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Original article

Acute kidney injury due to excessive and prolonged intramuscular injection of veterinary supplements containing vitamins A, D and E: A series of 16 cases

Elizabeth De Francesco Daher[a,*], *Lorena Vasconcelos Mesquita Martiniano*[a], *Laio Ladislau Lopes Lima*[a], *Newton Carlos Viana Leite Filho*[a], *Louize Emanuele de Oliveira Souza*[a], *Paulo Henrique Palácio Duarte Fernandes*[a], *Sonia Leite da Silva*[b], *Geraldo Bezerra da Silva Junior*[b]

[a] *Department of Internal Medicine, School of Medicine, Medical Sciences Graduate Program, Federal University of Ceará, Fortaleza, Ceará, Brazil*

[b] *School of Medicine, Public Health Graduate Program, University of Fortaleza, Fortaleza, Ceará, Brazil*

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ABSTRACT

Background: Despite well-documented risks, injectable supplements containing high doses of vitamins are commonly used.

Objectives: To describe acute kidney injury (AKI) as a complication of vitamin intoxication.

Methods: Our series consisted of 16 patients with kidney complications resulting from the use of veterinary intramuscular injection supplements of vitamin A, D and E. The patients were admitted to two referral hospitals in Fortaleza (Brazil) between January 2010 and January 2015.

Results: Patients' mean age was 28.3 ± 8.9 years (19–53 years), and 11 (68.7%) were male. Main signs and symptoms upon admission were nausea (68.7%), vomiting (62.5%), weight loss (43.7%), epigastric pain (31.2%) and headache (31.2%). At hospital admission the mean laboratory values were: hemoglobin 10 ± 2.0 g/dL (6.1–14.2), leukocytes 10,542 ± 4871/mm^3 (4100–15,100), creatinine 3.9 ± 5.2 mg/dL (0.7–22) and urea 91 ± 88 mg/dL (22–306), respectively. Serum calcium was 12 ± 2.2 mg/dL (8.8–15.5), 24-h urine calcium was 575 ± 329 mg (10.7–1058), serum PTH was 55 ± 141 pg/mL (2–406), and serum vitamin D concentration was 135 ± 75 ng/mL (22–265). Using KDIGO criteria, AKI was diagnosed in 13 patients (81.2%), classified as stage 1 ($n = 3$), stage 2 ($n = 3$) or stage 3 ($n = 7$). No deaths occurred in the study period.

Conclusions: Excessive use of veterinary vitamin supplements containing high doses of vitamin A, D and E was associated with AKI. Hypercalcaemia, which was a common finding, appears to be a contributing factor to the development of this type of AKI.

* *Corresponding author.*
E-mail address: ef.daher@uol.com.br (E. De Francesco Daher).

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Daño renal agudo debido a inyección intramuscular excesiva y prolongada de suplementos veterinarios con vitaminas A, D y E: serie de 16 casos

Palabras clave:
Daño renal agudo
Suplementos vitamínicos
Hipercalcemia

RESUMEN

Antecedentes: Suplementos inyectables que contienen altas dosis de vitaminas son utilizados con frecuencia, a pesar de los riesgos bien documentados.
Objetivo: Describir la ocurrencia de daño renal agudo (IRA) como complicación de intoxicación por suplementos vitamínicos.
Métodos: Esta es una serie de 16 pacientes con complicaciones renales resultantes de la utilización de inyección intramuscular de suplementos veterinarios con vitaminas A, D y E. Los pacientes fueron ingresados en 2 hospitales de referencia en Fortaleza (Brasil), entre enero de 2010 y enero de 2015.
Resultados: La edad media de los pacientes fue de 28,3 ± 8,9 años (19–53 años) y 11 (68,7%) eran varones. Signos y síntomas principales al ingreso fueron náuseas (68,7%), vómitos (62,5%), pérdida de peso (43,7%), dolor epigástrico (31,2%) y cefalea (31,2%). Al ingreso en el hospital los valores medios de laboratorio fueron: hemoglobina 10 ± 2,0 g/dL (6,1–14,2), leucocitos 10.542 ± 4.871/mm^3 (4.100–15.100), creatinina 3,9 ± 5,2 mg/dL (0,7–22) y urea 91 ± 88 mg/dL (22–306), respectivamente. El nivel de calcio sérico fue de 12 ± 2,2 mg/dL (8,8–15,5), el de calcio en orina de 24 h fue de 575 ± 329 mg (10,7–1.058), el de PTH sérico fue de 55 ± 141 pg/mL (2–406) y el nivel de vitamina D sérica fue de 135 ± 75 ng/mL (22–265). Utilizando criterios KDIGO, se diagnosticó IRA en 13 pacientes (81,2%); fueron clasificadas como clase 1 (n = 3), clase 2 (n = 3) y clase 3 (n = 7). No hubo muertes en el período de estudio.
Conclusiones: El uso excesivo de suplementos vitamínicos veterinarios que contienen altas dosis de vitamina A, D y E se asoció con IRA. La hipercalcemia, un hallazgo común, parece ser un factor que contribuye al desarrollo de este tipo de IRA.

Introduction

Body sculpting is an increasingly common practice in modern society.[1] Some enthusiasts resort to substance abuse to boost results, despite the serious health risks involved. A number of commercially available substances, from anabolic steroids (hormones promoting muscle anabolism) to oily compounds (increasing muscle volume by way of retention, without contributing to anabolism), are known to cause severe damage to the organism.[2]

One such substance is the compound "ADE", a veterinary product containing liposoluble vitamin A, D and E, indicated for the treatment of vitamin deficiency and infection in cattle and horses. According to the manufacturers, animals should not be injected with more than 5 mL per 120-day period of fattening. However, much higher doses are used by human body sculptors.[2] The injection of ADE produces a local granulomatous reaction and encapsulation. If encapsulation fails, or if the substance enters the blood stream, embolism may occur, in some cases followed by death.[2] In Brazil, human ADE use was first described in the late 1980s, but may have started earlier.[3]

The purpose of the present study was to evaluate the occurrence of acute kidney injury (AKI) or chronic kidney disease (CKD) in a series of patients admitted to two Brazilian referral hospitals due to complications from excessive and prolonged intramuscular injection of ADE vitamins.

Patients and methods

Study design

This is a descriptive study based on a case series. We have evaluated a series of 16 patients with kidney complications resulting from the use of veterinary intramuscular vitamin supplements containing high doses of vitamin A, D and E. The patients were admitted to two referral hospitals in Fortaleza (Northeastern Brazil) between January 2010 and January 2015. Patients with a history of renal failure, hypertension, diabetes mellitus, nephrolithiasis, nephrotoxic drug use, or any comorbidity potentially detrimental to renal function, were excluded from the analysis.

Vitamin supplements used

All studied patients have used vitamin supplements containing vitamins A, D and E. In each 100 mL the following composition was observed: vitamin A 20,000,000 IU, vitamin D 35,000,000 IU and vitamin E 6000 IU, which represents a very high dose, higher than the recommended daily intake for humans.

Study parameters

Information was collected on demographics, length of hospital stay, clinical manifestations, laboratory findings, need