Osmium tetroxide exposure: Unique clinical experience

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INTRODUCTION

Osmium Tetroxide (OsO_4), an oxidation product of osmium metal is a strong oxidizing agent used in electron microscopy. Exposure may cause severe burns to the eyes (including irreversible blindness), and damage to the skin, respiratory and gastrointestinal tracts. The toxic and lethal human dose has not been delineated. Exposure to osmium and its compounds is extremely rare.

MATERIALS AND METHODS

We present a case of a 32-year-old female, researcher, stained by9 mL of 2% Osmium Tetroxide in acetone during an accident t inthe laboratory, with rare dermal and ocular findings.

RESULTS

Osmium was detected in serum 19 hours later (0.22 µg/L) and in urine during the 15-hour collection (three samples—7.05, 1.65, and 8.45 µg/L). In blood serum on admission, after one and two days after exposure, the levels of iron (28.2, 39.8 and
50.5 µmol/L; reference range 5.8-34.5 µmol/L) and transferrin receptor/ferritin were elevated. The relationship betweenincreased iron in blood and exposure has not been described yet,and the mechanism remains unknown.

CONCLUSION

To our knowledge, this is the first documented case of a significant absorption from the skin and potentially from the eye conjunctiva, based on serum and urine analysis. Due to lack of data in toxicological databases and the absence of antidote, the therapy was challenging and mostly symptomatic. The patient recovered completely within four weeks. She is still being followed up for the unknown long- term effects.

BIOGRAPHY:

Natalie Friedova graduated from the 1st Faculty of Medicine,Charles University in Prague in 2018. She works as a physician atthe Department of Internal Medicine, Charles University, andThomayer Hospital in Prague. She gained her first experiencewith scientific activities in 2009 thanks to international scientific programs for talented youth. Her postgraduate studies at Charles University are in the field of Preventive Medicine focusing on the epidemiology of birth defects. She attended clinical research internships at the University Hospital in Oulu (Finland), University of Zurich (Switzerland). Dr. Friedova regularly participates in international courses and conferences as an active participant