

## CASE REPORT

# Angel or devil? Speech disorder after dexamethasone injection for sore throat

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**Abstract**

**Introduction:** The use of a single-dose of intramuscular (IM) dexamethasone in emergency department (ED) is a commonly employed practice. Along with its anti-inflammatory and immunomodulatory effects, dexamethasone use has considerable adverse effects and complications that affect almost all body systems. This paper describes a middle-aged patient receiving IM injection of the agent followed by a serious temporary neurological deficit.

**Case report:** A 48-year-old male patient presented to the ED due to cough, sore throat, fever, and malaise lasting for three days. In the medical history, the patient did not reveal any chronic illness, allergies or regular drug use. After complete evaluation, an IM injection of dexamethasone (8 mg vial) was administered to the patient as a treatment in the green (low acuity) area of the ED. While the neurological examination of the patient was completely normal on admission; dysarthria, bilateral dysmetria, and truncal ataxia ensued within 15 minutes after the IM injection. No pathological findings were detected in the laboratory and radiological work up. The signs and symptoms subsided and returned to normal within three-hour follow-up.

**Conclusion:** Acute neurological complications, although very rare, can follow IM steroid injections. Patients receiving IM dexamethasone need to be observed for a while even if they are asymptomatic. Causal relationships need to be highlighted with well-designed prospective studies.

**Keywords**

Dexamethasone; Dysarthria; Dysmetria; Ataxia; Side effect; Adverse effect; Emergency

## 1. Introduction

Low-dose steroid administration diminishes inflammatory response by affecting pre-inflammatory cytokine transcription and exhibits a strong anti-inflammatory and immunomodulatory effect. Because of that, corticosteroids are increasingly used in emergency departments (ED) alone or as a combined therapy in the treatment of many diseases such as acute asthma attack, allergic reactions, vestibular neuritis, some forms of pneumonia, exudative tonsillopharyngitis that are among the most common causes of presentation [1]. The most frequently used types of glucocorticoids in routine practice include prednisone, prednisolone, methylprednisolone, and dexamethasone [2, 3]. With the widespread use of these agents, reports on the untoward effects and complications such as depression, emotional lability, euphoria, headache, increased intracranial pressure, insomnia, malaise, myasthenia, neuritis, neuropathy, paresthesia, personality changes, pseudotumor cerebri (usually after discontinuation of the drug), psychic disorder, seizure, vertigo have substantially increased year by year, also depending on doses administered [4]. Nonetheless,

severe neurological deficits such as dysarthria or ataxia attributed to low-dose corticosteroid administration have scarcely been described, if any. “A decade ago in Italy, a young patient was reportedly suspected of experiencing a serious adverse reaction of paraphasia, a language disorder manifested by a difficulty to order words, attributed to IM administration of betamethasone. He was administered steroid injection due to low back pain lasting for several months, and a herniated disc was suspected. Following the betamethasone therapy, the patient was noted to have dysarthria which caused uncontrollable lingual or laryngeal movements leading to slurred speech. The discontinuation of the treatment has resulted in the improvement of the relevant signs and symptoms. Regarding this case, the causal relationship was highly presumable since the patient was not taking any other medicines in that period, and the adverse reaction emerged in two hours following the injection [5]. In addition, many studies have stated that there is a correlation between psychiatric disorders and corticosteroids use [6]”.

## 2. Case report

A 48-year-old male patient presented to the ED with the chief complaints of cough, sore throat, fever, and malaise that had been evident in two days and progressively become more severe. He had no history of chronic illness or regular drug use. He stated that his complaints had used to subside when NSAID injections via IM route had been performed by his son (working as a paramedic) at home in the past. He had no history of allergies and psychiatric illnesses. Vital signs on admission and bedside glucose results were as follows: blood pressure: 130/60 mmHg, pulse rate: 78 bpm, respiratory rate: 12 bpm, temperature: 37.2 °C, GCS: 15, bedside glucose: 90 mg/dL. His ECG revealed normal sinus rhythm, without any abnormality. On examination of the patient, pharyngeal hyperemia was recorded, bronchial breath sounds were noted on auscultation of the lung areas. No rales and rhonchi were noted. The neurological examination including cerebellar tests was normal, and direct and indirect pupillary light reflexes were intact. No additional pathological signs were found. The patient was diagnosed with exudative pharyngitis. A single dose of dexamethasone was administered to relieve symptoms in acute exudative pharyngitis. The glucocorticoids have been advocated to be given in exudative pharyngitis in the medical literature [1]. An 8 mg of IM dexamethasone was administered to the patient inside the left gluteal muscle in the green zone (low-acuity area) of the ED. Upon re-assessment of the patient in the ED within 15 minutes following the injection, speech disorder was remarkable in the patient. He was reexamined and noted to have a mild hypertension (153/82 mmHg) without any other abnormality. Thus, he was transferred to the red zone and monitored. Neurological examination of the patient was repeated with a neurology attending. Dysarthric speech and truncal ataxia were identified, along with positive Romberg test and bilateral dysmetria. No additional pathological signs were found apart from these. Laboratory tests, cranial computed tomography, and Diffusion Weighted MRI (DWI) were ordered. No pathological signs were remarkable in the patient's laboratory and radiological work up. The patient was followed up and consulted to a psychiatrist who did not consider any acute psychiatric condition. Exclusion of organic causes was recommended. The speech disorder subsided during the third hour of the follow-up, and the patient was directed to the outpatient follow-up for further investigations. To assess the probability of an index event whether it is attributed to the therapeutic procedure or ingested drug, the Naranjo Scale has been launched [7]. The causality criteria of Naranjo *et al.* was employed to evaluate the patient's condition (Table 1). On this scale, the adverse event obtained 5 points indicating a "probable" reaction to dexamethasone.

