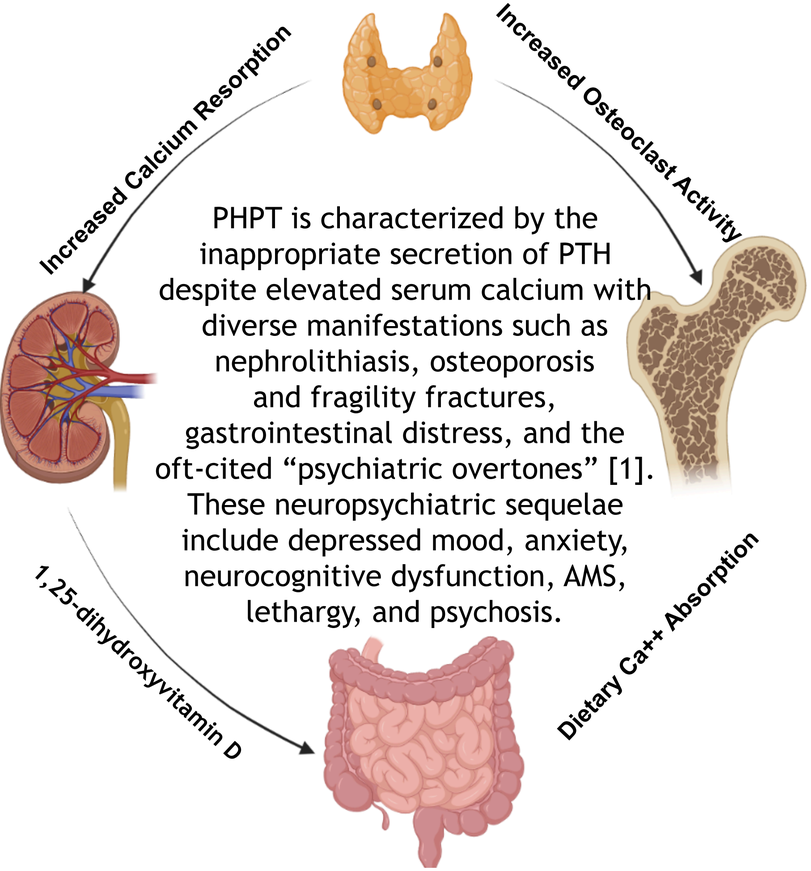
Neuropsychiatric Hyperparathyroidism: Severe Psychosis Resolves With Parathyroidectomy

Dr. Phillip H. Henry, Dr. David Banayan
Rush University School of Medicine, Department of Psychiatry and Behavioral Neurosciences

Introduction

Dysregulation of calcium homeostasis in Primary Hyperparathyroidism (PHPT) leads to a broad spectrum of neuropsychiatric symptoms, including psychosis. Despite the observed psychiatric manifestations of HPT and reports of curative parathyroidectomy these phenomena are poorly understood and can be under-appreciated contributors to psychiatric illness.

Deranged Calcium Homeostasis



Case Report

A 35 year-old Caucasian woman presented to the emergency department with insidious onset of paranoid delusions, hyperthymia, severe insomnia, and agitation. She demonstrated delusions of thought control, bodily possession, and implantation of explosives in her abdomen. She was detained by police after threatening herself with a knife. Psychiatric history was significant for Generalized Anxiety Disorder. Medical history was unremarkable. Family history is remarkable for Brief Psychotic Disorder. Workup revealed mild hypercalcemia (1.39mmol/L), elevated parathyroid hormone (219.3pg/mL), hypophosphatemia, with a 0.8cm hypoechoic lesion on thyroid ultrasound without evidence of functioning parathyroid adenoma on Sestamibi scan. The patient required constant IV hydration to maintain normal serum Ca^{++}, tolerated quetiapine 150mg nightly with residual psychiatric symptoms (hyperthymia, odd affect, staring, auditory hallucinations, retrograde amnesia) while awaiting definitive treatment. Endocrinology opined that relatively mild hypercalcemia did not explain observed psychiatric symptoms and proposed outpatient surgical treatment. Considering the high acuity presentation and risk of decompensation Psychiatry advocated for emergent surgical intervention. After subtotal parathyroidectomy and adenoma excision she achieved rapid resolution of the principal neuropsychiatric features described above, quetiapine was discontinued in favor of aripiprazole 10mg prior to discharge.

References

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Discussion

Neuropsychiatric symptoms of PHPT are diverse and poorly understood. Evidence suggests that cognitive and emotional dysfunction may be present in “asymptomatic” HPT [3]. Calcium plays a pivotal role in critical cell processes including modulation of monoamine metabolism, neurotransmitter exocytosis (A), and cellular apoptosis. PTH can independently incite calcium influx (B) causing dysregulation in neuro-transmission, glutamatergic excitotoxicity (C) and hippocampal degradation [4]. Intracellular calcium overload can directly insult mitochondria, resulting in membrane instability (D) and disruption of ATP synthesis [5]. These in turn lead to widespread derangements in cellular metabolism and homeostasis which can cause or exacerbate psychotic illness. Providers should remain vigilant for neuropsychiatric presentations of PHPT and are cautioned against using the degree of hypercalcemia as a prima facie method to determine need for definitive surgical treatment.