East African Scholars Journal of Medical Sciences
Abbreviated Key Title: East African Scholars J Med Sci
ISSN: 2617-4421 (Print) & ISSN: 2617-7188 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-7 | Issue-6 | Jun-2024 | DOI: 10.36349/easms.2024.v07i06.005

Original Research Article

Ventricular Tachycardia and Fibrillation: Amiodarone as a Safety and Prophylactic

Dr. Mugni Sunny[1*], Dr. Kamrunnahar[2]

[1]Associate Professor (Current Charge), Department of Cardiology, Northeast Medical College, Sylhet
[2]Consultant Microbiology and Virology, Sheikh Fazilatunnessa Mujib Memorial KPJ Specialized Hospital and Nursing College, Gazipur

Article History
Received: 05.04.2024
Accepted: 08.05.2024
Published: 29.06.2024

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: ***Background*:** The best antiarrhythmic drug on the market right now for treating both atrial and ventricular arrhythmias is amiodarone. This is a derivative of iodinated benzofuran that has shown promise in treating a variety of cardiac arrhythmias, such as life-threatening ventricular arrhythmias, paroxysmal supraventricular tachycardias, and atrial fibrillation. ***Objective*:** To assess the status of amiodarone with therapeutic doses in the Bangladeshi population. ***Materials and Method*:** The quasi experimental study was conducted in the Department of Cardiology, Northeast Medical College, Sylhet during April, 2022 to March, 2023 patients got admitted in the Department of Cardiology, NMCH, Sylhet, consecutive patients who had been treated with amiodarone for arrhythmia were included in this study. Patients without an amiodarone prescription were assumed and patients who will not give informed written consent were excluded in this study. ***Result*:** In multivariable logistic regression, bradycardia or conduction disturbance, amiodarone daily dose (≥300 mg), and duration of amiodarone (>4 month) were substantially ($p<0.05$) linked with deleterious effects of amiodarone. ***Conclusion*:** The most common adverse event was bradycardia or conduction disturbance followed by thyroid toxicity, hepatic toxicity, eye toxicity and pulmonary toxicity. Bradycardia or conduction disturbance, amiodarone daily dose (≥300 mg) and duration of amiodarone (>4 month) was found to be significantly associated with adverse effects of amiodarone.

Keywords: Bradycardia, Ventricular tachycardia, fibrillation, amiodarone, safety and prophylactic.

INTRODUCTION

Amiodarone is the most effective antiarrhythmic medicine on the market today, treating both atrial and ventricular arrhythmias. Its efficacy is most likely due to different effects on a variety of cardiac receptors [1]. Amiodarone is a frequently prescribed anti-arrhythmic medication. Amiodarone is approved by the U.S. Food and Drug Administration (FDA) specifically for the treatment of life-threatening ventricular arrhythmias. However, this drug is also widely used off-label to treat supraventricular tachyarrhythmias, such as atrial fibrillation, and to prevent ventricular tachyarrhythmias in high-risk patients [2]. Amiodarone is commonly utilized for treating both supraventricular and ventricular arrhythmias. While this drug is a very effective antiarrhythmic agent, it also leads to many well-known side effects involving a variety of organs such as the thyroid, liver, lungs, and eyes including many that are dose- and duration-dependent [3]. The use of amiodarone must be balanced between the drug's potentially serious adverse effects and its antiarrhythmic effects. However, current guidelines still recommend that amiodarone be chosen as the first-line therapy in some patient groups [4]. Continuous flow left ventricular assist devices (CF-LVADs) have been shown to improve survival and quality of life in patients with advanced heart failure; however, there are risks associated with CF-LVAD implantation.1 Common complications of CF-LVADs include pump thrombosis, ischemic stroke, right ventricular dysfunction, worsened hemodynamics, infection, and development of atrial and ventricular arrhythmias [5]. Adverse effects from amiodarone therapy can be as high as 15% within the initial year of use and may reach 50% with long-term treatment. The risk-to-benefit ratio frequently results in the discontinuation of amiodarone within the first year of treatment, particularly for patients with atrial fibrillation. The most prevalent adverse effect is the development of corneal microdeposits, which occur in at least 90% of

***Corresponding Author:** Dr. Mugni Sunny
Associate Professor (Current Charge), Department of Cardiology, Northeast Medical College, Sylhet

patients taking amiodarone. This occurrence is believed to result from amiodarone being secreted in the lacrimal gland and subsequently taken up by the corneal epithelium. However, only about 10% of these patients will develop actual visual symptoms. Additional ocular adverse effects include photophobia, optic neuropathy, and visual halos. A baseline ophthalmological assessment is recommended for patients initiating amiodarone therapy [6, 7].

