

## Amiodarone Induced Hypothyroidism –A Case Report

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### ABSTRACT

Hypothyroidism is a condition in which thyroid gland doesn't produce enough thyroid hormone, which is necessary for regulating body's metabolic rate, growth and development. Amiodarone is a benzofuran derived potent anti-arrhythmic drug which contains approximately 37% Iodine by weight. When Amiodarone is taken over a prolonged period it can lead to direct toxic effect on thyroid gland and also interfere the conversion of T4 to more active T3 form. A 70-year-old female patient was admitted with complaints of vomiting for 1 week, tiredness. She had a medical history of Depression, Right Empyema Thorax, Systemic Hypertension, Coronary Artery Disease, AF with FVR and surgical history of Video Assisted Thoracoscopic Surgery (VATS) and she had a medication history of Digoxin, Amiodarone, Rivaroxaban, Telmisartan, Escitalopram + Clonazepam, and Desvenlafaxine. After hospitalization, she was newly detected with Acute Kidney Injury (AKI), Esophagitis, Moderate Pancreatitis and Recurrent Urinary tract infection (MDR). The own medication Amiodarone which was taken for 6 months that resulted in Hypothyroidism. Therefore, the particular drug was stopped and alternatives were started. This case points out the possibility of occurrence of Amiodarone induced Hypothyroidism which has a low prevalence when compared to hyperthyroidism.

**KEYWORDS:** Amiodarone, Hypothyroidism, Atrial Fibrillation, Thyroid Stimulating Hormone.

### I. INTRODUCTION

Amiodarone is a class III anti-arrhythmic agent which is frequently prescribed for the treatment of Atrial Fibrillation. It has many adverse effects, one of them is hypothyroidism. Amiodarone was first developed in Europe in 1960s and approved by US Food and Drug

Administration in 1985. Today Amiodarone is often used for the control of ventricular rate with rapid atrial fibrillation<sup>[1]</sup>.

Amiodarone has several other adverse effects such as pulmonary toxicity, impairment of vision, hepatic injury and Heart Block. Amiodarone can cause thyroid dysfunction either Hypothyroidism or Hyperthyroidism. The effect of amiodarone on thyroid hormone secretion depends on dose and duration of treatment. Clinical signs and symptoms of amiodarone induced hypothyroidism include weight gain, cold intolerance, constipation, physical tiredness, deafness etc., and it can progress to destructive amiodarone induced thyrotoxicosis if the treatment is not discontinued<sup>[2]</sup>. It has an occurrence rate of 20% and can lead to permanent thyroid dysfunction. Elderly patients have a greater risk for developing this condition<sup>[3]</sup>.

### II. CASEREPORT:

A 70-year-old female presented to general medicine department with complaints of multiple episodes of vomiting and generalized weakness for a week. She had a medical history of psychiatric illness under treatment, Right Empyema Thorax, CAD (coronary artery disease), Atrial fibrillation with FVR (fast ventricular rate) and a surgical history of Video Assisted Thoracoscopic Surgery (VATS). Her medication history includes T. CLONAZEPAM 5mg + T. ESCITALOPRAM 0.25mg, T. DESVENLAFAXINE 50mg, T. DIGOXIN 0.25mg, T. AMIODARONE 200mg, T. RIVAROXABAN 20mg, T. TELMISARTAN 20mg.

Now she was newly detected with Acute Kidney Injury, Esophagitis grade B, Moderate Pancreatitis, Urinary tract infection-Multi Drug Resistant (MDR) and Hypothyroidism. General examination revealed conscious, afebrile and oriented. Laboratory investigation showed

variation in Total Count (13460cells/mm<sup>3</sup>), ESR(23mm/hr), Serum Creatinine (2.5mg/dl), Serum Sodium (133mmol/l), Total Protein(4.7g/dl), Albumin(2.5g/dl), TSH(15.24 uIU/ml), USG (ultrasound Sonography) abdomen and pelvis confirms raised and mildly heterogenoushepaticechotexture and bilateral

medical renal disease and her upper GI Endoscopy demonstrated Grade B Esophagitis, Moderate Pangastritis and deformed pylorus. Urine culture was done and detected the presence of Klebsiella pneumoniae. ECG result proves Atrial Fibrillation with a competing junctional pace maker, non-specific ST and T wave abnormality.

PARAMETERS	TEST VALUE WITH DATE	
	D1	D5
TSH(mlU/L)	15.24	13.46
T4(nmol/L)	-	5.68
T3(mcg/dl)	-	0.533

Initially patient was treated with ONDANSETRON 4mg for vomiting, PANTOPRAZOLE 40mg for treating gastritis, SODIUM BICARBONATE 500mg to treat acid indigestion, METOCLOPRAMIDE 10mg to treat esophagitis and Probiotic Capsule DAROLAC was started and continued her own medications. After cardiology consultation T. TELMISARTAN, T. DIGOXIN and RIVAROXABAN were stopped due to elevated creatinine level and T. AMIODARONE was stopped due to marked elevation in TSH level that is Amiodarone induced hypothyroidism. The adverse drug probability was checked by using Naranjo scale and the score obtained was 7, which means there is a probable causation of this reaction. Alternative treatment started with T. AMLODIPINE 5mg, T. NICOUMALONE 3mg, T. ATORVASTATIN 10mg and T. LEVOTHYROXINE 50mcg. After psychiatric consultation T. MIRTAZEPINE 50mg was added to previous medications. Finally, the patient got symptomatically improved and discharged.

### III. DISCUSSION:

Amiodarone can cause thyroid dysfunction either Hypothyroidism or Hyperthyroidism. The effect of amiodarone on thyroid hormone secretion depends on dose and duration of treatment. Patients on amiodarone exhibit alterations in serum TSH, thyroxine (T4) and 3,5,3'-triiodothyronine (T3) concentrations. Most commonly there is decreased serum T3, Increased serum T4 and reverse T3 levels while serum thyrotropin (TSH) is normally 3 or mildly elevated<sup>[4]</sup>. Early (dose- and time-

dependent) elevations in serum TSH usually return to normal around a few months. The effects of amiodarone on thyroid hormone economy are, at least, partially due to interference with the iodothyronine deiodinases, which metabolize thyroid hormones. Large amounts of iodide released during amiodarone bio transformation inhibit thyroid hormone synthesis (the Wolff-Chaikoff effect) and release. Persistent amiodarone-induced hypothyroidism due to a subtle effect that results in increased susceptibility to the inhibitory effect of iodine on hormonal synthesis, a failure to escape from the Wolff-Chaikoff effect, or both<sup>[5]</sup>.

### IV. CONCLUSION:

Amiodarone is considered the most effective antiarrhythmic drug and one of the most frequently prescribed antiarrhythmic medication.

Amiodarone has complex pharmacokinetic and pharmacodynamic parameters. It also has remarkable side effects which include hypothyroidism and thyrotoxicosis. Management of AIH (Amiodarone Induced Hypothyroidism) is usually straightforward whereas management of AIT (Amiodarone Induced Thyrotoxicosis) is far more complicated<sup>[6]</sup>. Most of amiodarone's adverse effects are reversible either with dose reduction or discontinuation of the drug. Amiodarone induced hypothyroidism is rare when compared to thyrotoxicosis, hence early recognition and management is necessary<sup>[7]</sup>. Patients who have unknown underlying thyroid disease are at a greater risk for amiodarone induced hypothyroidism when they are prescribed by the same<sup>[8]</sup>. Hence healthcare workers need to be more

efficient in promoting safe effective dosing. Additionally patient outcome will be improved by educating them with possible adverse effects of this medication.

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