

## Graves' Hyperthyroidism Induced Acute Psychosis- A Case Study

### Author Detail:

Gurpreet Singh-the Northern Hospital, Melbourne Victoria

**Abstract:** *Hyperthyroidism is a common medical condition that affects approximately 2-5% of all women during their lifetime. It is more common in females with a female to male ratio of 5:1 with the majority of women affected between the ages of 20-40. Most patients with hyperthyroidism have a common constellation of symptoms which include insomnia, irritability, restlessness, fatigue, tremor, palpitations, increased perspiration, heat intolerance and weight loss despite a normal or increased appetite.*

*Graves' disease is the most common cause of hyperthyroidism. It is an autoimmune condition in which IgG antibodies bind to TSH receptors in the thyroid leading to the overproduction of T3 and T4. The presence of eye disease on clinical examination and IgG antibodies in serum is unique to Graves' hyperthyroidism and helps distinguish it from other aetiologies. Graves' disease ophthalmopathy is caused by inflammation of orbital fat, muscle and connective tissue leading to exophthalmos, eyelid retraction, lid lag and periorbital oedema and conjunctivitis.*

*Patients with Graves' disease may also experience personality and behavioural changes such as anxiety, emotional lability, psychosis, agitation and depression. These changes are often accompanied by cognitive impairments with patients often complaining of poor orientation, confusion and difficulty with concentration. Whilst the mechanism of cognitive, personality and behavioural changes in Graves' disease is not known, treatment results in improvement in these domains.*

**Keywords:** *Hyperthyroidism, Graves' disease, Psychosis, Graves' Ophthalmopathy, Neuropsychiatric Symptoms*

### Case Background

A concerned husband brought his 38 year old Caucasian wife to a metropolitan general practice. His wife had been experiencing increasing confusion, labile mood, pressured speech, agitation, restlessness and hot flushes for the past 2 weeks. He also noted that his wife was becoming disorganized (tangential) with her speech and expressing persecutory delusions that she was going to be harmed by a stranger. She had no previous history of any psychiatric disorder and she had been otherwise well. She was a non-drinker but smoked about 30 cigarettes a day.

On examination, the patient was noted to be hyperactive and to have pressured speech. Her skin was warm and clammy to touch. She was also tachycardic (up to 110 beats a minute) and had an elevated blood pressure of 150/80 mmHg. Mental state examination revealed an anxious and guarded patient with flattened mood. Her thought content was dominated by paranoid persecutory and nihilistic delusions (the patient believed that a bushfire was going to kill her entire family). Her thyroid was mildly enlarged and she was also noted to have exophthalmos, lid lag and lid retraction. Neurological examination was normal except for brisk reflexes.

### What Are the Differential Diagnoses for the Patient's Psychosis?

Psychoses are broadly defined as a loss of contact with reality and presents with a wide range of signs and symptoms<sup>1</sup>. Commonly, abnormalities occur in one of the following five domains: delusions, hallucinations, disorganized thinking (speech), abnormal motor behaviour and negative symptoms (such as decreased ability to experience pleasure or reduced emotional expression).<sup>1</sup>

There are a variety of aetiologies that can cause psychosis but they can be broadly classified as

- Primary psychiatric disorder induced psychosis
- Primary medical condition induced psychosis or
- Drug induced psychosis

Psychiatric	Drug	Medical
Schizophrenia	Alcohol	Delirium (infection, hypoglycaemia, electrolyte abnormalities etc)
Schizophreniform Disorder	Cannabis	Neurodegenerative disorders (Alzheimer's Disease, Parkinson's Disease)
Brief Psychotic Disorder	Amphetamines (or other stimulants)	Neurological Disease (stroke, space occupying lesions, multiple sclerosis)
Major depression with psychotic features	Cocaine	Endocrine disorders (thyroid, parathyroid or adrenal diseases)
Delusional Disorder	Phencyclidine	Infection (HIV, malaria, encephalitis, syphilis)
Schizotypal Personality Disorder	Sedative, hypnotic or anxiolytic	Nutritional Deficiencies (Vitamin B12, folate, thiamine)

### What Investigations Should Be Ordered?

In a general practice setting, a full blood count, liver function tests (LFTs), thyroid stimulating hormone (TSH), Urea Electrolytes Creatinine (UEC's) and erythrocyte sedimentation rate (ESR) should be ordered as first line investigations.<sup>4</sup> In a middle aged woman who is of childbearing age or premenopausal, it might be useful to also to do a pregnancy test or to check her follicle stimulating hormone (FSH) and luteinizing hormone (LH) levels.<sup>4</sup>

