

## RESEARCH ARTICLE

# Incidence of Amiodarone Adverse Effects on Thyroid Function among Patients in Thi-Qar city, South of Iraq

Methaq A. M. Hussein<sup>1\*</sup>, Layth Jabbar<sup>2</sup>

<sup>1</sup> College of Medicine, Thi-Qar University, Nasiriyah, Iraq

<sup>2</sup> College of Pharmacy, Thi-Qar University, Nasiriyah, Iraq

Received: 19th March, 2021; Revised: 08th April, 2021; Accepted: 24th May, 2021; Available Online: 25th June, 2021

## ABSTRACT

**Background:** Amiodarone is the antiarrhythmic drug that was used for its effectiveness in controlling heart rhythm, and it was used in cases of ventricular tachycardia, ventricular fibrillation, paroxysmal supraventricular tachycardia in addition to atrial fibrillation. Amiodarone was associated with a wide range of adverse effects on different organs, including the thyroid gland, lungs, liver, eyes, and skin. The aim of this current study is to check the incidence of the adverse effects on thyroid functions associated with the use of amiodarone among patients who use it in Thi-Qar city, South of Iraq.

**Method:** Prospective study of 238 patients (156 females and 82 males) on amiodarone for 2 years was done, and the adverse effects on thyroid function were reviewed. All the patients were with normal thyroid function as the baseline before using amiodarone. The patients visited either private clinics or Al-Hussain teaching hospital in Thi-Qar from 2018–2020.

**Results:** After serial follow up with patients, the findings were 153 (69.5%) cases were normal, 38 cases (17.3%) with Subclinical hypothyroidism (only thyroid-stimulating hormone increase), 14 cases (6.4%) were pure hypothyroidism, 9 cases (4.1%) with abnormal thyroid function test, 4 cases (1.8%) with amiodarone induce thyroiditis (II), 2 cases (0.9%) with amiodarone induce thyroiditis (I), and 18 cases did not continue with the study.

**Conclusion:** we find out, amiodarone, when used for 2 years in patients with normal thyroid function, was have about (70%) no impact on thyroid function, while the rate of the adverse effect that was associated with the use of amiodarone distributed between thyroiditis and hypothyroidism about 30%.

**Keywords:** Amiodarone, Hypothyroidism, Thyroid function test, Ventricular fibrillation, Ventricular tachycardia.

International Journal of Drug Delivery Technology (2021); DOI: 10.25258/ijddt.11.2.60

**How to cite this article:** Hussein MAM, Jabbar L. Incidence of Amiodarone Adverse Effects on Thyroid Function among Patients in Thi-Qar city, South of Iraq. International Journal of Drug Delivery Technology. 2021;11(2):579-581.

**Source of support:** Nil.

**Conflict of interest:** None

## INTRODUCTION

Amiodarone belongs to a group of medications called antiarrhythmic drugs used to control heart rhythm through the action on myocardial depolarization and repolarization and through its action to block potassium ion channels, sodium ion channels, and calcium ion channels in addition to alpha and beta receptors blocking effects.<sup>1,2</sup> Amiodarone was characterized by unique pharmacodynamics and pharmacokinetics through its action on different sites within myocardium tissue that support its indication for different cardiac abnormalities conditions including ventricular arrhythmias, atrial fibrillation.<sup>3</sup> Amiodarone has iodine in its chemical structure as mentioned in the Figure 1 that give it similarity to thyroxine and because this high level of iodine in amiodarone lead to the development of its adverse effects on the thyroid gland, including hypothyroidism and hyperthyroidism,

which requires the physician to monitor thyroid function for patients (chronic amiodarone users) as hyperthyroidism may occur.<sup>4</sup> When amiodarone was prescribed for 24 patients who have an arrhythmia, and they were studied within the first 10 days of their treatment, they found that amiodarone interfered with thyroid function. These effects occurred as elevation in serum level of T4 and T3 concentrations and temporary elevation in TSH level; therefore, they recommend monitoring thyroid function for patients using amiodarone