MATERIALS AND METHODS

The quasi experimental study was conducted in the Department Of Cardiology, Northeast Medical College, Sylhet during April, 2022 to March, 2023. This study included consecutive patients admitted to the Department of Cardiology, NMCH, Sylhet and treated with amiodarone for arrhythmia. Patients without an amiodarone prescription were assumed, and those who refused to provide informed written consent were excluded from this study. Every patient receives therapy based on guidelines, which may involve revascularization. Amiodarone was administered and recorded at a loading and maintenance dose. Baseline demographics, an electrolyte and creatinine level, thyroid profile, eye condition, and a 24-hour Holter ECG (including a significant number of PVC, multifocal in origin, R on T phenomenon, couplets, triplets, short run, and non-sustained VT) or cardiac monitoring record were recorded. At the conclusion of the first, third, and sixth months, patients were checked on. Cardiac death, hospitalization due to arrhythmia, and the occurrence of arrhythmia symptoms were recorded. Every visit included a focused clinical assessment of the respiratory, cardiovascular, neurological, ocular, and skin systems as well as a 12-lead ECG. If amiodarone caused any side effects, the patient was treated in accordance with normal protocol, and in appropriate cases, amiodarone was stopped. Thyroid function testing, chest X-rays, liver function tests, and 24-hour Holter ECGs were performed early in clinically significant cases and after six months in asymptomatic cases to check for the emergence of novel arrhythmias or the correction of index arrhythmias. Preformed data sheets were used to record the data. Treatment outcome and complications was analyzed. Statistical analyses were carried out by using the Statistical Package for Social Sciences (SPSS) version 23.0 for Windows Software. Continuous data were expressed as mean ± standard deviation (SD) and categorical data were expressed as frequency and percentages. Mean and standard deviation were computed for quantitative variables and was analyzed by paired t-test. Chi square test was used for categorical variables. P values <0.05 was considered as statistically significant.

RESULTS

Smoker, amiodarone daily dose and duration of amiodarone treatment higher in side effects group than without side effects group. The difference were not statistically significant (p>0.05) between two group (Table-1). The most common adverse event was bradycardia or conduction disturbance (8.95%) followed by 5(2.63%) thyroid toxicity, 3(1.58%) hepatic toxicity, 3(1.58%) eye toxicity and 1(0.53%) pulmonary toxicity (Table-2). In multi variable logistic regression, bradycardia or conduction disturbance, amiodarone daily dose (≥300 mg) and duration of amiodarone (>4 month) was found to be significantly (p<0.05) associated with adverse effects of amiodarone (Table-3).

Table 1: Baseline clinical characteristics of the study patients (n=190)

	Side effects (n=29)		Without side effects (n=161)		*p* value
	n	%	n	%	
Demographic variable					
Male	15	57.7	89	58.6	0.934
Mean age (years)	65.7	±10.8	64.5	±11.9	0.631
Mean BMI (kg/m^2)	22.9	±4.0	22.3	±3.7	0.451
Co-morbidities					
Diabetes	6	23.1	28	18.4	0.372
Hypertension	7	26.9	25	16.4	0.155
Dyslipidemia	7	26.9	32	21.1	0.503
Coronary artery disease	13	50.0	54	35.5	0.159
Congestive heart failure	4	15.4	18	11.8	0.405
Stroke	3	11.5	12	7.9	0.379
Smoker	9	34.6	28	18.4	0.060
Cardiac status					
Ischemic heart disease	1	3.8	2	1.3	0.379
Acute decompensate chronic heart failure	2	7.7	3	2.0	0.155
Cardiac arrest	3	11.5	9	5.9	0.247
Cause of amiodarone use					
Atrial fibrillation	19	73.1	113	74.3	
Ventricular premature beat	2	7.7	10	6.6	0.977
Ventricular tachycardia	5	19.2	29	19.1	
Mean amiodarone daily dose (mg)	299.4	±86.7	264.8	±91.3	0.074
Mean duration of amiodarone (month)	4.9	±1.8	4.1	±2.2	0.081

