

Case report

Moxifloxacin-Induced Mental Status Change

Sertaç Güler, Dilber Üçöz Kocaşaban

*University of Health Sciences, Ankara Training and Research Hospital, Department of Emergency Medicine,
Ankara, Turkey*

SUMMARY

Introduction: Moxifloxacin is an antibiotic used orally or parenterally in the emergency department (ED) for the treatment of various infections, especially acute exacerbation of chronic bronchitis and community-acquired pneumonia. The side effects of the drug are mainly on the gastrointestinal system, while the central nervous system side effects are rare.

Case report: Herein, we present an elderly patient who had altered mental status associated with the use of moxifloxacin. Upon discontinuation of the drug, the patient quickly returned to baseline neurologic status. In the evaluation of altered mental status in elderly patients in the ED, much of the effort should be spent primarily on ruling out more complex diagnoses. However, this approach requires more invasive and advanced testing.

Conclusion: Considering drug side effects among these more complicated diagnoses may increase non-invasive and radiation-free options for the patient and physician.

Keywords: adverse drug reaction, central nervous system, emergency medicine, mental orientation, moxifloxacin (MeSH Database)

Corresponding author:

Sertaç Güler

e-mail: drsertacguler@gmail.com

INTRODUCTION

Moxifloxacin is a broad spectrum and the 3rd generation quinolone used in the treatment of respiratory, intra-abdominal, urinary tract, skin and soft tissue infections. Quinolones are generally well tolerated agents, but they may sometimes cause adverse drug reactions (ADRs). In general, the central nervous system (CNS) side effects are few (1% and less) (1, 2). The most common side effects are on the gastrointestinal system (approximately 20%) (2). Central nervous system ADRs have also been reported but are very rare (2).

Herein, we present an elderly male patient who was started on moxifloxacin treatment with the diagnosis of pneumonia and developed mental status changes, slurred speech and bizarre behavior patterns, and these symptoms completely resolved after discontinuation of the drug.

CASE REPORT

An 81-year-old male patient was admitted to the emergency department (ED) with the complaints of altered mental status, nonsense speech; also, the patient urinated in the living room of the house after taking off his clothes. The patient did not complain of any symptom such as headache, nausea, vomiting, vision defects, syncope, dizziness, falling, and head trauma. The vital signs of the patient were within the normal limits. The patient was conscious but disoriented to time and place. Bilateral pupils were equal and responsive to the light. Further neurological examination of the patient did not reveal any motor or sensory deficits, dysmetria, nuchal rigidity, and pathological reflexes. There was no significant history of any chronic disease. The patient had no history of smoking, alcohol or drug use. The patient was admitted to the ED the night before with the symptom of productive cough and was started on oral moxifloxacin 400 mg (Avelox®) and paracetamol with the diagnosis of pneumonia. Complaints of the patient started two hours after taking the moxifloxacin.

There was no metabolic and respiratory acidosis in the blood gas analysis. Blood glucose level, leukocyte count, electrolyte levels, kidney and liver function tests, aPTT and INR levels of the patient were within normal limits. Urinalysis of the patient was completely normal. In the light of these data, the patient was excluded from the causes of metabolic or

hypertensive encephalopathy. Computerized brain tomography, brain magnetic resonance imaging, and lumbar puncture examinations were performed, with the preliminary diagnosis of intracranial mass/bleeding/ischemia and central nervous system infection; the findings were normal. Mental status change of the patient was attributed to the moxifloxacin treatment, and the drug was discontinued. The patient was followed up in the emergency critical care unit. Symptoms of the patient had resolved spontaneously 10 hours following the discontinuation of the drug. The patient was discharged after 24 hours of observation, with the recommendation of an Infectious Diseases and Neurology Outpatient Clinic control.

