



Herbal Supplement Consumption: A Rare Case of Cholinergic Syndrome

Bitkisel Takviye Tüketimi: Nadir Bir Kolinerjik Sendrom Olgusu

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ABSTRACT

Dietary supplements for weight loss are widely marketed without true regularization. The use of such non-medical supplements is increasing, as they are often perceived to be natural and harmless. A 34-year-old-woman presented to our emergency department with lethargy and hypersalivation after chronic use of herbal supplement and aloe vera concentrate. In this case, a cholinergic toxidrome was considered, and appropriate supportive care was provided. We report here a rare case of cholinergic symptoms induced by dietary supplements. This aimed to raise awareness regarding dietary supplements and contribute to the literature.

Keywords: Cholinergic syndrome, herbal supplement, emergency department

ÖZ

Kilo kaybı için diyet takviyeleri, gerçek bir düzenleme olmaksızın yaygın olarak pazarlanmaktadır. Bu tür tıbbi olmayan takviyelerin doğal ve zararsız olduğu düşünüldüğü için kullanımı artmaktadır. 34 yaşında bir kadın, bitkisel takviye ve aloe vera konsantresi kronik kullanımından sonra uyuşukluk ve aşırı tükürük salgısı ile acil servisimize başvurdu. Olguda kolinerjik toksidrom düşünüldü ve gerekli destek tedavisi verildi. Burada diyet takviyelerinin neden olduğu nadir bir kolinerjik semptom olgusunu bildiriyoruz. Bu sayede diyet takviyeleri konusunda farkındalığı artırmayı ve literatüre katkı yapmayı amaçladık.

Anahtar Kelimeler: Kolinerjik sendrom, bitkisel takviye, acil servis

INTRODUCTION

Herbal supplements are used as dietary supplements and are frequently perceived to be natural therefore harmless, but unlabeled ingredients may lead to significant adverse effects. Herbalife® products are a complex herbal formula that is known for promoting weight loss and weight maintenance, these products are mostly combined with other supplements like drinks, tea concentrates or vitamins¹. However, the literature

abounds with the descriptions of hepatotoxicity due to herbal remedies and prior publications related Herbalife® products to hepatotoxicity². In this report, we present a rare case of cholinergic toxidrome due to dietary supplements.

CASE REPORT

A 34-year-old female patient was admitted to the emergency department with lethargy, hypersalivation and difficulty

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in speaking. No relevant medical history was reported. At admission, she was sweating and diaphoretic, her vital signs were as follows: blood pressure 144/65 mmHg, heart rate 122/minute, respiratory rate 22/minute, oxygen saturation 84% on room air, and temperature 36.7 °C. During first examination, she was awake but seemed to be confused, she was unable to answer questions because of extreme secretions coming out of her mouth, necessitating mechanical suctioning. On physical examination, urinary incontinence was remarked, the patient was very uncooperative and moving all her extremities. Assessment of motor, sensory, and cerebellar functions was difficult due to agitation but both pupils were miotic. Routine laboratory tests were performed at the time of admission, showing blood glucose of 245 mg/dL, white blood cells of $27.6 \times 10^9/L$ and potassium of 2.8 mmol/L. All other tests including kidney and liver function tests were all within the normal range. Computed tomography of the head showed normal results. Considering potential for drug intoxication, a nasogastric tube was inserted to perform gastric lavage, followed by the administration of activated charcoal through the same tube. A competent supportive care with attention to vitals and further complications was initiated. Consequent to questioning, the patient relative revealed the routine consumption of dietary supplements; Herbalife® products (Herbalife® Formula 1 Shake Vanilla and Herbal Aloe Concentrate Drinks) in the previous 3 months. During follow-up, the patient's need for mechanical suction decreased, she did not require intubation, and her orientation and cooperation recovered. The patient was discharged 3 days later, no deterioration of liver or kidney function had developed. One week after discharge, the patient was examined in the internal medicine department with no complaints, and no supplementary testing was performed.

