

LOCAL ECZEMATOUS ALLERGIC REACTION TO THE MENADIONE (VITAMIN K3) INJECTION

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REZUMAT

Manifestările cutanate datorate medicamentelor sunt foarte frecvente și bine documentate. Dermatita de contact alergică medicamentoasă apare la multe medicamente și este descrisă în literatură. Totuși, reacția alergică locală eczematooasă la administrarea subcutanată de vitamina K3 (Menadionă) este rară și nu a fost descrisă în literatură. Există puține articole privind dermatita de contact în contextul expunerii profesionale la vitamina K3. Această lucrare descrie un caz de reacție alergică locală eczematooasă după injecția de vitamina K3, relația cauzală între acestea fiind stabilită după criteriile standard.

Cuvinte cheie: dermatită de contact, reacție alergică locală eczematooasă, Menadionă

ABSTRACT

Cutaneous manifestations due to drugs are very common and are well documented. Allergic contact dermatitis, due to drugs is known to occur with many drugs and is reported in the literature. However, local eczematous allergic reaction to the subcutaneous injection of vitamin K3 (Menadione) is rare and has not been reported in the literature. There are few reports of contact dermatitis during occupational exposure to vitamin K3. We hereby report a case of local eczematous allergic reaction to the injection of vit.K3, the causal relation ship of which has been established as per the standard criteria.

Key Words: Contact Dermatitis, local eczematous allergic reaction, Menadione

INTRODUCTION

Vitamin K is an essential cofactor in the hepatic synthesis of prothrombin and other clotting factors (factors VII, IX and X, Protein C and Protein S). The term vitamin K is used for a range of Naphthoquinone compounds which include vitamin K₁ (phytomenadione), the natural form; vitamin K₂ (menaquinone) from intestinal bacterial synthesis; vitamin K₃ (menadione) and vitamin K₄ (menadiol) as synthetic analogues. We report a case of local eczematous allergic reaction presenting two weeks after subcutaneous menadione (vitamin

K3) injection in a patient with hepatitis secondary to rodenticide poisoning with established causality as per the Naranjo algorithm.¹

CASE REPORT

A 35 year old male patient was admitted with history of consuming a small amount of rodenticide. At admission patient had severe abdominal pain and repeated episodes of vomiting. Clinical examination at admission was normal; there were no signs of hepatic failure or bleeding manifestations. Liver function test showed hyperbilirubinemia (total bilirubin 3.0 mg/dL, direct bilirubin 1.0mg/dL), elevated liver enzymes [Aspartate aminotransferase (AST): 124 IU/L, Alanine aminotransferase (ALT): 164 IU/L, Alkaline phosphatase (ALP): 248 IU/L], consistent with acute toxic hepatitis. Prothrombin time (PT) (patient: 16.09 sec., control: 13.66 sec.) and activated partial thromboplastin time (APTT) (patient: 33.94 sec, control: 24.59 sec) were prolonged. In view of features suggestive of acute hepatitis, with prolonged APTT and PT, 3 doses of vitamin K (10 mg) were injected

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Received for publication: Jul. 29, 2005. Revised: Nov. 3, 2005.

subcutaneously on the first three days of hospital admission. The patient was also treated symptomatically with intravenous Ranitidine, Metoclopramide, syrup Sucralfate and Salbutamol nebulisation. He was discharged after normalization of liver enzymes, PT and APTT. At discharge, patient was asymptomatic. After 16 days, patient again attended the medical outpatient department with history of painful erythematous itchy swellings at the sites of subcutaneous injection along with fever for 6 days. Dermatological examination revealed edematous oozing plaques about 3x3 cm each studded with vesicles on both upper arms (Fig. 1 and 2) and on the right thigh (Fig. 3). Surrounding skin also showed erythema and edema. All lesions occurred on the sites where injection Vitamin K₃ was given subcutaneously. A diagnosis of local eczematous allergic reaction secondary to vitamin K₃ injection was made. Blood cultures were sent to rule out the possibility of infective pathology and came sterile after 48 hours of incubation. Patient was started on 40 mg oral prednisolone and 25 mg oral pheniramine maleate. In three days lesions completely healed with hyper pigmented scars.



Figure 1. Allergic eczematous dermatitis to vitamin K₃ at the sites of subcutaneous injection site, both upper arms (a) and right upper thigh (b).

In order to establish the causal relationship between the drug and the reaction, the patient was



Figure 2. Close up view of right upper arm: this erythematous, edematous vesicular lesion with oozing and crusting developed 1 week after subcutaneous vitamin K₃ injection



Figure 3. Recurrence of erythematous rash at the same site after rechallenge with vitamin K₃ intradermally.

admitted again and a scratch patch test and an intradermal test with Vitamin K₃ injection were done on both arms. There was no immediate reaction; but after 48 hours, the patient had erythema, edema and vesiculation at the previous two contact dermatitis sites on upper arms. The thigh lesion did not flare up. We also made an attempt to establish the causality of the particular reaction with the drug. The causality assessment as per Naranjo algorithm categorized the reaction to be definitely attributable to the drug (Naranjo algorithm score: 9).

DISCUSSION

Vitamin K is a lipid-soluble vitamin used systemically in patients with hypoprothrombinemia or vitamin K deficiency and liver disease, or as an antidote to coumarin. Vitamin K exists in four different forms: vitamin K₁ (phytomenadione), the natural form; vitamin K₂ (menaquinone) from intestinal bacterial synthesis; and vitamin K₃ (menadiolone) and vitamin K₄ (menadiol) as synthetic analogues.² Cutaneous allergic

reactions have mostly been attributed to vitamin K₁, K₂ and K₄; these reactions are immunologically mediated and are generally supposed to arise in patients with coagulation or liver problems. The lipid-soluble vitamin K₁ (phytomenadione) causes more cutaneous reactions than its water-soluble analogues. Reactions to water soluble vitamin K are less common, because vitamin K is absorbed through the skin.³

There are three distinct types of cutaneous reactions to vitamin K₁: localized eczematous, localized morpheaform, and, very rarely, diffuse maculopapular eruption.⁴ Eczematous response to intramuscular injection of vitamin K₁ has been well documented in literature and appears at any time from 4 days to a few weeks after intramuscular injection and may persist for up to 2 months to 2 years.^{5,6} A possible association with liver disease is debated. Adverse effects are seen not only in patients with liver-function disturbances but also in patients without liver diseases, and occur mostly after intramuscular or subcutaneous administration of vitamin K₁, independent of the total dose. Patch and intracutaneous tests often give positive reactions as the mechanism of action is probably a delayed-type hypersensitivity reaction.

Allergic contact dermatitis to topical vitamin K₁ used for treatment of facial melanosia has also been recently reported.⁷

There are few case reports on contact dermatitis caused due to vitamin K₃-sodium bisulphite.^{8,9,10} However, these cases occurred during occupational exposure and not during therapeutic use. Localized eczematous dermatitis following vitamin K₃ injection has not been reported in the literature to the best of our knowledge.

CONCLUSIONS

Vitamin K₃ is a commonly used drug in clinical practice. It is used in several conditions where there is a bleeding tendency due liver disease or due to deficiency of vitamin K. Though eczematous dermatitis due to this drug is very rare, this reaction is associated with significant morbidity. Hence, when patients are given this drug, the possibility of this reaction should be kept in mind.

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