Other common investigations that should be considered include a urinalysis (to rule out a urinary tract infection) and a blood or urine culture if indicated.<sup>5</sup>

Depending on the results of the first line investigations, further tests to consider include a rheumatologic workup, electro-encephalogram (EEG) or neuro-imaging of the brain such as a magnetic resonance imaging (MRI) or computed tomography (CT) brain to rule out space occupying lesions, stroke or a demyelinating disease.<sup>5</sup>

In our patient, her full blood count, LFTs, UEC's, FSH and LH levels were all within the normal range.

The patient's ESR was raised and her thyroid function test revealed hyperthyroidism:

- Decreased TSH <0.01 mU/L (0.27-4.20)
- Raised free T3 – 7.22 pmol (4.0-6.8)
- Raised free T4 – 22.5 pmol (12-22)

### What Is The Diagnosis?

Graves' disease induced psychosis

### What Are The Management Options For The Patient?

Graves' disease can be treated through radioiodine, anti-thyroid medications and surgery with the choice of therapy dependent upon patient factors such as the size of the goitre, age and complications of treatment amongst others.<sup>6</sup> Treatment of the underlying disease is sufficient in managing the psychiatric symptoms of Graves' induced psychosis.<sup>7</sup> A common treatment for Graves' disease and its associated psychiatric

symptoms involves both anti-thyroid medications (such as a thionamide) and beta adrenoceptor antagonists.<sup>8</sup> Psychotropic medications should be considered in patients who display ongoing psychiatric disturbances despite a return to their baseline thyroid function after treatment with both anti-thyroid medications and beta adrenoceptor antagonists<sup>8</sup>.

As anti-thyroid medications have no effect on the progression of Graves' disease ophthalmopathy,<sup>9,10</sup> other corrective measures such as artificial tears, ointments, sunglasses and nocturnal taping of the eyes should be employed.<sup>10</sup> In severe ophthalmopathy, high doses of systemic glucocorticoids, lid surgery or surgical decompression of the orbit may be required.<sup>11</sup>

Furthermore, inpatient admission and treatment should be considered in patients who do not rapidly experience an improvement in their psychiatric symptoms despite treatment with first line medications, when there are concerns about a patient's wellbeing or that of the general community or if the patient's psychiatric or medical symptoms are severe.<sup>7,8</sup>

### Case Discussion

Hyperthyroidism is a common medical condition that affects approximately 2-5% of all women during their lifetime. It is more common in females with a female to male ratio of 5:1 with the majority of women affected between the ages of 20-40.<sup>12</sup> Most patients with hyperthyroidism have a common constellation of symptoms which include insomnia, irritability, restlessness, fatigue, tremor, palpitations, increased perspiration, heat intolerance and weight loss despite a normal or increased appetite.<sup>6</sup>

Graves' disease is the most common cause of hyperthyroidism. It is an autoimmune condition in which IgG antibodies bind to TSH receptors in the thyroid leading to the overproduction of T3 and T4.<sup>12</sup> The presence of eye disease on clinical examination and IgG antibodies in serum is unique to Graves' hyperthyroidism and helps distinguish it from other aetiologies.<sup>12</sup> Graves' disease ophthalmopathy is caused by inflammation of orbital fat, muscle and connective tissue leading to exophthalmos, eyelid retraction, lid lag and periorbital oedema and conjunctivitis.<sup>13</sup>

Patients with Graves' disease may also experience personality and behavioural changes such as anxiety, emotional lability, psychosis, agitation and depression.<sup>14</sup> These changes are often accompanied by cognitive impairments with patients often complaining of poor orientation, confusion and difficulty with concentration.<sup>14,15</sup> Whilst the mechanism of cognitive, personality and behavioural changes in Graves' disease is not known, treatment results in improvement in these domains.<sup>8</sup>

### Key Points

- Hyperthyroidism is a frequently encountered medical condition in the general practice setting
- Graves' disease is the most common cause of hyperthyroidism and patients can present with personality, behavioural or cognitive impairments including psychosis
- Treatment of the underlying disease can lead to resolution of the neuropsychiatric symptoms of Graves' hyperthyroidism

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