Table 2: Reasons for discontinuation of therapy (n=29)

Adverse effect	Frequency	Percentage
Bradycardia or conduction disturbance	17	8.95
Thyroid toxicity	5	2.63
Hepatic toxicity	3	1.58
Eye toxicity	3	1.58
Pulmonary toxicity	1	0.53

Table 3: Multivariate analysis predictors for adverse effects of amiodarone

Variable	OR (95% CI)	*p* value
Age (≥60 years)	1.01 (0.46–2.23)	0.961
BMI (≥25 kg/m^2)	1.08 (0.37–3.09)	0.883
Coronary artery disease	1.61 (0.72–3.58)	0.244
Bradycardia or conduction disturbance	3.55 (1.19-10.55)	0.022
Pulmonary disease	0.96 (0.57–1.18)	0.159
Thyroid dysfunction	1.23 (0.41–12.83)	0.876
Liver disease	3.26 (0.51–20.86)	0.212
Amiodarone daily dose (≥300 mg)	3.56 (1.19–10.47)	0.022
Duration of amiodarone (>4 month)	3.71 (1.36-11.47)	0.017

DISCUSSION

In this study observed that baseline clinical characteristics smoker, amiodarone daily dose and duration of amiodarone treatment higher in side effects group than without side effects group. The difference were not statistically significant (p>0.05) between two group. Kim *et al*., [8], study observed there were no significant differences between the two groups, except for the mean dose and total duration of amiodarone treatment. The mean daily dose of amiodarone was higher in patients with adverse events than in those without adverse events (231 ± 130 mg vs. 208 ± 102 mg, $p = 0.039$). The duration of amiodarone treatment was longer in patients with side effects than in those without (813 ± 1,086 days vs. 425 ± 730 days, $p < 0.001$). In a randomized controlled trial by Roy *et al*., [9], 18% of patients who had received 200 mg/day amiodarone for the maintenance of sinus rhythm discontinued taking the drug because of adverse events during a 16-month follow-up. In another trial with a similar study design, the incidence of adverse effects requiring discontinuation was 12.3% during the first year [10].

The guidelines published by the North American Society of Pacing and Electrophysiology in 2000 estimated that the incidence of adverse effects of amiodarone was 15% during the first year and as high as 50% with long-term therapy [11].

Julian *et al*., [12], demonstrated that 38.5% of patients in the amiodarone group (200 mg/day) discontinued medication, compared with 21.4% of those in the placebo group, during the 21-month study period. Bardy *et al*., [13], demonstrated study drug discontinuation rates of 32% in the amiodarone group and 22% in the placebo group among patients with congestive heart failure. Their study used a median dose of 300-mg/day amiodarone and a median study follow-up period of 45.5 months [13].

In present study showed that the most common adverse event was bradycardia or conduction disturbance (8.95%) followed by 5(2.63%) thyroid toxicity, 3(1.58%) hepatic toxicity, 3(1.58%) eye toxicity and 1(0.53%) pulmonary toxicity. Kim *et al*., [8], reported the most frequent adverse effect was bradycardia or conduction disturbance, which occurred in 88 patients (9.5%). Thyroid and hepatic toxicities occurred in 23 patients (2.5%) and 20 patients (2.2%), respectively. The chronic use of low dose amiodarone was associated with an increased risk of bradycardia compared with placebo (3.3% vs. 1.4%) in a previous meta-analysis [14], An additional study reported that the overall incidence of bradycardia was 5% [11]. This high iodine content and the direct toxic effects of amiodarone on the thyroid parenchyma alter thyroid function, [15], and the incidence of amiodarone-induced thyroid dysfunction in previous studies was 14% to 18% [16]. Hepatotoxicity due to amiodarone was 1.7% in the current study, which is considerably lower than the previously reported incidences of 14% to 82%, [17], among which 20% to 40% of patients required drug discontinuation because of hepatotoxicity.[18] Pulmonary toxicity due to amiodarone was found 0.6% in this study. Recent studies reported that the incidence of amiodarone-induced pulmonary toxicity (AIPT) was 5% to 13% [19].

