

15 **CLINICAL FEATURES OF 1,2-DICHLOROETHANE POISONING: A REVIEW OF 59 CASES**

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10.1136/oemed-2018-ICOHabstracts.1164

Purpose The aim of this study was to summarise the features of toxication on cases of occupational subacute 1,2-dichloroethane poisoning and to evaluate the prognosis through their different patterns of clinical manifestation.

Methods In this cross sectional study, medical records of all occupational subacute 1,2-dichloroethane intoxicated patients at the Guangzhou Occupational Health Prevention and Treatment Centre, Guangdong, China from 2009 to 2015 were retrospectively reviewed. Clinical features, laboratory findings, cranial computed tomography (CT) and therapies of each case were evaluated.

Results A total of 59 patients were included for evaluation. There were 3 main clinical manifestations (1): intracranial hypertension (n=29), tremor of the limbs (n=20), mental and behavioural disorder (n=10). There were four cases of mortality while basic recovery was observed in 45 patients and 10 experienced an improvement of symptoms.

Conclusion The clinical characteristic of occupational subacute 1,2-dichloroethane poisoning is central nervous system damage. It is serious after onset, especially in intracranial hypertension patients without specific antidote. However, prompt treatment resulted in a favourable prognosis in most case.

1023 **RETROSPECTIVE STUDY OF THE PROFILE OF BRAZILIANS ALCOHOL AND DRUG DEPENDENT WORKERS RECEIVING SICK LEAVE BENEFIT**

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10.1136/oemed-2018-ICOHabstracts.1165

Introduction Mental and behavioural disorders including chemical dependency (CD) are one of the most important causes of work absence. More than 6 million Brazilians is affected with problems associated with substance abuse. Studies suggests that alcohol and drugs have been the most prevalent and the main cause of long period work absence. The objective of this study is to analyse the profile of workers with chemical dependency receiving sick leave benefits.

Method This was a retrospective study between July 2014 and July 2016. It involved 42 workers receiving temporary sick leave benefits from the National Social Security Institute (INSS) and they were submitted to structured analysis for the data collection, including: sex, age, occupation, international classification of diseases (ICD), work absence, readmissions, time of chemical dependence and current employment status.

Results Most of the chemical dependents were: male (40), with mean age of 37 years (ranging from 21–63 years); 30.9% traders, 28.6% construction workers, 16.7% cleaning and public safety workers, 9.5% drivers, 9.5% rural workers and 4.8% general production workers; mean time of dependence=16 years (ranging from 1–48 years). Most prevalent disorders: multiple drug (ICD-F19%–69%), alcohol related (ICD-F10%–26.2%) and cocaine related (ICD-F14 4.8%), with 93%

associated with smoking; mean time work absence was 79 days; 57% were employed.

Discussion The results showed the worker's profile with CD, demonstrating the relevance of alcohol and drug abuse in this population and present to companies to take preventive measures related with work absence, and health promotion through the reduction of CD's prevalence at work. The results of the analysis are consistent with findings from the literature.

1016 **DIAGNOSTICS BIOMARKERS OF MALIGNANT PLEURAL MESOTHELIOMA**

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10.1136/oemed-2018-ICOHabstracts.1166

Introduction Malignant Pleural Mesothelioma (MPM) is an aggressive cancer caused by occupational, environmental and indirect exposure to asbestos, material that some countries have already prohibited. Survival is less than 1 year. Diagnosis is currently a challenge and the search for early, single or combined diagnostic biomarkers continues to be performed on non-invasive samples.

Methods A case-control study was conducted in 166 cases and 394 controls recruited from 2007–2016 at the Mexican Social Security Institute. Men and Women were included. The plasma concentration of mesothelin, calretinin and megakaryocyte potentiating factor (MPF) was determined by Enzyme-linked Immunosorbent Assay (ELISA) in each sample. Each participant has general data, socio-economic, occupational exposure, environmental, etc. Data were analysed using STATA.

Results The median of mesothelin in cases and controls was 2.25 and 0.55 nM/ml respectively; For MPF of 50.80 and 17.13 ng/ml and for calretinin of 1.05 and 0.14 ng/ml. Mesothelin had a sensitivity of 80.12% and specificity of 91.12% (AUC=0.9175); MPF with 78.18% and 88.78% (AUC=0.9009) and calretinin with 79.88% and 81.68% (AUC=0.8791), respectively.

Discussion Mesothelin is the most promising molecule to be used as a diagnostic biomarker of (MPM) because it offers better specificity alone or in combination with another biomarker. However, it will be necessary searching for other molecular levels of biomarkers that offer, together with mesothelin, the capability to increase the sensitivity and specificity of a non-invasive diagnostic method.

914 **HYDROFLUORIC ACID – EFFECTS OF SKIN DECONTAMINATION ON THE BIOAVAILABILITY OF FLUORIDE**

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10.1136/oemed-2018-ICOHabstracts.1167

Introduction After dermal contact to occupational hazardous substances the cleaning of exposed skin areas is an important first aid measure to reduce adverse health effects. Due to possible severe systemic intoxication following dermal exposure to

hydrofluoric acid (HF) the decontamination of skin should focus on the inactivation of free fluoride ions. The present *ex-vivo* study investigated the effects of exposure duration and different antidotes on the potential systemic uptake of fluoride.

