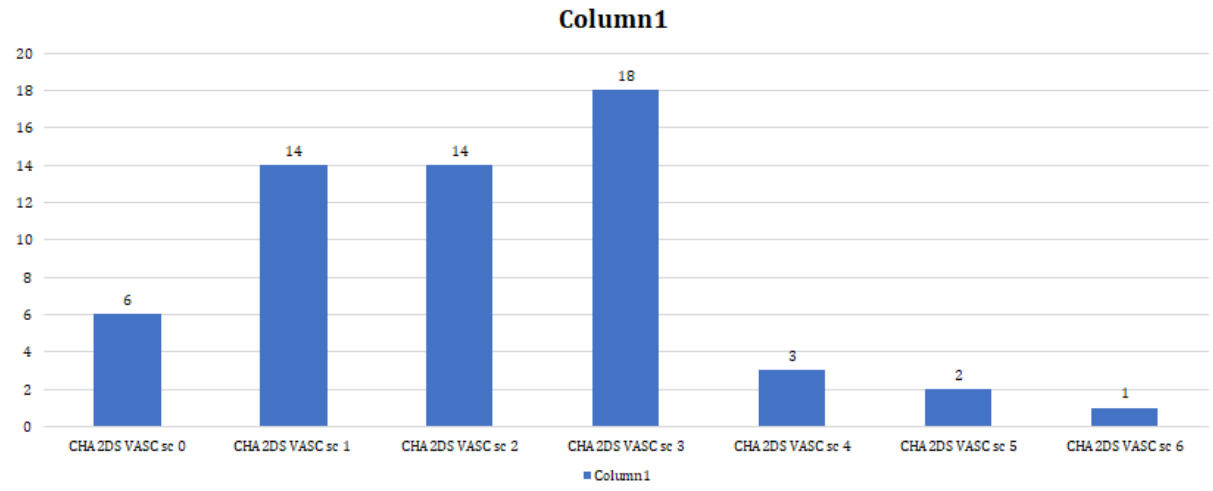

Figure 3: CHA2DS VASC Score.

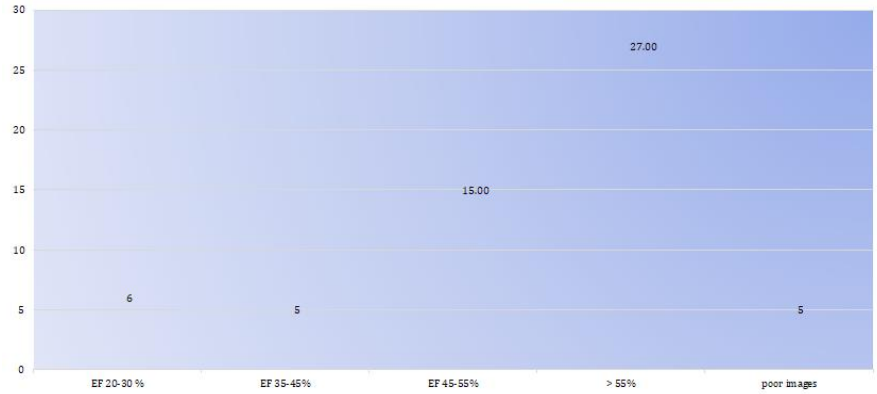

Figure 4: Ejection Function.

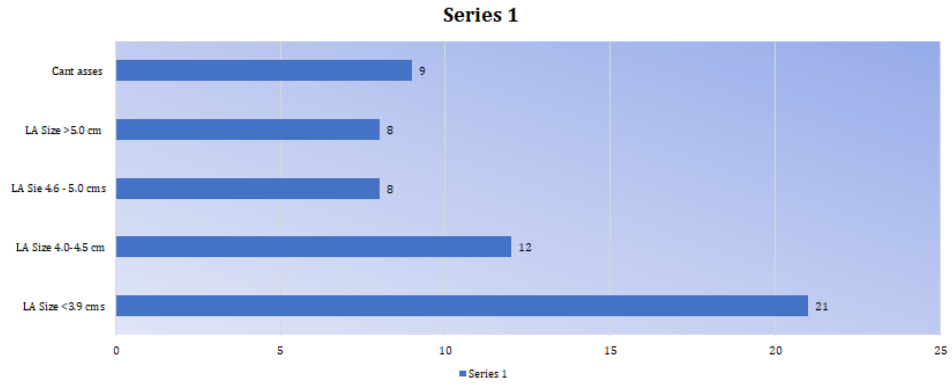

Figure 5: Left atrium size.

Conclusion

The outlook of electrical cardioversion in treatment of atrial fibrillation in the present era remains substantial. There are no historical data available to report on individual determinants of success of electrical cardioversion. In our study we found that normal left atrial size is an independent decisive factor in successful restoration of sinus rhythm from atrial fibrillation followed by optimal blood pressure control (SBP <150 mmhg) and obesity respectively (Figure 6). It is also concluded from our study that chances of restoration in to sinus rhythm from AF is inversely proportional to number of attempts of DCCV (Figure 7) In another subset of this observational study, we also noted that two or more than two medical comorbidities with moderately enlarged left atrium (Figure 8) will have difficulty in restoration of sinus rhythm with electrical cardioversion.