DISCUSSION

The central nervous system side effects of moxifloxacin have a low rate of approximately 0.2-1.1% (2, 3). In patients who developed quinolone-related neuropsychiatric side effects, there was a certain patient and drug reaction profile. These side effects have been reported more frequently especially in elderly patients with underlying neurological diseases such as cerebrovascular disease, head trauma or epilepsy (4). At the same time, the risk of CNS side effects associated with quinolones is higher in patients who concomitantly use penicillin, cephalosporin, carbapenem, theophylline, warfarin, and non-steroidal anti-inflammatory drugs (4 - 7). However, our patient did not have any other cerebrovascular disease or drug use. Tasleem and Viswanathan reported moxifloxacin-induced delirium and visual hallucination in an elderly patient with drug abuse (8). Disorientation to place and time and inappropriate behavior (urinating in the living room) are symptoms that may be evaluated in favor of delirium in our patient, but we did not observe any hallucinations. Confusion, ataxia, behavioral changes, agitation, and acute psychosis have been reported in the literature (9). Uncommonly reported CNS side effects of the fluoroquinolones also include seizures, hallucinations, depression and anxiety, and neuropathy (10 - 12). These reported cases mostly involve patients who are elderly, have an underlying comorbidity, or are taking other concomitant medications.

Our patient did not have metabolic acidosis, and the carbon monoxide level was normal. Liver and kidney function tests and arterial blood pressure

values were within normal limits, helping us to avoid the diagnosis of hepatic, uremic or hypertensive encephalopathy. Furthermore, central nervous system imaging and LP did not reveal any pathology. Dramatic return to baseline neurological level 10 hours after discontinuation of moxifloxacin and Naranjo ADR probability scale score of 6 (13) supported our hypothesis by showing that this relationship was "probable". It can be accepted that limitations of the causal relation are: not being able to measure moxifloxacin levels in any body fluid sample and not having the chance to administer the drug to monitor if the adverse reaction occurs again (re-challenge).

In our opinion, the important feature of our patient is that he did not have liver and/or kidney diseases, no history of drug use, no polypharmacy, no previous medical or family history of neurological disease, and relatively normal neurological examination except for disorientation. Central nervous system side effects of fluoroquinolones may range from mild reactions to more complex and serious side effects, and the possible mechanism of these side effects of the quinolones are selective antagonism of GABAA receptors, overactivation of N-

methyl-D-aspartate (NMDA) receptors, and affecting of the molecular cascade by changing the intensity of some synaptic cations (like calcium or zinc) (14).

CONCLUSION

Moxifloxacin is a commonly used antibiotic agent in outpatient treatment in the ED. Mental status change(s) may develop after the oral use of the moxifloxacin, although it is rarely seen. Emergency physicians should be aware of this potentially serious and rare reversible side effect of moxifloxacin. This may help avoid further expensive and invasive tests and imaging modalities.

Notification

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Promena mentalnog statusa izazvana maksifloksacinom

Sertaç Güler, Dilber Üçöz Kocaşaban

*Univerzitet zdravstvenih nauka, Bolnica za obuku i istraživanja Ankara, Odeljenje za urgentnu medicinu,
Ankara, Turska*

SAŽETAK

Uvod. Maksifloksacin je antibiotik koji se primenjuje oralno i parenteralno na odeljenjima urgentne medicine zbog lečenja različitih infekcija, naročito akutne egzacerbacije hroničnog bronhitisa i vanbolnički stečene pneumonije. Neželjeni efekti leka uglavnom se ispoljavaju u gastrointestinalnom sistemu, dok se u centralnom nervnom sistemu javljaju ređe.

Prikaz slučaja. U radu je prikazan stariji pacijent kod koga je uočena promena mentalnog stanja nakon primene maksifloksacina. Nakon isključivanja leka, pacijent je brzo povratio svoj normalni neurološki status. U proceni promenjenog mentalnog statusa starijih osoba na odeljenjima urgentne medicine treba obratiti pažnju na isključivanje kompleksnijih dijagnoza. Međutim, ovakav pristup zahteva invazivnija i složenija ispitivanja.

Zaključak. Razmatranje neželjenih efekata leka kod komplikovanijih dijagnoza može da uključi veći broj neinvazivnih opcija, kao i procedura koje isključuju zračenje.

Ključne reči: neželjeni efekti leka, centralni nervni sistem, urgentna medicina, mentalna orijentacija, maksifloksacin (MeSH baza podataka)