

Occupational Varicella Zoster Virus Exposure among Health Care Workers

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RATIONALE: Varicella zoster virus (VZV) is one of eight human Herpesviruses with enveloped virions, 120-200 nm in diameter and linear double stranded DNA. We assessed whether airborne VZV may be present in the hospital environment, presenting an occupational hazard to health workers. **METHODS:** A cross-sectional study was conducted to measure airborne VZV in several hospitals in Taiwan, by using a full-shift personal breathing zone air sampling method for VZV. 315 health workers agreed to participate in this study. Their job titles included nurses, dentists, clinical laboratory personnel, and administrators. The study population was classified into three groups: 1) group-1 (high-risk, n=145): workers who worked in the departments of dentistry, dermatology, ENT, pediatrics, infection, neurology, thoracic medicine, laboratory; 2) group-2 (low-risk, n=135): other clinical departments; and group-3 (comparison, n=35): administrators. Nested PCR was used to assess VZV DNA sampled from the hospital air. **RESULTS:** The personal samplers detected airborne VZV positive among 20.5 percent (9 of 44 samples). After adjusting for covariates, workers who had contact with patients-body fluids had a 2.7-times (OR=2.73, 95% CI: 1.30, 5.7, p=0.0081) higher risk of VZV positivity on their lapel sampler, in the work environment compared to workers who had not contacted with patient body fluids. In addition, group-1 workers had almost 4-times (OR=3.95, 95% CI: 1.94, 8.05, p=0.0002) increased risk of VZV positivity compared to group-2 workers. **CONCLUSIONS:** We conclude that VZV occupational inhalation hazard exists in the health care environment. Further occupational epidemiologic studies of disease risk from these exposures are needed.

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Indicators of Oxidative Stress in the Serum of Asymptomatic Shipyard Welders

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RATIONALE: Oxidative stress is believed to play a key role in the development of welding-induced diseases. The objectives of this study were to investigate the effects of welding fumes on correlates of oxidative stress in serum of asymptomatic shipyard welders in South Korea.

METHODS: Blood samples were collected from 197 welders and 150 non-exposed white-collar males matched for age, sex and smoking. The serum was assayed for total protein, albumin, total antioxidant capacity, manganese superoxide dismutase, aconitase, glutathione peroxidase (GPx), heat shock protein 70, isoprostane, and reactive oxygen species (ROS). Changes caused by welding was evaluated in three groups based on exposure duration i.e., 1-10, 11-20 and 21 or more years of work. This resulted in a sample size of 142 with exposure duration of 3.91 ± 2.95 years, 27 with exposure duration of 16.52 ± 2.91 years, and 28 with welding exposure of 25.39 ± 2.74 years. In addition, we investigated whether independent and combined effect of smoking and welding influenced the markers of oxidative stress.

RESULTS: Welding was associated with increases in serum protein, GPx, aconitase, ROS generation and isoprostane levels compared to controls. The most dramatic change was a 143% increase in serum isoprostane levels with the corresponding 19% increased potential for generating ROS in welders, which was also significant in all exposure groups. Smoking, independently or in combination with welding exposure, generally was not influential in markers of oxidative stress.

CONCLUSIONS: The results suggest that welding exposure can cause oxidative stress in workers of significant magnitude to be measured by serum biomarkers.

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Airway Hyperresponsiveness and Current Asthma in Swiss Professional Firefighters and Policemen

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Background: Based on the Swiss Study on Air Pollution and Lung Diseases in Adults (SAPALDIA) bronchial airway hyperresponsiveness (AHR) is found in 16.4 % and asthma in 2.3 % of the general Swiss population. There is evidence that short term exposure to inorganic dust is associated with AHR in firefighters.

Aim: Determination of AHR and current asthma in firefighters compared to a control group of policemen in Basel / Switzerland.

Method: Lung function, AHR to the "direct" agent methacholine and to the "indirect" agent mannitol, exhaled nitric oxide, exhaled carbon monoxide and skin prick test were measured in a cross-sectional study. All subjects answered a questionnaire about respiratory symptoms and occupational exposure.

Results: 102 firefighters (mean age 40; range 23-63, 1 woman) and 85 policemen (mean age 39; range 22-62, 19 women) were included in this cross sectional study. The mean employment has been 15.7 yrs (range 2-36 yrs) in the firefighters and 13.0 yrs (range 1-34 yrs) in policemen (p=0.1). Current asthma was found in 5/102 (4.9%) firefighters and in 5/85 (5.8%) policemen (p=1.0). A positive response to the methacholine bronchial provocation test was found in 15/99 (15.1%) firefighters and 9/42 (21%) policemen (p=0.5). A positive response to the mannitol bronchial provocation test was found in 16/97 (16.5%) firefighters and 2/42 (4.7%) policemen (p=0.1).

Conclusion: In Switzerland, AHR and current asthma is not different between firefighters and a control group of policemen.