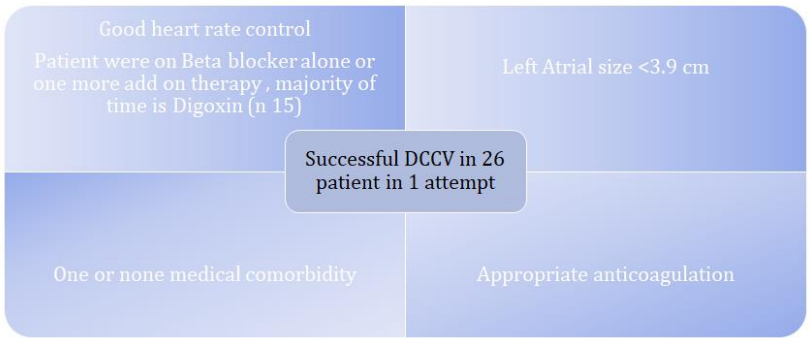

Figure 6: Determinants of successful DCCV.

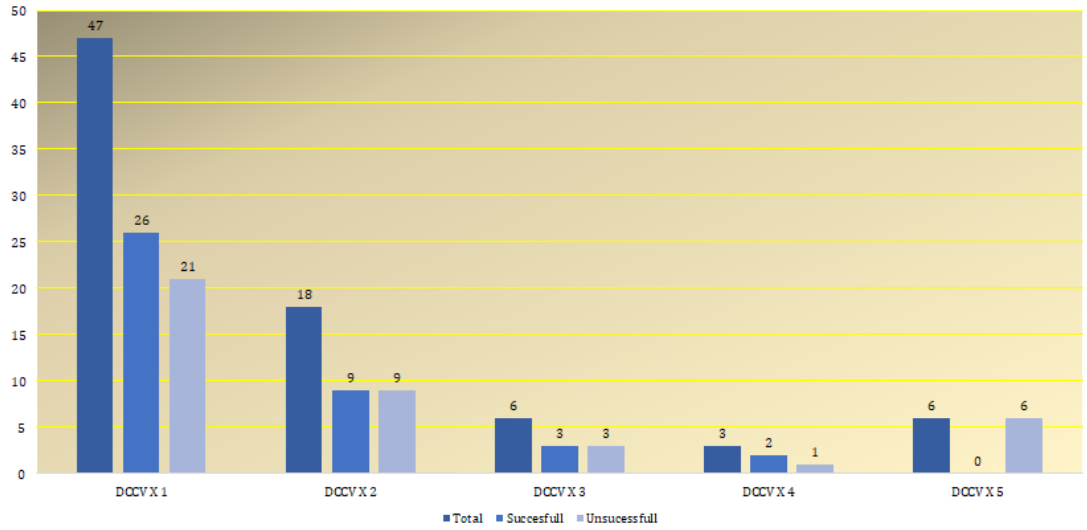

Figure 7: Successful DCCV with number of attempts.

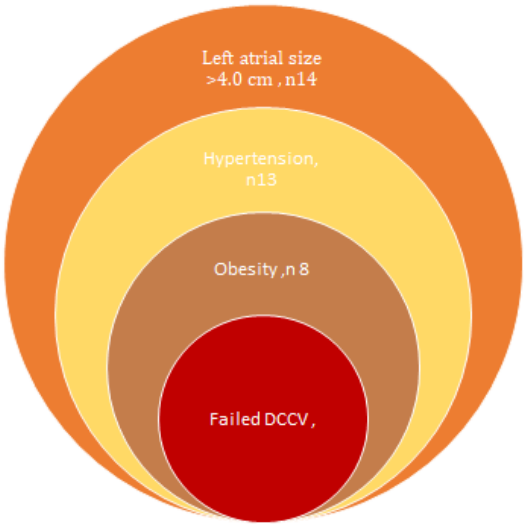

Figure 8: Determinants of unsuccessful DCCV.

Limitation

Each patient involved in this study was selected based on criteria identified with in the admission unit. There may be a possibility of selection bias. Patients are assessed in cardiology clinic or acute medical assessment unit by our team doctor, if found suitable then will be listed for elective cardioversion. Though, our centre is a district general hospital. However, this is not the only one. There are few other district hospitals in surrounding vicinity in Drogheda, within close proximity to our catchment area. This may skew the population that attended our emergency services, cardiology services or acute medical assessment unit services. Some patient may seek health care elsewhere. Nonetheless, we believe our sample to be reasonably sizeable and more representative sample could only be achieved, should a disease registry to be established.

