

## Accidental death following inadvertent perfusion of zinc oxide shake lotion

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**CASE HISTORY:** A 74 year old woman who was in postoperative treatment after a colonic surgery in the intensive care unit of a hospital died immediately after perfusion of about 1.5 ml of a white emulsion which was believed to contain 2% propofol via cardiac catheter into the right ventricle. Resuscitation attempts for 30 min were unsuccessful. It was strongly suspected that a syringe with a zinc oxide shake lotion (consisting of 20 % ZnO, 20 % talcum, 30 % glycerol and 30 % H<sub>2</sub>O) that was intended for external treatment of an eczema of the same patient had been mistaken for the propofol syringe. During autopsy, chronic pathologic changes of the cardiovascular system were observed including blood stasis of the liver, the lungs and the spleen as well as an acute plethora of the internal organs and the brain. An anatomic cause of death could not be found.

**AIMS:** To determine the cause of death and the significance of the perfusion fluid.

**METHODS:** The body fluids and tissue samples of the deceased were examined by systematic toxicological analysis using immunoassays, HPLC/DAD, GC-MS. Zinc was determined by AAS. For comparison another case without zinc application (control) was included. Histological sections were prepared after fixation by formaldehyde and imbedding in paraffin from lungs, heart, liver, pancreas, kidneys, brain and coronary arteries and were evaluated after staining with hematoxiline-eosine in direct and polarized light.

**RESULTS:** By HPLC-DAD and GC-MS the following drugs were identified in blood at therapeutic levels: Propofol (0.40 µg/ml), ambroxol (0.92 µg/ml), diazepam (0.03 µg/ml), nordazepam (0.14 µg/ml), midazolam (0.04 µg/ml) und metoclopramide (0.18 µg/ml). The zinc concentrations (µg/ml or µg/g) were determined by AAS (case/control): blood from right ventricle 56/6.5, blood from left ventricle 74.5/6.5, blood from vena femoralis 5.4/4.4, lung tissue (2 samples) 2600/12 and 3100/18, kidney 100/26 and liver 80/31. Histology showed a strong embolism of the lung tissue with birefringent sharp-edged crystals, which were identified as the talcum, and a more homogeneous component (ZnO) was also seen. The same embolism was seen to a medium extent also in the brain sections and to a low extent in heart, liver, pancreas and kidney.

**CONCLUSIONS:** A pulmonary embolism by talcum and zinc oxide was established as the cause of death. An intoxication by drug overdose could be excluded. In the same way, also an acute intoxication by zinc appeared to be improbable since ZnO is not dissolved at physiological pH and since according to literature data much higher Zn concentrations lead to quite different intoxication symptoms. From the Zn distribution between both ventricles as well as from macroscopic observations follows that the amorphous ZnO is able to pass the lung capillaries. Nevertheless, the accumulation of Zn in the lung proves its contribution to the embolism. The results are discussed in context of pulmonary microembolism cases frequently described for drug addicts after injection of crashed talcum containing tablets.

**KEYWORDS:** *Zinc oxide perfusion; Pulmonary microembolism; Talcum perfusion; AAS of zinc; Fatality after medical malpractice; Zinc oxide shake lotion*

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