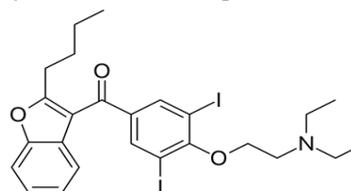


Figure 1: Chemical Structure of amiodarone

and thus help in early diagnosis and treatment of thyroid dysfunction induced amiodarone.<sup>5</sup> There are percent which is a range between (14%–18%) of patients who are using amiodarone develop either hypothyroidism or thyrotoxicosis, but both these two adverse effects do not need to stop the use of amiodarone, and most cases of thyroid abnormalities are transient and reversible after amiodarone discontinuation.<sup>6</sup> Amiodarone induces thyrotoxicosis (AIT I) was treated by stop amiodarone as it considers the source of iodine and given to the patients of thionamide to block thyroid hormone secretion. In contrast, in the case of amiodarone-induced thyroiditis, patients can be treated by prednisolone with a stop of amiodarone.<sup>7</sup>

Thionamide represents the first line for treating type one of amiodarone, inducing hypothyroidism and inhibiting thyroid iodine uptake by potassium perchlorate, synergistically affecting thionamide overall most therapeutic measures treat amiodarone hypothyroidism depend on the volume of thyroid and thyrotoxicosis severity.<sup>8</sup> This study aims to check the adverse effects on thyroid functions associated with amiodarone among patients who use it in Thi-Qar city, South of Iraq.

**METHODS**

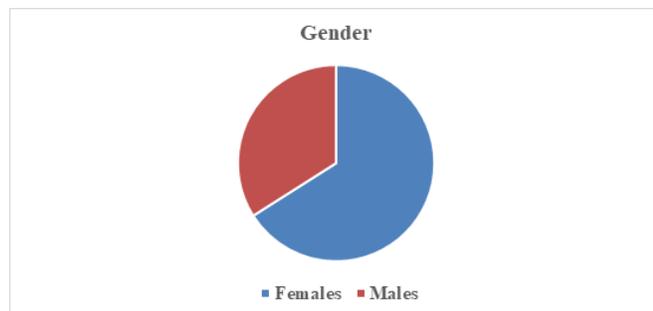
The study period was continued for 2 years from 2018–2020, during which the patients were exposed to a set of follow-ups by measuring their basal thyroid function, and it was found normal thyroid function test and checked their T3, T4, and TSH levels during the treatment period.

All patients with disorders in their thyroid function; taking medications that may affect thyroid function were excluded from the study. Then the data was collected and analyzed through the statistical program SPSS (statistical package for social sciences).

**RESULTS**

238 patients their age (20–75) years on amiodarone for two years which is the study period from 2018–2020 they were distributed as 156 (66%) females and 82 (34%) males as in the Figure 2, They were collected from private clinics and consultation clinics of Al-Hussain teaching hospital, Thi-Qar.

They have used amiodarone for paroxysmal AF 88 patients (37%), MVES without IHD 66 patients (28%), MVES with IHD 20 patients (8%), NSVT with heart failure 14 patients (6%), VF 9 patients (4%), no any documents (normal cardiac diagnosis) 41 patients (17%) as in Table 1.



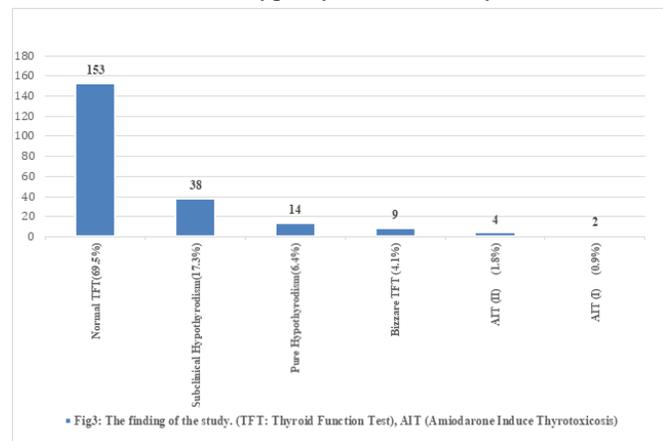
**Figure 2:** Gender distribution of patients

The patients after checking their levels of T3, T4, and TSH patients were distributed between hypothyroidism that was needed from the physicians to either stop amiodarone therapy or refer the patients for cardiologists and normal thyroid function that need no action from physicians and just waiting period and tight follow up for their thyroid function.