Discussion

In patients with AF, assessment of LA dimensions is fundamental for follow-up and outcome prediction, including determination of arrhythmic freedom, quality of life and thromboembolic risk [13]. Our results show a substantially larger LA volume in male AF patients, confirming and expanding earlier data from healthy populations [14]. Interestingly, the incidence of AF is lower in women than in men at every age group, which may be explained by the fact that a small LA may protect from developing AF [10]. Further studies are needed to evaluate whether this finding is due to smaller body size in women or to true sex specific differences. Body dimensions and diabetes are important metabolic risk factors for AF [15]. The body dimensions, height and weight, have been shown to be a major determinant of LA size in the general population [11,16]. Our study confirms the importance of obesity as a key risk factor for LA enlargement in patients with established AF. The interrelationships of body dimensions (e.g. body mass index), LA dimensions and incident AF have been shown previously [13,16,17]. In addition, a recent study showed

the relevance of weight reduction for the reduction of both AF related symptoms and LA dimensions [17]. Thus, our study and the available evidence underscore the importance of weight loss in patients with symptomatic AF. Interestingly, diabetes seems to have a detrimental effect on LA volume that is independent of obesity. Diabetes has been associated with inflammatory processes, cardiac fibrosis and diastolic dysfunction, which in turn may promote LA remodeling and atrial arrhythmogenicity independent of body fat.

References

1. CDC (2015) Heart Disease Other Related Conditions. Center for Disease Control and prevention.

2. Zoni-Berisso M, Lercari F, Carazza T, Domenicucci S (2014) Epidemiology of atrial fibrillation: European perspective. Clin Epidemiol 16: 213-220.

3. Munger TM, Wu LQ, Shen WK (2014) Atrial fibrillation. J Biomed Res 28(1): 1-17.

4. Gray D, Andrew RH (2010) Chamberlain's Symptoms and Signs in Clinical Medicine: An Introduction to Medical Diagnosis. (13th edn), Hodder Arnold, London, pp. 70-71.

5. Richard D Urman, Linda S Aglio, Robert W Lekowski (2015) Essential clinical anesthesia review: keywords, questions and answers for the boards. P480. ISBN 9781107681309.

6. Wolf PA, Abbott RD, Kannel WB (1991) Atrial fibrillation as an independent risk factor for stroke: the Framingham study. Stroke 22(8): 983-988.

7. Camm AJ, Kirchhof P, Lip GY, Schotten U, Savelieva I, et al. (2010) Guidelines for the management of atrial fibrillation: the Task Force for the Management of Atrial Fibrillation of the European Society of Cardiology (ESC). Europace 12(10): 1360-1420.

8. Hoit BD (2014) Left atrial size and function: role in prognosis. J Am Coll Cardiol 63(6): 493-505.

9. Dzeshka MS, Lip GY, Snezhitskiy V, Shantsila E (2015) Cardiac Fibrosis in Patients with Atrial Fibrillation: Mechanisms and Clinical Implications. J Am Coll Cardiol 66(8): 943-959.

10. Conen D, Glynn RJ, Sandhu RK, Tedrow UB, Albert CM (2013) Risk factors for incident atrial fibrillation with and without left atrial enlargement in women. Int J Cardiol 168(3): 1894-1899.

11. Abhayaratna WP, Seward JB, Appleton CP, Douglas PS, Oh JK, et al. (2006) Left atrial size: physiologic determinants and clinical applications. J Am Coll Cardiol 47(12): 2357-2363.

12. D'Andrea A, Riegler L, Rucco MA, Cocchia R, Scarafile R, et al. (2013) Left atrial volume index in healthy subjects: clinical and echocardiographic correlates. Echocardiography 30(9): 1001-1007.

13. Gupta DK, Shah AM, Giugliano RP, Ruff CT, Antman EM, et al. (2014) Left atrial structure and function in atrial fibrillation: ENGAGE AF-TIMI 48. Eur Heart J 35(22): 1457-1465.

14. Kou S, Caballero L, Dulgheru R, Voilliot D, De Sousa C, et al. (2014) Echocardiographic reference ranges for normal cardiac chamber size: results from the NORRE study. Eur Heart J Cardiovasc Imaging 15(6): 680-690.

15. Wang TJ, Parise H, Levy D, D'Agostino RB Sr, Wolf PA, et al. (2004) Obesity and the risk of new-onset atrial fibrillation. JAMA 292(20): 2471-2477.

16. Gerdts E, Oikarinen L, Palmieri V, Otterstad JE, Wachtell K, et al. (2002) Correlates of left atrial size in hypertensive patients with left ventricular hypertrophy: the Losartan Intervention For Endpoint Reduction in Hypertension (LIFE) Study. Hypertension 39(3): 739-743.

17. Abed HS, Wittert GA, Leong DP, Shirazi MG, Bahrami B, et al. (2013) Effect of weight reduction and cardiometabolic risk factor management on symptom burden and severity in patients with atrial fibrillation: a randomized clinical trial. JAMA 310(19): 2050-2060.