DISCUSSION

Cholinergic agents trigger muscarinic and nicotinic receptors which respond to acetylcholine, the chief neurotransmitter of the parasympathetic nervous system. A pure cholinergic toxidrome affects nearly every organ system. To describe cholinergic toxidromes, mnemonics such as DUMBBELS (defecation, urination, miosis, bronchorrhea, bronchoconstriction, emesis, lacrimation, and salivation) or SLUDGE (salivation, lacrimation, urination, defecation, gastrointestinal dysfunction, and emesis) have been used³. In our case, the manifestation of symptoms including hypersalivation, miosis, and urinary incontinence strongly indicated a diagnosis of cholinergic toxidrome. This case presents a rare case of cholinergic symptoms secondary to the use of a herbal supplement associated with aloe vera, a common herbal product that is drunk as a tea. The utilization of medicine including certain "active" nutrients, herbals and combinations of traditional remedies is growing regularly, considering the easy access to products marketed

on the web^{4,5}. Herbalife® products are a medicinal product sold in more than 60 countries, whose main indication is weight reduction. Herbalife® products are marketed mostly online directly at home, without company establishments open to the public, and, sometimes, it is the same consumers who become distributors. This distribution model undoubtedly hinders the traceability of products. Herbalife® products are prepared based on a set of plants and herbs enriched with different nutrients, trace elements, minerals, and vitamins. The Herbal Aloe Concentrate Drink consists of eight ingredients, namely aloe vera leaf juice, sugar, water, citric acid, concentrated lemon juice, chamomile flower extract, potassium sorbate, and sodium benzoate. In contrast, the Herbalife® Formula 1 Shake Vanilla contains a total of 40 distinct ingredients^{6,7}. The large number of components present in Herbalife® products, the lack of complete information on their composition, and the geographical differences in marketed preparations in different countries, make it difficult to identify a defined toxic factor. These geographical differences in Herbalife® products are driven by factors such as national food and health regulations, the accessibility of locally sourced ingredients, regional supply chain constraints, and consumer preferences. For instance, Herbalife introduced Immunoturmeric in Indonesia, a supplement containing curcumin—the active ingredient in turmeric—traditionally used in the local context⁸. In 2004, the Food and Drug Administration banned the sale of dietary supplements containing ephedra (ephedrine alkaloids) because of their cardiovascular effects, including increased blood pressure and irregular heart rhythm^{9,10}. Ephedra is an alkaloid used for cough, fever, edema, joint and bone pain and to help with weight loss. The active ingredient is ephedrine, a central nervous system stimulant and sympathomimetic agonist at both α - and β -adrenergic receptors: hallmark effects of α - and β -adrenergic receptor stimulation include enhanced heart rate and contractility, bronchodilation, peripheral vasoconstriction, and central nervous system stimulation¹¹. However, there are no FDA-regulated medications containing ephedra alkaloids; the reasoning lies in the potential for additive or synergistic effects contributing to sympathomimetic toxic effects. In the present case, our patient was taking Herbalife® products along with an aloe vera concentrate drink. Gurley et al.¹² have determined significant variances between label claims and the actual content of ephedra alkaloids; moreover, the impressive difference in alkaloid content within and among specific products. Haller et al.¹³ have demonstrated that dietary supplements often contain substantially varying amounts of ephedra alkaloids compared to the quantities stated on the product labels. Apart from the variation in pharmacological potency and activity, additive and synergistic effects in certain combinations must be considered¹⁴. An updated review has reported that assorted non-alkaloidal natural constituents of ephedra include flavones, tannin precursors, and bisflavonols¹¹.

It is known that the phytochemistry of aloe vera reveals the presence of terpenoids, flavonoids, and tannins¹⁵. Tachjian et al.¹⁶ have highlighted that aloe vera use may elevate the risk of hypokalemia, potentially leading to arrhythmias. In the present case, both hypokalemia and tachycardia were observed. We believe that the ephedrine-like symptoms observed in our patient were due to the Herbal Aloe Concentrate Drink; moreover, its combination with Herbalife® Formula 1 Shake Vanilla may have enhanced the total effect. Therefore, physicians should be cautious when considering adverse events related to the consumption of herbal dietary supplements. The clinical presentation may be related to factors that are not easily identified by reading product labels for harmful plants or active ingredients¹⁷. Since many drugs have no direct antidote and the toxic agent involved may be unclear, competent supportive care should be the main approach. Attention to supportive care, vital signs, and prevention of complications are the most important steps. Taking care of these issues will often be all that is necessary to ensure recovery.

