

OCCUPATIONAL IMMEDIATE-TYPE ALLERGIC ASTHMA DUE TO POTASSIUM TETRACHLOROPLATINATE IN THE PRODUCTION OF CYTOTOXIC DRUGS

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Introduction: Allergic immediate-type reactions by halogenated compounds of platinum (platinum salts) have been described in workers in precious metal refineries and catalyst productions. In both industries there are exposures to many different platinum compounds. It is believed that the most important allergens are those compounds with the highest number of halide ligands. It is unknown whether sensitizations to compounds with a lower number of halide ligands represent co-sensitizations or are due to cross-reactivity. We report a case with occupational asthma and exposure to only one platinum salt. **Case report:** The 22-year-old subject suffered from asthma and rhinoconjunctivitis due to animal danders since his childhood. About a year after he had started to work in the cytotoxic drugs production in 11/2007 he developed work-related sneezing, runny nose and variable dyspnea and was immediately removed from his workplace. He was exposed to potassium tetrachloroplatinate(II) which is used in the production of cis- and carboplatin, but not to further platinum salts. The patient was admitted to our institute for a medical opinion about 6 months afterwards. He gave written consent for the investigations and publication of his case. The patient underwent a comprehensive diagnostic examination including spirometry, bodyplethysmography, methacholine testing and specific testing with potassium tetrachloroplatinate(II) (K₂PtCl₄; skin prick test and inhalative challenge) and sodium hexachloroplatinate(IV) (Na₂PtCl₆, skin prick test). Both substances were provided by Heraeus, Hanau, Germany). The inhalative challenge was performed with a 646-DeVilbiss nebulizer and an APSpro dosimeter (Jäger, Würzburg, Germany) with a freshly prepared solution in quadrupling doses from 2.7 pg to 0.0028 mg (11 steps). The response was evaluated by spirometry, bodyplethysmography, blood gas analysis and exhaled nitric oxide (eNO). The general medical examination showed no pathological findings, but total IgE was 757 kU/L. The forced expiratory volume in one second (FEV₁) was 107 %predicted, but asthma was corroborated by a positive response to methacholine after inhalation of a cumulative dose of 0.092 mg. The results of skin prick testing to environmental allergens and both platinum salts could not be interpreted due to urticaria factitia. After inhalation of a cumulative dose of 0.00375 mg potassium tetrachloroplatinate(II) there was a significant fall of FEV₁ of 38% from baseline and an increase of specific airway resistance (sRt) from 0.58 kPa.s to 5.1 kPa.s. There was a fall of oxygen partial pressure from 73 to 56 mmHg (after 20 minutes) and an increase of eNO from 32 to 156 ppb (after 24 hours) indicating an increased airway inflammation. **Conclusion:** Platinum salts with four halide ligands like potassium tetrachloroplatinate(II) may cause an allergic immediate-type reaction and occupational asthma. Workers in the production of platinum-containing cytotoxic drugs with exposure to

these substances should be included in medical surveillance programs for the prevention of occupational asthma caused by platinum salts.