**DISCUSSION**

Amiodarone as a drug has a wide range of indications due to its complex mechanism of action but at the same time has a wide range of adverse effects on different organs, including the thyroid, lung, and eyes. Therefore, this work was focus to monitor the incidence of adverse effects of amiodarone on the thyroid, which is mostly was occur due to its chemical structure due to the presence of two atoms of iodine in the structure as iodine represent about 37% of amiodarone weight as each 200 mg of the tablet of amiodarone contain 75 mg iodine that interferes with thyroid function.<sup>9</sup>

Due to the high rate of adverse effects of amiodarone on thyroid function, it requires us to focus more on the adverse effects and manage them. It needs great attention to monitor thyroid hormones level of patients using amiodarone which resulted in our actions towards patients, distributed between either no action that means no need to stop the amiodarone because their thyroid function test was not clearly affected, and other group was referred to cardiologists and advised to stop amiodarone. When amiodarone was stopped, patients can restore their basal thyroid function within 3 months.<sup>10</sup> Amiodarone induces hypothyroidism mostly do not need to



**Figure 3:** The details of study findings

**Table 1:** Show details of indications of amiodarone for the study patients.

Indications of amiodarone for patients study	Patients number	(%)
Paroxysmal AF	88	37%
MVES without IHD	66	28%
MVES with IHD	20	8%
NSVT with HF	14	6%
Ventricular fibrillation	9	4%
Normal cardiac diagnosis	41	17%
Total	238	100 %

not contain iodine that makes it preferred choice for patients with arrhythmia and have risk to develop amiodarone induce hypothyroidism.<sup>13</sup>

Drug discontinuation is not associated with immediate benefit because of the long half-life, but some type 2 amiodarone induce hypothyroidism cases can benefit from amiodarone discontinuation and consider dronedarone as a choice.<sup>14</sup>

## CONCLUSION

we find out, Amiodarone, when used for 2 years in patients with normal thyroid function, was have about (70%) no impact on thyroid function, while the rate of the adverse effect that was associated with the use of amiodarone distributed between thyroiditis and hypothyroidism about 30%.

## REFERENCES

1. Amiodarone Hydrochloride. The American Society of Health-System Pharmacists. Archived from the original on 2016-09-19. Retrieved Mar 22, 2020.
2. Narayana SK, Woods DR, Boos CJ. Management of amiodarone-related thyroid problems. *Therapeutic advances in endocrinology and metabolism*. 2011 Jun;2(3):115-126.
3. Siddoway LA. Amiodarone: guidelines for use and monitoring. *American family physician*. 2003 Dec 1;68(11):2189-2196.
4. Jukić, T, *et al*. Amiodarone and the thyroid function [Amiodaron i funkcija {š}titnja{&}. *Lijecnicki Vjesnik*, 2015;137:181188.
5. Loh KC. Amiodarone-induced thyroid disorders: a clinical review. *Postgraduate medical journal*. 2000 Mar 1;76(893):133-140.
6. Enio M, Luigi B, Fausto B, Andlewis E. Braverman B. The Effects of Amiodarone on the Thyroid. *Endocrine Reviews*, 2001; 22(2):240-254.
7. Trohman RG, Sharma PS, McAninch EA, Bianco AC. Amiodarone and the thyroid physiology, pathophysiology, diagnosis and management. *Trends Cardiovasc Med*. 2018; 20. pii: S1050-1738(18)30195-30196.
8. Bogazzi F, Bartalena L, Martino E. Approach to the patient with amiodarone-induced thyrotoxicosis. *J Clin Endocrinol Metab*, (2010);95:2529-2535.
9. Mini G. Thyroid Dysfunction Induced by Amiodarone Therapy. *Drugs and Disease in Endocrinology*. Medscape. 2018.
10. Janna C L, Peter D, Sara D, Irwin K. Effects of amiodarone therapy on thyroid function. *Nature reviews Endocrinology*. 2010;6:34-41.
11. Luigi B, Fausto B, Luca C, *et al*. European Thyroid Association (ETA) Guidelines for the Management of Amiodarone Associated Thyroid Dysfunction. *European Thyroid Journal*, 2018;7:55-66.
12. Maqdasy S, Batisse-Lignier M, Auclair C, Desbiez F, Citron B, Thieblot P, Roche B, Lusson JR, Tauveron I: Amiodarone-induced thyrotoxicosis recurrence after amiodarone reintroduction. *Am J Cardiol*, 2016;117:1112-1116.
13. Cohen-Lehman J, Dahl P, Danzi S, Klein I. Effects of amiodarone therapy on thyroid function. *Nat Rev Endocrinol*. 2010;6:34-41.
14. Inoue, K. *et al*. Amiodarone-induced thyrotoxicosis with cardiopulmonary arrest. *Internal Medicine*. 2018;57:59-63.