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Acute dermal and inhalation exposure to 4-Vinylpyridine - a case report

Ostra przezskórna i wziewna ekspozycja na 4-Vinylpirydynę - opis przypadku

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Introduction: To the best of our knowledge there are only few reports in medical literature concerning the acute dermal exposure to 4-Vinylpyridine (4-VP). We describe a dermal and inhalation exposure to 4-VP followed by systemic symptoms and local injury. **Case report:** A 58-year old female, with non significant previous medical history, was admitted to the ward with the signs of vertigo, weakness and local pain in the foot dorsal region after exposition to few drops of 4-VP. After 7 days of the treatment all symptoms resolved. **Conclusion:** Vinylpyridines are irritant and corrosive substances which can lead to skin damage. In case of inhalation exposure the late onset of systemic symptoms should be taken into account.

Introduction

To the best of our knowledge there are only few reports in medical literature about acute dermal exposure to 4-Vinylpyridine (4-VP). We described dermal and inhalation workplace exposure to 4-VP (1-5).

Case Report

In June 2008, a 58-year-old female, research chemist, with medical history of arterial hypertension and glaucoma, was admitted to the hospital because of dermal and inhalation exposure to 4-VP.

According to the anamnesis, about a week before the bottle containing of 4-Vinylpyridine has been smashed in the laboratory cooler. The patient spent about 30 minutes with the head inside the fridge and inhaled the fumes of 4-VP while cleaning. After about 3-4 hours she noticed that some amounts of the substance has been dropped on her right foot. Because there was no pain, and only slight skin erythema she rinsed the skin with copious amount of cold water and disregarded the incident. The next day, aggravation of erythema was accompanied by onset of itching. Approximately 2 days later the weakness, dizziness, vertigo and nausea have also appeared. The medical examination, including neurology and ENT examination, showed no abnormalities however there were increasing burning sensation, itching and erythema of the exposed skin on the right foot. After the next 2-3 days

Wprowadzenie: Według naszej najlepszej wiedzy w literaturze medycznej znajduje się zaledwie kilka doniesień na temat ostrej, przezskórnej ekspozycji na 4-Vinylpirydynę (4-VP). W pracy przedstawiono przypadek przezskórnej i inhalacyjnej ekspozycji na 4-VP powikłanej objawami systemowymi oraz lokalnymi. **Opis przypadku:** Kobieta lat 58, dotychczas zdrowa, została przyjęty do Kliniki z powodu zawrotów głowy, osłabienia oraz bólu stopy po ekspozycji na kilka kropel 4-VP. Po ok. 7 dniach terapii wszystkie objawy ustąpiły. **Wniosek:** Winylopirydyny są substancjami o działaniu drażniącym i żrącym, które mogą powodować uszkodzenia skóry. W przypadku zatruc wziewnych nie można wykluczyć opóźnionego i systemowego działania substancji.

the painful ulceration appeared and the patient was admitted to the hospital.

At the time of admission to the hospital the patient was awake, blood pressure was 120/60 mmHg, MAP 80 mmHg, heart rate 100 beats/min, respiratory rate 25 breaths/min, and temperature 37.0 degrees C. The patient complained about vertigo and dizziness which did not allow her to walk unaccompanied. Blood biochemistry was not remarkable and medical examination revealed deep ulcerations in right foot which was exposed to 4-VP about a week earlier (Fig. 1).

The supportive treatment, included systemic and topical steroids, antihistaminics, and silver sulfathiazole. After about 4-5 days vertigo, dizziness and weakness resolved spontaneously. The skin changes healed within next 5 days.

Discussion

Pyridine derivatives are important industrial chemicals. Both 2-Vinylpyridine and 4-Vinylpyridine are used as in polymer production of tire-cord binders, and also as biochemical reagent for alkylation of thiol groups in amino acids, peptides, and proteins (1). 4-Vinylpyridine [CAS number 100-43-6], known as 4-ethenylpyridine, gamma-vinylpyridine, 5-ethenyl or pyridine is a liquid substance with unpleasant odor. The chemical structure of 4-VP is C7-H7-N.

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Figure 1
Skin changes after exposition to 4-VP.

allergic contact dermatitis from 4-VP and other vinylpyridine derivatives (1-5). In most of those cases the patients reported intense pain, and erythema immediately after the skin contact. In our case intense pain and ulceration appeared about 2-3 days later, while swelling and slight erythema was noted by patient just after exposure (1-5).

The other interesting observation was the appearance of generalized symptoms including weakness, dizziness, vertigo which was not noted by other authors during pure dermal vinylpyridine derivatives exposure (1-5). Although we are not able to fully exclude that neurologic symptoms have a different pathogenesis as 4-VP ex-

posures, it seems highly unlikely as the patient had no remarkable anamnesis apart from the 30 min inhalation exposure to 4-VP and no marked changes neurological and ENT examination. Moreover all symptoms resolved spontaneously after a few days.

Conclusion

Vinylpyridines are irritant and corrosive substances which can lead to allergic dermatitis and skin damage. In case of coincidence with inhalation exposure the late onset of systemic symptoms should also be taken into account.

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