



## HYPERTHYROIDISM

### Amiodarone was the most common cause of thyroid storm in French intensive care units

#### BACKGROUND

Thyroid hormone has a direct effect on heart function. Hyperthyroidism usually causes an increase in heart rate and occasionally causes the heart muscle to weaken. Hyperthyroidism is especially difficult in patients with underlying heart problems. Amiodarone - a medication used for irregular heart rhythms – contains a lot of iodine that can affect thyroid function. In Europe, amiodarone can often cause the development of hyperthyroidism (amiodarone-induced thyrotoxicosis), while in the United States, hypothyroidism is more common.

Thyroid storm, while rare, is the extreme result of an overactive thyroid and has a high risk of death even when recognized and treated appropriately. In this study, authors looked to evaluate the presentation, management and death rate of patients with thyroid storm causing admission to French intensive care units (ICUs).

#### THE FULL ARTICLE TITLE

Bourcier S et al 2019. Thyroid storm in the ICU: a retrospective multicenter study. *Crit Care Med* 48:83–90. PMID: 31714398.

#### SUMMARY OF THE STUDY

The investigators reviewed all patients admitted to 31 intensive care units in France from 2000-2017 who were diagnosed with any type of hyperthyroidism. After reviewing the records, they selected those patients > 18 yr who had hyperthyroidism and at least one organ failure felt to be secondary to the hyperthyroid state. This comprised their group of patients with thyroid storm – which is diagnosed as severe hyperthyroidism resulting in central nervous system (CNS) abnormalities, temperature elevation, rapid pulse, congestive heart failure (CHF) and stomach problems. Among 270 patients admitted to the ICU's with elevated thyroid hormone levels, they identified 92 as having thyroid storm.

Amiodarone-induced thyrotoxicosis was the most common cause of thyroid storm (33%), followed by Graves' disease (26%). Autoimmune thyroiditis, toxic multinodular goiter, and toxic solitary thyroid adenoma were much less frequent causes (10%, 9%, and 6% respectively). In 16% of patients, a cause was not stated. Other than the use of amiodarone, other inciting factors were discontinuation of antithyroid drugs (14%), infection (10%), excess thyroid hormone medication (4%), pregnancy (2%), iodinated contrast administration (2%), and nonthyroid surgery in one patient. Approximately 1/3rd of patients had no identifiable precipitating factor.

At the time of admission to the ICU, clinical manifestations of CHF were present in 72% of the patients. CNS problems was noted in 53% of patients and stomach or liver problems occurred in 48%. About half of the patients had fever. Common treatments included antithyroid drugs (80%), beta-blockers (71%) and steroids (~50%) with other treatments used less commonly. Mortality in the ICU and 6 mo later was 17% and 22%, respectively.

#### WHAT ARE THE IMPLICATIONS OF THIS STUDY?

Using fairly stringent criteria to diagnose thyroid storm and looking only at patients who required ICU admission, the risk of death remains quite high. While Graves' disease is the most common cause of hyperthyroidism overall, amiodarone was the most frequent cause of thyroid storm in this study. In patients who develop thyroid storm while on amiodarone, the risk of death is particularly high, likely due to the difficulty in treating amiodarone-induced thyrotoxicosis along with the patient's underlying cardiac issues. It is important that thyroid function be carefully followed in patients on amiodarone.

— Marjorie Safran, MD



## HYPERTHYROIDISM, continued

### ATA THYROID BROCHURE LINKS

Hyperthyroidism (Overactive): <https://www.thyroid.org/hyperthyroidism/>

### ABBREVIATIONS & DEFINITIONS

**Hyperthyroidism:** a condition where the thyroid gland is overactive and produces too much thyroid hormone. Hyperthyroidism may be treated with antithyroid meds (Methimazole, Propylthiouracil), radioactive iodine or surgery.

**Graves' disease:** the most common cause of hyperthyroidism in the United States. It is caused by antibodies that attack the thyroid and turn it on.

**Amiodarone:** an iodine-rich drug that is commonly used for the treatment of irregular heart rhythms. Amiodarone can cause thyroid problems, including both hypothyroidism and hyperthyroidism.

**Amiodarone-induced Thyrotoxicosis:** elevated thyroid hormone levels that can occur as a result of excessive iodine from amiodarone resulting in increased thyroid hormone production and secretion or to destruction of thyroid cells with release of thyroid hormone into the blood

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