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Long-Term Impact of Western Red Cedar Asthma on Quality of Life

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Rationale: Western red cedar (WRC) asthma is the most common form of occupational asthma in British Columbia and in the northwest United States. The purpose of this study was to assess the long-term impact of WRC asthma on quality of life. **Methods:** We interviewed 215 subjects (70.7% participation) who had been previously diagnosed with WRC asthma by specific challenge testing. Interviews were conducted by telephone (in English or Punjabi) over a one year period in 2003. The questionnaire included demographic items, work history, and questions from the IUATLD, ATS, SF-36 and Marks Asthma Quality of Life questionnaire (AQLQ-M). Analyses were applied to 169 subjects of working age (<65 years), divided into 4 groups: working with WRC (n=46), working but unexposed to WRC (n=80), not working because of asthma (n=22) and not working because of other reasons (n=21). **Results:** The average time since diagnosis was 17.6 ± 8.2 years and 97.6% were males. There were differences in age, work characteristics and prevalence of respiratory symptoms between groups. Those employed but unexposed to WRC had a lower prevalence of chest tightness, dyspnea and wheeze. Their SF-36 scores were consistently higher with means ranging from 64.1 (vitality) to 90.0 (social functioning); average AQLQ-M scores were consistently lower ranging from 0.9 (mood) to 1.5 (social). The opposite pattern was observed for those unemployed due to asthma with average scores ranging from 48.2 (vitality) to 72.4 (mental health) for SF-36 and 2.7 (mood) to 4.2 (social) for AQLQ-M. After adjustment for age, sex, and respiratory symptoms, SF-36 and AQLQ-M scores remained worse for those unemployed either due to asthma or for other reasons. **Conclusion:** The long-term quality of life outcomes of workers diagnosed with WRC asthma were most favourable when they were able to stay employed but no longer exposed to WRC.

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Pulmonary Presentation and Management of Patients Exposed to World Trade Center Site

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Screening programs have revealed an increase in respiratory symptoms in workers at the World Trade Center (WTC) site. We describe the clinical presentation and treatment of a self and physician referred population based on a retrospective chart review of patients with WTC exposure, seen at 2 pulmonary practices (one University-based and one private) on Long Island between 9/2001 and 9/2004. **Results:** 128 consecutive patients were studied. 95% were male. 37% were firefighters/paramedics, 35% police officers, 25% reconstruction workers and 3% WTC evacuees. 93% had symptoms of cough, chest tightness, or dyspnea while 7% of referrals were asymptomatic (abnormal x-ray 4%, asymptomatic screening 2%, abnormal spirometry 1%). Chest radiographs or chest CT were abnormal in 14% of all patients (3 patients had sarcoid-like granulomatous disease on biopsy and 15 patients had radiologically stable nodules, localized infiltrates, plaques or adenopathy). Spirometry revealed no obstruction in 65% of patients, mild obstruction/hyperresponsiveness in 30% and moderate/severe obstruction in 5%. Clinical evaluation led to these diagnoses: 50% new onset asthma, 6% exacerbation of pre-existing asthma, 3% sarcoid-like disease and 41% multifactorial cough/dyspnea probably not due to asthma. Pharmacological treatment included inhaled pulmonary corticosteroids (ICS) in 48%, short acting beta agonists alone in 5%, and medication for rhinitis/sinusitis/GERD without specific asthma therapy in 17%. Only 5 (4%) patients (including 3 with sarcoid-like condition) required systemic corticosteroids for more than two weeks. 26% of patients received no medications. **Conclusion:** While approximately half of symptomatic WTC rescue/construction workers were treated for new onset asthma with ICS, their spirometric abnormalities were often subtle. Moderate/severe airways disease requiring maintenance systemic corticosteroid therapy was uncommon.

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Differences in Cell Surface Marker Activation in Irritant and Allergen Exposed and Non-Exposed Workers

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Introduction: Irritants and allergens are thought to alter airway function in workers by different mechanisms. While the mechanisms for airway sensitisation are reasonably understood, the same is not true for irritant exposure. Even less is known about the immunological separation of workers with respiratory symptoms due to either irritant or allergen exposure. **Methods:** We studied 76 allergen-exposed (insect breeders & latex workers), 55 irritant exposed (welders & wire workers) and 41 non-exposed control workers. Respiratory symptoms, lung function, bronchial responsiveness to histamine, atopic status and workplace specific IgE and a range of cell surface markers on PBMC cells were measured. **Results:** Self reported allergy was significantly less common in irritant exposed workers compared to non-exposed workers. A similar trend was seen for allergen-exposed workers. This may be explained by the healthy worker effect. Work related lower respiratory symptoms were significantly more common in allergen (OR 11.53, 95% CI 1.5 - 90.1) and irritant (OR 9.41, 95% CI 1.1 - 79.1) exposed workers. There was also evidence of up-regulation of CD14 and down-regulation of CD54 on monocytes in both allergen and irritant-exposed workers. Furthermore, a higher occurrence of positive BHR was observed in individuals showing upregulation of CD14 and downregulation of CD54. There was no association between atopic status and expression of CD14 and CD54 on monocytes. **Conclusions:** This study confirmed the association between harmful allergen and irritant exposures and the development of lower respiratory symptoms in exposed workers. Results also suggest that both allergen and irritant exposures may alter the immune profile of peripheral blood, which in turn may contribute to the presentation of work-related lower respiratory symptoms by increasing airway responsiveness.

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