In this study observed that in multi variable logistic regression, bradycardia or conduction disturbance, amiodarone daily dose (≥300 mg) and duration of amiodarone (>4 month) was found to be significantly (p<0.05) associated with adverse effects of amiodarone. Kim *et al*., [8], observed the independent risk factors for amiodarone-related adverse effects, multiple logistic regression analyses were performed. After controlling for confounders, the duration of amiodarone treatment was the only independent risk factor for adverse events (odds ratio, 1.21; 95% confidence interval, 1.03 to 1.41; $p = 0.016$, per year).

Previous studies showing that the cumulative administered dose of amiodarone was a major risk factor for amiodarone-induced organ toxicity [11-21]. Age, gender, and underlying disease have also been suggested to be predictors of specific organ toxicities [22-24], however, these factors were not associated with the overall adverse effects of amiodarone in the current study. We also performed multivariate analyses to identify independent predictors for specific organ toxicities, but the data were limited because of the small number of adverse events. Doyle and Ho [25], study showed cessation of amiodarone therapy because of intolerable adverse effects was more common compared with a placebo or rate control drug (10.7 vs 1.9 per 100 patient-years; RR, 3.0; 95% CI, 1.4-6.2; P<0.001), but amiodarone was not associated with an increased incidence of hospitalizations (RR, 1.1; 95% CI, 0.6-2.1; P=0.77).

CONCLUSION

Bradycardia or conduction disturbance was the most frequent adverse event, and it was followed by pulmonary, hepatic, thyroid, and eye toxicity. Amiodarone side effects were observed to be substantially correlated with bradycardia or conduction disturbance, amiodarone daily dose (≥300 mg), and amiodarone duration (>4 month).

