

## CASE REPORT

**Hyperthyroidism and Transient Atrioventricular Heart block: A Case Report.**<sup>1</sup>Akintunde A.A., <sup>1</sup>Akinwusi P.O<sup>1</sup>Department of Internal Medicine, LAUTECH Teaching Hospital, P.M.B.5000, Osogbo, Osun State, Nigeria.  
Correspondence to: e-mail address: iakintunde2@yahoo.com**Abstract**

Various types of electrocardiographic changes have been reported in patients with hyperthyroidism but atrio-ventricular block is rare.

We report transient first degree atrio-ventricular block in a 42 year old male Nigerian with hyperthyroidism. Concomitant myocarditis from infections endemic in the environment could also have been responsible for the transient atrio-ventricular block. Further studies on this population of patients for prevalence of atrio-ventricular blocks and clinical correlates are necessary for effective prevention of cardiovascular morbidity.

**Keywords:**

Electrocardiography (ECG), Hyperthyroidism, atrio-ventricular heart block (AV Block), Thyroxine.

**Introduction**

Different types of electrocardiographic abnormalities have been reported in patients with thyroid disease. Sinus tachycardia is the most common arrhythmia in hyperthyroidism<sup>1,2</sup>. Atrio-ventricular blocks have also been reported among hyperthyroid patients<sup>3,4</sup>.

This is a report of transient first degree heart block in a male Nigerian and a discussion of its implication for management. Although rare, atrio-ventricular block in hyperthyroid subjects is a possibility that warrants electrocardiographic monitoring, notably when negative dromotropic drugs are prescribed.

**Case Report:**

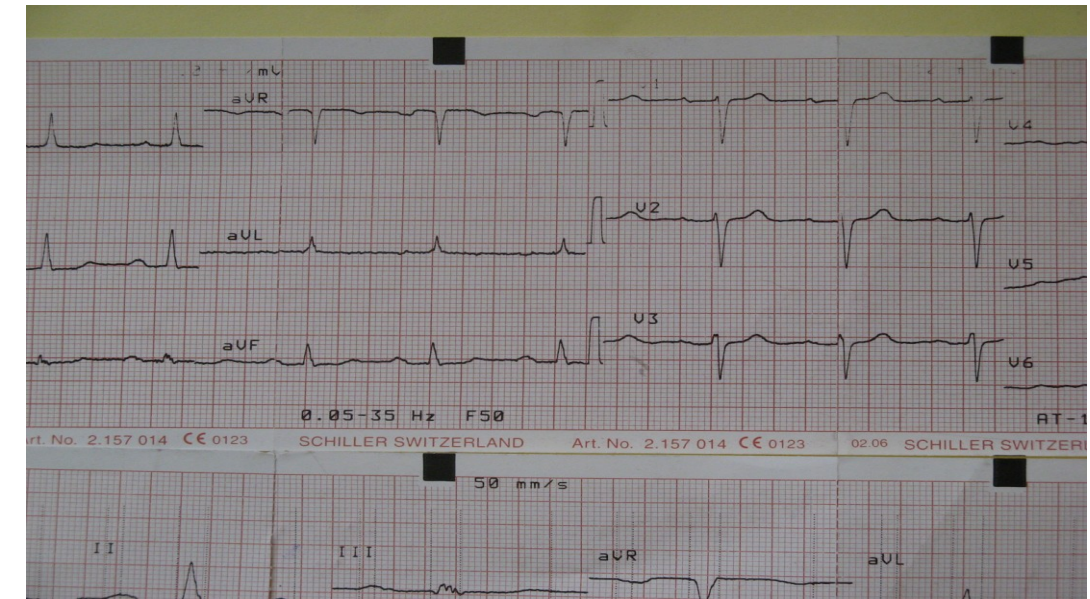
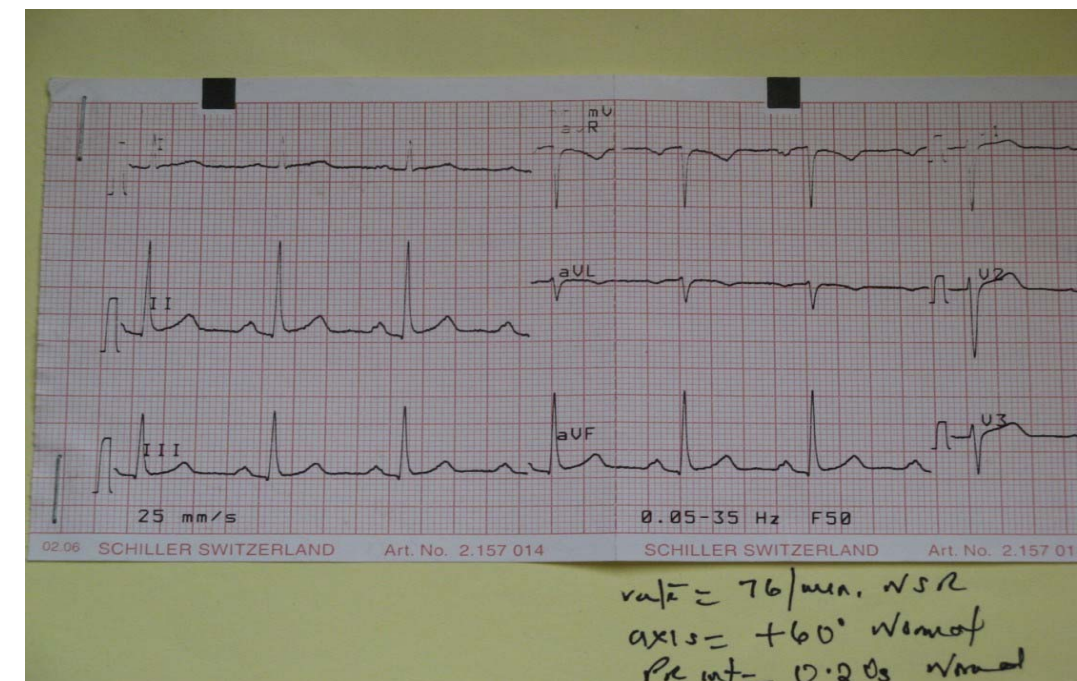
42 years old Mr. I.A was seen in December 2006 at the cardiology Clinic of the LAUTECH Teaching Hospital, Osogbo with history of a painless anterior neck mass which was noticed eight months earlier and which had been growing in size till then. There was no history suggestive of thyrotoxicosis and he had not been previously diagnosed diabetic or hypertensive. He had lived for sometime in Jos,

