
**Case and question**
A healthy 60 year old man, active in farming, presented to my clinic to establish care. Only complaint was nonspecific mild fatigue of several months, characterized as less stamina for physical work. Extensive review of systems otherwise negative. Lab abnormalities significant only for persistently suppressed TSH with normal T3 discovered on pre-insurance testing prior to his presenting for care. EKG obtained in advance of potential exercise stress testing to evaluate decreased stamina showed atrial fibrillation with ventricular rate in 60s. Further evaluation revealed hot thyroid nodule, and radio-iodine ablation was planned. Should this patient with hyperthyroidism and atrial fibrillation be placed on coumadin?

**Search**
I searched Pub Med (both clinical queries and general search) for combinations of hyperthyroidism, atrial fibrillation, anticoagulation, and stroke. There actually were surprisingly few articles on the specific question. The one I chose was a recent (2009) publication that was a prospective observational study of both inpatients and outpatient at one hospital in Hong Kong, China, exploring the risk of ischemic stroke in hyperthyroid patients with new onset of atrial fibrillation. The study specifically looked at clinical outcomes of this patient population in comparison to hyperthyroid patient without atrial fibrillation, and atrial fibrillation patients with normal thyroid function.

Hyperthyroidism is a relatively common endocrine abnormality, is a recognized treatable cause of atrial fibrillation, and has been proposed as a risk factor for thrombosis and subsequent thromboembolism independent of atrial arrhythmia. However, thyroid disorders are not included in the most commonly used clinical tool to determine anticoagulation management, namely the CHADS2 scoring tool. Thus, understanding the risks of ischemic stroke in the hyperthyroid patients, if it is different from that of “all comers” stands out as an important clinical question.

**Study methods**
Consecutive patients admitted to medicine between 2000-2005 were screened for study. Those with history of AF, structural heart disease, CHF, of LVEF <45% were excluded. The remaining 160 patients were matched by age and sex with equal number of admitted AF patients with normal thyroid function (recruited patients) and 160 age and sex matched clinic patient with hyperthyroidism. Demographic data, physical exam, ECG, echo, and laboratory testing were gathered prospectively (for hyperthyroid patients), and retrospectively for nonthyroid AF patients. Risk of stroke assessed using CHADS2 scheme.

Statistical analysis was based on hazard ratio using univariate and multivariate Cox proportional hazards regression models.

**Results**
Baseline differences in the three comparison groups: Hyperthyroid patients with AF had higher prevalence of diabetes than did those without AF; patients with nonthyroid AF had higher

prevalence of hypertension and higher mean CHADS score than hyperthyroid AF patients. At 1 year follow-up, ischemic stroke occurred in 15 (9.4%) of hyperthyroid patients with AF and 5 (3.1%) of patients with nonthyroid AF and 1 (0.6%) hyperthyroid patient without AF. The majority of ischemic strokes in hyperthyroid patient with AF (73%) occurred within the first 30 days of initial presentation, and the majority (93%) occurred while patients were in persistent AF. Hyperthyroidism and persistent AF were independent predictors of occurrence of ischemic stroke.

**Validity (in prospective observational study)**

1. Equivalence of comparison groups
   - Selection bias--not all patient with new hyperthyroidism and new afib are admitted; are admission criteria comparable to practice here, and how different were these patients from those in the outpatient group? Were authors able to show that hyperthyroid group had less comorbidity?
   2. Determining timing of onset, is it new disease?--both hyperthyroid and afib can be “silent”

**Application and clinical management of my patient**

- anticoagulation in anticipation of treatment: standard of care in advance of attempted conversion
- anticoagulation in early period of presentation: do we disregard CHADS2 score and anticoagulate in newly diagnosed atrial fibrillation in the hyperthyroid patient? I don’t feel that this study alone is adequate to compel me to do so, weighing risks of anticoagulation.