

Steroid-induced psychosis

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ABSTRACT

Steroid-induced psychosis is a well-documented phenomenon. It usually occurs with oral systemic steroid treatment and is more common at higher doses, although there are case reports of occurrence with local steroid injections. We report a case of a 35-year-old man with no previous history of psychosis who was seen for follow-up after a brief psychotic episode following an injection of 5 mg of dexamethasone into his scrotum the previous day. The injection was given to treat chronic pain from a combat injury.

KEYWORDS Dexamethasone; DSM-5; psychotic episode; steroid-induced psychosis; steroid treatment

Steroid-induced psychosis is an uncommon disorder that is classified under the subsection of substance or medication-induced psychosis in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders*.¹ Contrary to early thought, it is not very prevalent in populations with known psychological illnesses but rather it is a dose-dependent disorder that is more prevalent in people who have certain diseases or are on medications that will augment the effect of the steroids. The disease, however, is possibly underreported in the general population because not all of the psychoses are severe, nor are they necessarily long lasting, and most resolve without intervention.

CASE DESCRIPTION

A 35-year-old man with prior hypertension, hyperlipidemia, chronic testicular pain, lumbar spinal stenosis and radiculopathy, depression, anxiety, and posttraumatic stress disorder presented to the emergency department on September 17, 2017, after cutting into his right scrotum because he had seen someone in his shower the previous night, and “they put something in my testicle.” He had taken a kitchen knife to try to remove it. His wife called 911 for his unusual behavior. He stated that there were “bad guys trying to shoot him in the face” and that teams of doctors had “implanted a tracking device in his testicle.” During police response, the patient was noted to be aggressive toward the officers to the point where he had to be pepper-sprayed and

handcuffed. On arrival, the patient was noted to have his right testicle protruding from a 2-cm scrotal laceration and continued to have persecutory and aggressive behaviors, for which he was placed in restraints and on an order of emergency detention. While in the emergency department, the patient was observed to be oriented to his name, situation, and place but believed the year to be 2009. His vitals were notable for tachycardia of 120 beats/min. Laboratory results were notable for leukocytosis (white blood cell count of $17.1 \times 10^9/L$), glucose level of 252 mg/dL, and slight elevations in potassium, aspartate aminotransferase, and alanine aminotransferase. Tests for alcohol, acetaminophen, and salicylates were negative, and the urine drug test was positive for opioids, which was explained by his prescription for tramadol.

On mental status evaluation by psychiatry, the patient was noted to be calm, cooperative, and attentive. He had good eye contact. His speech was spontaneous, fluent, and coherent with normal rate and volume. He was alert and oriented to person, place, and situation. He had no aggressive or self-harm behavior. His mood was reported as “frustrated” and his affect was rather calm. His thought processes were linear and goal directed. However, his thought content was delusional. He denied suicidal or homicidal thinking, intentions, or plans or thoughts of wanting to hurt self or others. He denied auditory or visual hallucinations. He did not appear to respond to internal stimuli. He appeared to have limited knowledge. He displayed paranoid thought content. Insight into his problems was limited. Judgment was also

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limited. Urology was consulted and his testicle was reduced back into his scrotum and the laceration repaired. He was recommended for inpatient psychiatric hospitalization at an outside hospital for his delusions. The whole psychotic episode lasted approximately 24 hours.

On further inquiry, it was noted that he had been seen the previous day at the pain medicine center for chronic genitofemoral neuralgia and had received an injection of 5 mg of dexamethasone and 0.25% of bupivacaine, along with radio-frequency ablation. He had received steroid injections in the past, even just 2 months earlier, of 15 mg dexamethasone for chronic back pain. His home medications included bupropion, fluticasone, methocarbamol, olopatadine, pregabalin, testosterone cypionate injection, and tramadol. He was in a stable marriage with three children without any legal troubles. He was a previous smoker, having quit 5 years earlier after 7 years of <0.5 packs per day; he used alcohol socially but used no drugs. The differential diagnosis at the time included drug use/intoxication (a urine drug test was positive for opioids but the patient was noted to be on tramadol); electrolyte imbalance (abnormalities noted but explained by gross hemolysis); infection (elevated white blood cells but otherwise no signs of infection); hypoglycemia/hyperglycemia (glucose elevated but not at a level typical of diabetic ketoacidosis or a hyperosmolar hyperglycemic state); and psychiatric causes (recent steroid injection, history of psychiatric disease).

DISCUSSION

The *Diagnostic and Statistical Manual of Mental Disorders*, fifth edition, categorizes steroid-induced psychosis as a form of substance/medication-induced psychotic disorder.¹ For steroid-induced psychosis to be diagnosed, a number of criteria must be met. First, the patient must have at least delusions or hallucinations after exposure to a medication capable of producing these symptoms. The disturbance cannot be better explained by a non-medication-induced psychotic disorder, and it does not occur exclusively during the course of a delirium. Finally, it must cause clinically significant distress or functional impairment. These requirements make the condition a diagnosis of exclusion and therefore a physician must rule out other potential differential diagnoses of other medications, drug use, intoxication, electrolyte imbalance, infection, hypoglycemia, hyperglycemia, neoplasms, or known psychiatric causes. Although our patient had hyperglycemia, the amount of glucose in his system would be very unlikely to cause a hyperosmolar hyperglycemic state, and he had no changes to his tramadol prescription and had been stable on that dosage.

The pathophysiology of this disorder is poorly understood but basically follows that of other diseases like Cushing's or Addison's in that abnormalities of the hypothalamo-pituitary-adrenal axis have the potential to result in mood disorders by disturbing the cortisol pathway as the synthetic steroids activate

glucocorticoid receptors preferentially, which suppresses the secretion of cortisol by the adrenal glands. This preferential selection creates imbalance between glucocorticoid stimulation over mineralocorticoid receptor stimulation, leading to cognitive impairment and emotional disturbances.^{2,3}

Lewis and Smith reviewed 79 cases of steroid-induced psychosis and found that disturbances in reality testing were reported in 71% of the 79 cases, but only 14% had a psychotic disorder without evidence of significant mood changes or features of a delirium.⁴ They found that depression was present in 40.5%, mania in 28%, a mixed state in 7.5%, and delirium in 10% of these cases.⁴ Another study found that mania and hypomania were reported most commonly (in 35% of cases), followed by depressive symptoms in 28% and psychotic reactions in 24%.⁵ The vast majority of these patients develop symptoms <2 weeks from the inductive event^{6,7} and more typically 3 or 4 days after the initiation of corticosteroid therapy, although symptoms can occur at any time, including after cessation of therapy. The symptoms may last anywhere from a few days up to three or more weeks.³ In most cases, any associated delirium commonly resolves within days and psychosis within a week, though depression or manic symptoms may last up to 6 weeks after discontinuation of steroids.⁷

There are not largely powered studies in the field of steroid-induced psychosis due to its unpredictable nature, but it is an important consideration because it is a stressful and dangerous situation for a patient to experience. Diagnosis hinges on exclusion, and prevention hinges greatly on keeping dosages as low as possible and not prolonging medication regimens beyond what is required.

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