

ZINC CHLORIDE SMOKE (SMOKE BOMB) INHALATION-INDUCED LUNG INJURY - ANALYSIS OF TWENTY CASES

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BACKGROUND/AIMS: Inhalation of zinc chloride smoke discharged from smoke bomb may lead to chemical pulmonary edema and acute respiratory failure. Neither clinical spectrum nor long-term effect of serious zinc chloride inhalation has been reported.

METHODS: We analyzed clinical manifestations, cytokine changes, treatment outcomes and pulmonary sequelae in 20 patients with acute pulmonary symptoms induced by accidentally zinc chloride smoke inhalation during a military training.

RESULTS: Zinc chloride smoke inhalation acutely caused fever, dry cough, chest tightness, and short of breath. The respiratory symptoms were complicated by pneumothorax and pneumomediastinum in 15% of patients. Five patients developed acute lung injury and required artificial ventilation support. Restrictive ventilation dysfunction and impairment of lung diffusion were universal findings in these patients. The impaired pulmonary functions were reversible after supportive management, although one patient presented with chronic sequelae of restrictive lung disease for more than 6 months. Transient impairment of liver function was noted in 70% of patients and completely recovered in 2 months. Transient elevation of serum TNF- α was found only before pharmacological therapy with corticosteroid, but delayed elevation of TGF- β 1 was found in 2-4 weeks after the accident. All the treatments are supportive, including glucocorticoids, antibiotics and respiratory therapy. All our patients survived the acute lung injury induced by zinc chloride smoke inhalation.

CONCLUSION: Zinc chloride smoke inhalation induces cytokine production, acute lung injury and liver toxicity with various severities. The tissue toxicities are mostly transient, but respiratory sequelae of restrictive ventilation impairment may develop in the severest cases.

Key words: smoke inhalation, pneumothorax, liver function test, cytokines, restrictive ventilation impairment