CONCLUSION

People are taking more and more herbal dietary supplements combined with auxiliary products or drinks, without being aware of the adverse side effects of functional health foods that can be encountered. Most patients do not mention these types of non-medical supplies, thinking they are natural and harmless. Therefore, emergency physicians should consider potential dietary supplements as a health threat and be aware of the adverse effects such herbal products may have. Additionally, it is essential to educate consumers about the potential risks associated with these products to facilitate informed decision-making regarding their health.

Ethics

Informed Consent: Informed consent was obtained from all individual participants included in this study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: Y.Ç., Ö.Y.E., A.K., Concept: Y.Ç., Ö.Y.E., A.K., Design: Y.Ç., A.K., Data Collection or Processing: Y.Ç., Ö.Y.E., A.K., Analysis or Interpretation: Y.Ç., Ö.Y.E., A.K., Literature Search: Y.Ç., Ö.Y.E., A.K., Writing: Y.Ç., Ö.Y.E., A.K.

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REFERENCES

- Schoepfer AM, Engel A, Fattering K, Marbet UA, Cribblez D, Reichen J, et al. Herbal does not mean innocuous: ten cases of severe hepatotoxicity associated with dietary supplements from Herbalife products. *J Hepatol.* 2007;47:521-6.
- Lin JK-S, Tuijss SR. Hidden dangers: herbal and dietary supplement induced hepatotoxicity. *Livers.* 2023;3:618-36.
- Holstege CP, Borek HA. Toxidromes. *Crit Care Clin.* 2012;28:479-98.
- Mishra S, Stierman B, Gahche JJ, Potischman N. Dietary supplement use among adults: United States, 2017-2018. *NCHS Data Brief.* 2021:1-8.
- O'Brien SK, Malacova E, Sherriff JL, Black LJ. The prevalence and predictors of dietary supplement use in the Australian population. *Nutrients.* 2017;9:1154.
- Herbalife. Formula 1 Öğün Yerine Geçen Besleyici Shake Karışımı Vanilya Aromalı 550g. Available from: https://www.herbalurunler.com/?gad_source=1&gclid=EAlalQobChMI8dCR6qjPiwMVioN8Bh0s0h9hEAYASAAEgJozvD_BwE
- Herbalife. Herbal Aloe Concentrate Original 473ml. Available from: <https://www.herbalife.com/tr-tr/u/products/herbal-aloe-concentrate-original-473ml-0006>.
- NutraIngredients-Asia. Herbalife Overcomes Solubility Barriers of Curcumin yo Roll Out New Immune Support Supplement. Available from: https://www.herbalurunler.com/?gad_source=1&gclid=EAlalQobChMI8dCR6qjPiwMVioN8Bh0s0h9hEAYASAAEgJozvD_BwE
- de Boer YS, Sherker AH. Herbal and dietary supplement-induced liver injury. *Clin Liver Dis.* 2017;21:135-49.
- Rados C. Ephedra ban: no shortage of reasons. *FDA Consum.* 2004;38:6-7.
- Abourashed EA, Abir TE, Ikhlas AK, Walker L. Ephedra in perspective-a current review. *Phytother Res.* 2003;17:703-12.
- Gurley BJ, Gardner SF, Hubbard MA. Content versus label claims in ephedra-containing dietary supplements. *Am J Health Syst Pharm.* 2000 May 15;57:963-9.
- Haller CA, Duan M, Benowitz NL, Jacob P 3rd. Concentrations of ephedra alkaloids and caffeine in commercial dietary supplements. *J Anal Toxicol.* 2004;28:145-51.
- Ishigooka J, Yoshida Y, Murasaki M. Abuse of "BRON": a Japanese OTC cough suppressant solution containing methylephedrine, codeine, caffeine and chlorpheniramine. *Prog Neuropsychopharmacol Biol Psychiatry.* 1991;15:513-21.
- Kar SK, Bera TK. Phytochemical constituents of aloe vera and their multifunctional properties: a comprehensive review. *Int J Pharm Sci Res.* 2018;9:1416-23.
- Tachjian A, Maria V, Jahangir A. Use of herbal products and potential interactions in patients with cardiovascular diseases. *J Am Coll Cardiol.* 2010;55:515-25.
- Hudson A, Lopez E, Almalki AJ, Roe AL, Calderón AI. A review of the toxicity of compounds found in herbal dietary supplements. *Planta Med.* 2018;84:613-626.