Methods The transdermal penetration of HF (c=30%) through excised human skin was investigated by using static diffusion cells. After dermal application of the acid (100 µl/0.64 cm²) for 1 min the excess was removed using one dry cotton swab. Subsequently, the skin was cleaned with water, calcium gluconate (CaGl), polyethylene glycol (PEG) 400 or hexafluorine[®] using a standardised protocol. In a further study, the application time was extended to 3 min to assess the effect of exposure duration. Chemical analyses of fluoride were carried out by GC-MS or via a fluoride-sensitive electrode.

Result Extension of the exposure time from 1 to 3 min led to an enhancement in the transdermal penetration of fluoride, however with similar penetration kinetics. At the end of experiments (6 hour) a 7-fold higher fluoride amount was detected in the receptor fluid (16 vs 114 µg). In all test series maximum flux was achieved within the first hour past exposure. Decontamination of the skin reduced the cumulative penetrated amount of fluoride by 28% (PEG 400), 49% (water) and 64% (CaGl/hexafluorine[®]) compared to control.

Discussion The results indicate that the systemic uptake of fluoride ions and therefore possible systemic intoxication after exposure to hydrofluoric acid can be diminished by shortening the exposure duration. Reduction was further increased by decontamination of skin – most by substances which are known to supply the complexation of fluoride ions.

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DERMAL ABSORPTION OF FLUORIDE AND HYDROGEN IONS FOLLOWING TOPICAL EXPOSURE TO HYDROFLUORIC ACID

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10.1136/oemed-2018-ICOHabstracts.1168

Introduction Despite being an extremely hazardous liquid, hydrofluoric acid (HF) is commonly used in industry due to its unique chemical properties. Chemically HF is defined as a 'weak' acid but fluoride ions can induce serious systemic toxic effects. Upon contact with low concentrated HF, symptoms such as pain or local lesions may be delayed.

The aim of this study was to characterise changes in intradermal pH and dermal fluoride penetration following HF application.

Methods A static diffusion cell model was used to study dermal fluoride penetration for 6–72 hour following application of varying amounts of HF (c=5%–50%, 100–160 µl/0.64cm², 1–10 min.) on human skin (thickness 0.9 or 2.5 mm). Intra- and transdermal amounts of fluoride and intradermal pH were determined.

Result Transdermal penetration of fluoride increased exponentially with increasing HF concentration. In addition, penetration increased four-times by extending the exposure time from 1 to 3 min. No further increase was seen with longer HF application (5 and 10 min.). The increased amount of HF penetrated through 0.9 mm compared to 2.5 mm skin within one hour was levelled out at later time points. Intradermal

accumulation of fluoride increased dose-dependently but to a lower degree. Intradermal pH dropped with increasing HF concentration and exposure time. Additionally, the lag time between HF application and onset of pH changes decreased with increasing HF concentration and application time.

Discussion The results of the present study show that following 3 min. HF application maximal amounts of fluorides seem to have penetrated the skin. The longer lag time in pH drop with lower concentrated HF might explain the delay between HF contact and onset of pain.

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TOXICOLOGICAL EFFECTS OF REPETITIVE EXPOSURE TO MIG-WELDING FUME PARTICLES ON RAT PRECISION-CUT LUNG SLICES

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10.1136/oemed-2018-ICOHabstracts.1169

Introduction The proinflammatory effects of metal inert gas brazing (MIG) welding fumes containing zinc and copper have been demonstrated in humans. However, little is known about the specific effects on the lung. Here we examined the effects of different concentrations of welding fumes for repetitive exposure in rat precision-cut lung slices (PCLS).

Methods PCLS were prepared from agarose-filled lungs of male rats. To mimic a five day 'work week', PCLS were incubated in welding fume containing media with 1 and 0.1 µg/ml in a repetitive exposure model for 6 hours on 5 consecutive days. For the remaining 18 hours PCLS received incubation in standard incubation medium. For each day cytotoxicity was determined via WST-1 and LDH assay. To determine the maximal LDH release possible, PCLS were treated with Triton X-100 as a positive control.

Result Over all days of consecutive treatment no significant reductions of mitochondrial activity determined via WST-1 could be found in comparison to untreated controls. LDH levels in supernatants increased up to 15% of levels of positive controls treated with Triton X-100, indicating no relevant toxicity.

Discussion This is the first time repetitive toxicological effects of welding fumes on the lung have been examined in isolated lung tissue with intact microanatomy. We demonstrate that a repeated exposure for up to five days has no relevant toxic effects on lung tissue in doses comparable to a realistic occupational exposure. Lung tissue slices could be a promising model to study toxicity of welding particles and need to be investigated further.

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MINERAL OIL IS A RISK FOR AUTOANTIBODIES INDUCTION

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10.1136/oemed-2018-ICOHabstracts.1170

Introduction Mineral oil(hydrocarbon)is also used in many factories, and workers are exposed to a lot kind of mineral oil. It was reported that one element mineral oil named pristane induced inflammatory arthritis in rats and also induced lupus-