During the 1-year follow-up of the patient, no organic central pathological signs were identified in his diagnostic evaluations. Nevertheless, the complaint of dysarthria or "stammering" continues.

## 3. Limitations

There are limitations related to the present case. Although he had no history of allergies and psychiatric illnesses, medical

professionals should bear in mind that every experience related to drug effects or adverse events are unique to this situation and can not easily be extrapolated to the general population or a specific subgroup. Lumbar puncture or other diagnostic procedures were not performed to rule out CNS infections (meningitis and/or encephalitis).

The patient gave consent for having his case history published in the medical literature.

## 4. Discussion

Upper respiratory tract infections (URTI) and in particular, acute pharyngitis, constitute around 1.5 million visits to North American EDs every year. As the main symptom, it rarely mandates or relieved by antibiotic treatment, although some physicians are still likely to prescribe antibiotics to these patients, expecting at least some degree of improvement. The concept of antibiotic stewardship represents the struggle with this prescription tendency worldwide [8]. It should also be considered that these patients may present to the ED many times with the same complaints. In addition to management of myriad emergency conditions, most EDs admit ambulatory patients with mild symptoms. These seemingly mild conditions can turn out to be more serious than presumed in some patients and warrant interventions more than simple prescriptions [9].

The medical literature yields few data related to use of steroids in URTI. Tasar *et al.* pointed out that in adult patients presented to the ED with exudative pharyngitis, parenteral treatment with a single dose (8 mg) of intramuscular steroid (i.e., dexamethasone) in addition to the prescriptions facilitated a more favorable relief in pain in this form of URTI. In addition; 8 mg single dose of dexamethasone was not associated with any untoward effects in the recipients [1]. In their systematic review Hayward *et al.* [10], pointed out that patients with URTI treated with a single dose of steroids were 3 times more likely to have complete resolution of hyperemia due to inflammation in the throat in 24 hours. Previously healthy young adults mostly tolerate short courses of low-dose steroids well, whilst in some patients the side effects of systemic steroids may be evident [11]. Incidences of sepsis, venous thromboembolism and fracture have been found to increase in a month after treatment [10].

Even though the use of IM dexamethasone alleviates the severity of complaints attributed to the infection during acute stage, it prolongs the course of disease [1, 12]. As it is known, although steroids have a broad spectrum, they are avoided by clinicians unless it is obligatory. This is because the common concern that complications may cause a greater damage to the patients' health. Of note, complications of steroids prescribed in outpatient care for long-term use are more frequently encountered in the literature, whilst transient acute neurological symptoms after IM or IV Dexamethasone administration in the ED have been reported rarely.

It is recommended to give the most effective dose as soon as possible, especially when it comes to geriatric and pediatric patients. When using high-dose corticosteroid, acute myopathy has been reported in patients with neuromuscular conduction disorders [13, 14]. In addition, it may cause some psychiatric disorders such as depression, euphoria, insomnia,

**TABLE 1. Assignments of scores respecting the causality criteria of Naranjo *et al.* in evaluation of the present case.**

(1) Are there previous conclusive reports on this reaction?	0
(2) Did the adverse event appear after the suspected drug was administered?	Yes (+2)
(3) Did the adverse event improve when the drug was discontinued or a specific antagonist was administered?	0
(4) Did the adverse event reappear when the drug was readministered?	0
(5) Are there alternative causes that could on their own have caused the reaction?	No (+2)
(6) Did the reaction reappear when a placebo was given?	0
(7) Was the drug detected in blood or other fluids in concentrations known to be toxic?	0
(8) Was the reaction more severe when the dose was increased or less severe when the dose was decreased?	0
(9) Did the patient have a similar reaction to the same or similar drugs in any previous exposure?	0
(10) Was the adverse event confirmed by any objective evidence?	Yes (+1)

mood swings, and psychotic symptoms. A Cochrane Review postulated that the evidence base consists of only eight studies recruiting only 743 patients with URTI [10]. These studies included patients with sore throat from many parts of the world; evaluated different dosages, types, and routes of steroids. Mostly include adjuvant antibiotics; and measured all types of outcomes. Complications related to single-dose use are not classified separately in most research. However, antibiotics were prescribed to participants in both steroid and placebo groups in all trials and only 1 trial had recruited participants from primary care [10]. Therefore, evidence for corticosteroids for URTI in primary care, unaccompanied by antibiotics, is still lacking. Although one can find consistent results in favor of steroids, the only reliable conclusion is the need for a more robust trial.

## 5. Conclusions

Patients who are to receive steroid injections in acute setting should be followed up in a multi-disciplinary manner. In addition to systemic examination, central nervous system examination should also be performed and recorded. It should be kept in mind that transient acute neurological disorders may develop after a single-dose of IM dexametasone administration.

## AUTHOR CONTRIBUTIONS

SY designed the study. SY, OK, RA and NMH collected the data. All authors wrote the manuscript with input from each author. They also approved the final proof.

## ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The patient gave consent for having his case history published in the medical literature. The manuscript does not include any information indicating the patient's identity.

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## CONFLICT OF INTEREST

The authors declare no conflict of interest. Ozgur Karcioğlu is a member of the Editorial Board of this journal.

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