Nigeria-a mountainous area of the country. There was no history of chronic use of beta blockers or any other medications.

Examination showed a middle aged man who was afebrile to touch, anicteric, acyanosed and well hydrated. He had no pedal oedema, no lid lag, or lid retraction, Kocher's and Berry's signs were negative. Neck examination revealed a round mass, 6 X 6 cm which moved with swallowing, and was soft, smooth, non-tender, freely mobile, and showed neither differential warmth, nor attachment to overlying skin or underlying structures. The chest, abdominal, cardiovascular and central nervous system examination findings were grossly normal.

Complete blood count and blood film appearance, chest radiography, urinalysis and indirect laryngoscopy findings were all normal. The Thyroid function tests showed markedly elevated tetraiodothyronine (T4), to over 250ng/ml which was more than 230% of upper limit of the highest level of normal in our laboratory's reference value of 44-108ng/ml. There was a low normal triiodothyronine (T3):0.7ng/ml (reference value 0.49-2.02ng/ml) and a very low level of total Thyroid stimulating hormone (TSH): 0.09mIU/L (reference value 0.39-6.16mIU/L).

Histology of fine needle aspirate showed clusters of follicular cells and siderophages with colloid materials in a haemorrhagic background thereby suggesting a degenerating colloid goiter. Electrocardiography done at the first visit revealed a pulse rate of 76 beats per minute, normal sinus rhythm, axis was 60 degrees and the PR interval was 0.26 seconds as shown in Figure 1. A repeat ECG done after four months in the same setting was similar except for a PR interval of 0.20 seconds as shown in figure 2. The patient later had elective partial thyroidectomy done.

