Can psychosis-associated creatine kinase-emia be a marker of underlying disease? A case report and review of the literature

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Introduction

Psychosis-associated creatine kinase (CK)-emia, the so-called "PACK" phenomenon, has been consistently described in acutely psychotic patients. Although PACK can be the result of antipsychotic exposure [1], other causes are possible. For example, physical restraints, intramuscular injections, or intense physical activity can elevate CK by causing muscle trauma [2]. CK elevation has also been found in the unaffected first-degree relatives of psychotic patients [3] and in psychotic patients not taking medication [4], suggesting a genetic vulnerability. Routine monitoring of CK levels in asymptomatic patients on antipsychotics is therefore not generally thought to be useful [5]. We present a case that may, under at least some circumstances, call this recommendation into question.

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Case Report

"Tom" was a 17-year-old male who presented with symptoms of mania and psychosis and an extensive history of substance abuse. He had multiple hospital admissions over two months with CK levels that ranged from approximately 2,000 to 62,000 IU/L. A CK level was originally drawn due to concerns that Tom had neuroleptic malignant syndrome. At initial admission, he was receiving risperidone orally 1mg twice a day. Pertinent initial laboratory values included urine drug screen positive for marijuana (known history of use since age 8), AST/ALT elevated at 2-3 times the normal range, and urinalysis negative for myoglobin. Risperidone was discontinued due to concerns of possible medication-induced CK elevation (8,000 IU/L). Tom was readmitted on his previous medication regimen with a CK level of 30,000 IU/L. Medication was discontinued and he was transferred to an inpatient psychiatric unit. At the time of his final admission, Tom had been taking aripiprazole 5mg per day and his CK level was 51,000 IU/L. Medication was again discontinued. He received a trial of quetiapine 250mg divided twice daily with no clinical improvement in psychosis. There was no clear correlation between medication and CK level. Lithium 900mg divided twice daily was initiated to target manic symptoms. Thorough medical and laboratory evaluations for genetic metabolic disorders and neurological disorders were negative, with the exception of a homozygous pathogenic variant in PYGM (c.2262delA), the gene associated with glycogen storage disease type V (GSDV), or McArdle's Disease [6].

Discussion

Tom had multiple medical and psychiatric admissions with concerns regarding his elevated CK levels. As PACK is a known phenomenon, Tom did not initially undergo an extensive medical workup, but when this was ultimately pursued, he was found to have a significant metabolic disorder that has implications for his long-term health. In our view, there may be a danger in presuming that PACK is benign, particularly if it becomes apparent, as it did in Tom's case, that the CK elevation is probably not related to antipsychotic treatment.

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