REFERENCE

1. SAHA, S. K., MAHMOOD, M., ADHIKARY, D. K., AHSAN, S. A., AHMED, C. M., HOQUE, M. H., ... & BANERJEE, S. K. (2021). Safety of Amiodarone in Ventricular Arrhythmia in Patients Admitted in Bangabandhu Sheikh Mujib Medical University. *University Heart Journal*, *17*(2), 118-121.
2. Perkins, G. D., Olasveengen, T. M., Maconochie, I., Soar, J., Wyllie, J., Greif, R., ... & European Resuscitation Council. (2018). European resuscitation council guidelines for resuscitation: 2017 update. *Resuscitation*, *123*, 43-50.
3. Chokesuwattanaskul, R., Shah, N., Chokesuwattanaskul, S., Liu, Z., & Thakur, R. (2020). Low-dose amiodarone is safe: a systematic review and meta-analysis. *The Journal of innovations in cardiac rhythm management*, *11*(4), 4054.
4. Epstein, A. E., Olshansky, B., Naccarelli, G. V., Kennedy Jr, J. I., Murphy, E. J., & Goldschlager, N. (2016). Practical management guide for clinicians who treat patients with amiodarone. *The American journal of medicine*, *129*(5), 468-475.
5. Graboyes, S. D., Kline, T. M., Harris, T. N., Iyer, P. S., & Hollis, I. B. (2023). Safety and efficacy of prophylactic amiodarone after left ventricular assist device. *ASAIO Journal*, *69*(1), 96-100.
6. Tauveron, I., Batisse-Lignier, M., & Maqdasy, S. (2018). Challenges in the management of amiodarone-induced thyrotoxicosis. *Presse Medicale (Paris, France: 1983)*, *47*(9), 746-756.
7. Moore, B. M., Cordina, R. L., McGuire, M. A., & Celermajer, D. S. (2018). Adverse effects of amiodarone therapy in adults with congenital heart disease. *Congenital heart disease*, *13*(6), 944-951.
8. Kim, H. L., Seo, J. B., Chung, W. Y., Kim, S. H., Kim, M. A., & Zo, J. H. (2014). The incidence and predictors of overall adverse effects caused by low dose amiodarone in real-world clinical practice. *The Korean Journal of Internal Medicine*, *29*(5), 588.
9. Roy, D., Talajic, M., Dorian, P., Connolly, S., Eisenberg, M. J., Green, M., ... & Thibault, B. (2000). Amiodarone to prevent recurrence of atrial fibrillation. *New England Journal of Medicine*, *342*(13), 913-920.
10. AFFIRM, F. (2023). Antiarrhythmic Drug Substudy Investigators. Maintenance of sinus rhythm in patients with atrial fibrillation: an AFFIRM substudy of the first antiarrhythmic drug. *J Am Coll Cardiol*, *42*, 20-29.
11. Goldschlager, N., Epstein, A. E., Naccarelli, G., Olshansky, B., & Singh, B. (2000). Practical guidelines for clinicians who treat patients with amiodarone. *Archives of internal medicine*, *160*(12), 1741-1748.
12. Julian, D. G., Camm, A. J., Frangin, G., Janse, M. J., Munoz, A., Schwartz, P. J., & Simon, P. F. T. (1997). Randomised trial of effect of amiodarone on mortality in patients with left-ventricular dysfunction after recent myocardial infarction: EMIAT. *The Lancet*, *349*(9053), 667-674.
13. Bardy, G. H., Lee, K. L., Mark, D. B., Poole, J. E., Packer, D. L., Boineau, R., ... & Ip, J. H. (2005). Amiodarone or an implantable cardioverter–defibrillator for congestive heart failure. *New England Journal of Medicine*, *352*(3), 225-237.
14. Vorperian, V. R., Havighurst, T. C., Miller, S., & January, C. T. (1997). Adverse effects of low dose amiodarone: a meta-analysis. *Journal of the American College of Cardiology*, *30*(3), 791-798.
15. Basaria, S., & Cooper, D. S. (2005). Amiodarone and the thyroid. *The American journal of medicine*, *118*(7), 706-714.
16. Martino, E., Bartalena, L., Bogazzi, F., & Braverman, L. E. (2001). The effects of amiodarone on the thyroid. *Endocrine reviews*, *22*(2), 240-254.
17. Babatin, M., Lee, S. S., & Pollak, P. T. (2008). Amiodarone hepatotoxicity. *Current vascular pharmacology*, *6*(3), 228-236.
18. Podrid, P. J. (1995). Amiodarone: reevaluation of an old drug. *Annals of internal medicine*, *122*(9), 689-700.
19. Ernawati, D. K., Stafford, L., & Hughes, J. D. (2008). Amiodarone-induced pulmonary toxicity. *British journal of clinical pharmacology*, *66*(1), 82-87.
20. Haffajee, C. I., Love, J. C., Alpert, J. S., Asdourian, G. K., & Sloan, K. C. (1983). Efficacy and safety of long-term amiodarone in treatment of cardiac

arrhythmias: dosage experience. *American heart journal*, *106*(4), 935-943.
21. Santangeli, P., Di Biase, L., Burkhardt, J. D., Bai, R., Mohanty, P., Pump, A., & Natale, A. (2012). Examining the safety of amiodarone. *Expert opinion on drug safety*, *11*(2), 191-214.
22. Jackevicius, C. A., Tom, A., Essebag, V., Eisenberg, M. J., Rahme, E., Tu, J. V., ... & Pilote, L. (2011). Population-level incidence and risk factors for pulmonary toxicity associated with amiodarone. *The American journal of cardiology*, *108*(5), 705-710.
23. Camus, P., Martin, W. J., & Rosenow, E. C. (2004). Amiodarone pulmonary toxicity. *Clinics in chest medicine*, *25*(1), 65-75.
24. Yamada, Y., Shiga, T., Matsuda, N., Hagiwara, N., & Kasanuki, H. (2007). Incidence and predictors of pulmonary toxicity in Japanese patients receiving low-dose amiodarone. *Circulation Journal*, *71*(10), 1610-1616.
25. Doyle, J. F., & Ho, K. M. (2009, March). Benefits and risks of long-term amiodarone therapy for persistent atrial fibrillation: a meta-analysis. In *Mayo Clinic Proceedings* (Vol. 84, No. 3, pp. 234-242). Elsevier.

Cite This Article: Mugni Sunny & Kamrunnahar (2024). Ventricular Tachycardia and Fibrillation: Amiodarone as a Safety and Prophylactic. *East African Scholars J Med Sci*, *7*(6), 254-258.