**Figure I. Showing a prolonged PR interval of 0.26 seconds****Figure II: Showing ECG tracing taken on the same patient four months after with a normal PR****Discussion:**

Hyperthyroidism is a common condition with a prevalence of approximately 1% globally<sup>5</sup>. It affects predominantly women aged 30-50 years and is usually (70%) caused by Grave's disease which is characterized by diffuse goiter, orbitopathy, pretibial myxoedema and the presence of stimulating thyrotrophin (TSH) receptor antibody in the serum among the caucasians<sup>5</sup>. Cardiovascular

abnormalities occur in thyroid diseases. These include tachycardia, hypertension, coronary heart diseases, arrhythmias, and heart failure which can affect the presentation and management of the patients<sup>6</sup>.

Cardiovascular complications have been associated with increased mortality in hyperthyroidism<sup>7</sup>. Sinus tachycardia is the most common arrhythmia in hyperthyroidism<sup>1,2</sup> though a report of bradycardia

has been reported in hyperthyroidism from Australia by Lee et al<sup>8</sup>. Other electrocardiographic (ECG) abnormalities have also been described in patients with thyroid diseases. These include alteration of autonomic modulation of heart rate and increase in homogeneity of ventricular recovery times (as manifested by a higher QT dispersion in patients with subclinical hypothyroidism than in normal controls subjects)<sup>9</sup>.

Paslawska<sup>10</sup> described abnormalities which included prolongation of P wave, QRS complex and QT interval prolongation among dogs with hyperthyroidism. Other ECG abnormalities described include ST-T wave changes in the absence of Ischaemic heart disease. This has been related to increasing demand of the thyrotoxic myocardium and/or excessive coronary vasospasm<sup>5,6</sup>.

Heart block may predispose to cardiac arrhythmias. The pathophysiology of the arrhythmias may include the occurrence of a possible reversible thyrotoxic cardiomyopathy in which the left ventricular ejection fraction as measured by radionuclide ventriculography is increased at rest but falls on exercise. This paradoxical response has been shown to disappear within a few weeks of the patient becoming euthyroid<sup>11</sup>. Sawin et al<sup>12</sup> also showed in a large Framingham study using a heterogeneous group of patient with low Thyroid stimulating Hormone (TSH) concentration that they have a six fold risk of developing atrial fibrillation.

Toloune<sup>3</sup> and other authors<sup>4</sup> have also reported the association between hyperthyroidism and atrio ventricular block. Our patient may also experience atrio ventricular block especially in this environment where focal or general myocarditis commonly occurs due to variety of infectious diseases.

In a study in Ife<sup>13</sup> similar findings to those recorded in Caucasians including sinus tachycardia, systolic hypertension, left ventricular hypertrophy and atrial fibrillation have been recorded in spite of the established racial difference in beta adrenergic response<sup>5,11</sup>. Our patient did not have evidence of left ventricular hypertrophy on the electrocardiograph. Heart block is as an important risk factor for cardiovascular events as left ventricular hypertrophy is. The transient nature of the cardiac abnormality in our patient raises the possibility that associated viral myocarditis may have complicated the thyroid disease and been responsible for the manner of presentation of our patient. The effect of thyroid

hormone on the heart is also a possible cause of the transient electrocardiographic abnormalities. Therefore aggressive monitoring and appropriate intervention is important in the reduction of increased risk of cardiovascular events such as sudden cardiac death due to malignant arrhythmias. An association between goiter endemicity and residence in mountainous low iodine content areas has been documented. Our patient had spent some earlier part of his life in such an area (Jos, Nigeria) and this might have contributed in some ways to the development of thyroid swelling<sup>14</sup>. Though apathetic thyrotoxicosis is a close differential diagnosis, it is not common in the age group of our patient.

### Conclusion

ECG abnormalities of cardiac rhythm and timing occur among hyperthyroid black patients. Identification allows for adequate screening and prevention of malignant atrio-ventricular blocks. Therefore, further studies on such population for prevalence of atrio-ventricular blocks, and clinical correlates are necessary for effective prevention of cardiovascular morbidity.

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