

significantly down-regulated, and the protein content and mRNA expression of E-cadherin were significantly up-regulated; I, III collagen content and I, III type procollagen mRNA expression levels were decreased and lung tissue pathological changes were reduced in vary degrees.

- PolyG intervention (prophylactic and therapeutic) can effectively inhibit the progression of EMT, and further delay the formation of pulmonary fibrosis, and the effect of early to give preventive intervention is better.

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ROLE OF ENDOPLASMIC RETICULUM STRESS IN THE INTERVENTION EFFECT OF POLYG TO SILICOTIC FIBROSIS IN RATS

¹Sanqiao Yao, ²Meng Yang, ¹Na Wang, ²Yuping Bai, ¹Xinlai Qian, ¹Weidong Wu, ¹Zhen An, ¹Guanghui Zhang. ¹Xinxiang Medical University, Xinxiang, China; ²North China University of Science and Technology, Tangshan, China

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Background Silicosis is a kind of serious occupational disease caused by inhalation of silicon dioxide dust in the professional activities for a long term, and its basic pathological features mainly include pulmonary inflammation and diffuse fibrosis. Scholars have poured much energy into research and put forward a variety of hypotheses about the mechanism of silicotic fibrosis, and the apoptosis of lung cells is considered as one of the most important mechanism of silicosis fibrosis. Endoplasmic reticulum stress is one of the important signal pathways mediating cell apoptosis, and it has been proved to be associated with many diseases. But there is still little knowledge about the relationship between endoplasmic reticulum stress and silicotic fibrosis. Our previous study found that PolyG has preventive and therapeutic effect on pulmonary fibrosis in rats, however the mechanism about the intervention effect of PolyG on silicotic fibrosis is still unclear.

Objective To investigate the role and the mechanism of endoplasmic reticulum stress in the intervention effect of polyuridylic acid (PolyG) on silicotic fibrosis in rats.

Methods Eighty SD rats were randomly divided into saline group, silicosis model group, PolyG prevention group and PolyG treatment group, building the animal model of silicosis with non exposed tracheal method except saline group. Rats in prevention group were given PolyG on the day after dusts and were sacrificed at 28 d and 56 d time point after given PolyG, 8 rats were sacrificed in each group. Rats in treatment group were given PolyG at 28 d after dusts and were sacrificed at 28 d and 56 d time point after given PolyG, 8 rats were sacrificed in each group. At 28 d, 56 d and 84 d time point after dusts, rats in saline group and silicosis model group were sacrificed (8 rats were sacrificed in each group) as the negative and positive groups at the same time. The pathological changes of lung tissue was observe by hematoxylin eosin staining and Masson staining, detect the expression level of endoplasmic reticulum stress and apoptosis related proteins IRE1, GRP78, CHOP, PERK, ATF6, casepase3 and casepase12 in lung tissue by Western blot.

Results In saline groups, the structure of lung tissue was normal, some showed mild inflammation and there is no silicotic nodule and collagen deposition, the lung tissue in silicosis model groups showed the alveolar structure were severely destructed, and it occurred a lot of silicotic nodules and collagen deposition, most lung tissue in this groups have typical

fibrous nodules, and along with the extension of exposure, the nodules gradually fused and formed clumps. But the silicotic nodules and collagen deposition in PolyG prevention group and PolyG treatment group were markedly reduced, most of the nodules disappeared, just showed the inflammation in the lung tissue. At 28 d and 56 d time point after prophylactic use polyG, the expression level of IRE1, GRP78, CHOP, PERK, ATF6, casepase3 and casepase12 in prevention group were lower than the same period of silicosis model group ($p < 0.05$), compared with 28 d PolyG prevention group, the expression level of each protein was decreased in 56 d PolyG prevention group, but it has no statistical significance ($P > 0.05$). 3. At 28 d and 56 d time point after Therapeutic use polyG, the expression level of IRE1, GRP78, CHOP, casepase3 and casepase12 in treatment group were lower than the same period of silicosis model group ($p < 0.05$), compared with 28 d PolyG treatment group, the expression level of each protein was decreased in 56 d PolyG treatment group, but it has no statistical significance ($P > 0.05$). 4. The expression level of each protein in PolyG prevention group were lower than the PolyG treatment group, the expression level of GRP78, PERK, ATF6, casepase12 and casepase3 was significantly different between PolyG prevention group and PolyG treatment group ($p < 0.05$), the different expression level of IRE1 and CHOP in this comparison closed significant level ($p = 0.056$, $p = 0.055$).

Conclusion The endoplasmic reticulum stress participate in the mechanism of the intervention effect of PolyG to silicosis fibrosis in rats, PolyG can be effective in the prevention and treatment of silicosis fibrosis, and we will get more significant effect by preventative using PolyG, both the short-term and long-term intervention effect of PolyG on silicotic fibrosis are well.

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A POPULATION BASED LONGITUDINAL STUDY OF RISK FOR CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND OCCUPATIONAL EXPOSURE TO ORGANIC AND INORGANIC DUST

¹K Grahn*, ^{1,2}P Gustavsson, ^{1,2}T Andersson, ^{2,3}A Lindén, ²T Hemmingsson, ^{1,2}P Wiebert. ¹Centre for Occupational and Environmental Medicine, Stockholm County Council, Sweden; ²Institute of Environmental Medicine, Karolinska Institutet, Stockholm, Sweden; ³Lung Allergy Clinic, Karolinska University Hospital, Stockholm, Sweden

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Introduction The development of chronic obstructive pulmonary disease (COPD) has previously been linked to occupational exposure. The aim of this register-based study was to assess the risk for being diagnosed with COPD in subjects with occupational exposure to organic and inorganic dust.

Methods The study population included 20 069 men and 23 572 women from the Stockholm Public Health Cohort. Information of occupation was derived from 1985 or 1990 censuses. New cases of COPD were identified for the period 1990–2010. COPD cases were defined as either a self-reported COPD diagnosis by a physician or a prescription for anticholinergic drugs. A quantitative job-exposure matrix provided information on organic dust (wood dust, paper dust, textile dust, oil mist, cooking fumes, other organic dust) and inorganic dust (respirable crystalline silica dust, iron dust, other inorganic dust and fibres). Analyses were adjusted for age and smoking.

Results Exposure to any organic dust was associated with an increased risk of COPD in men (HR 1.32, 95% CI: 1.12 to 1.56), and in women (HR 1.21, CI: 1.00 to 1.46). Among organic dusts, men exposed to paper dust had a HR of 1.39 (CI: 1.01 to 1.92). In women, paper dust (HR 1.56, CI: 1.08 to 2.26) and other organic dust (HR 1.48, CI: 1.12 to 1.96) were associated with an increased risk.

Exposure to any inorganic dust was associated with an increased risk in men (HR 1.39, CI: 1.15 to 1.67) and among these, risks for respirable crystalline silica dust (HR 1.46, CI: 1.13 to 1.90) and other inorganic dust and fibres (HR 1.56, CI: 1.18 to 2.05) were increased. Analysis of women exposed to inorganic dusts were not possible due to too few subjects.

Conclusion This study confirms an increased incidence of COPD in Swedish workers exposed to organic and inorganic dusts. Health care personnel should consider not only smoking but also occupational exposure when informing COPD-patients of potential risk exposures.

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SILICOSIS, ESPECIALLY COMPLICATED, SHOWS SIGNIFICANT LUNG VOLUMES AND AIRFLOWS IMPAIRMENT COMPARED TO INTERSTITIAL LUNG DISEASES OF NON-OCCUPATIONAL AETIOLOGY

S Perečinský*, Z Mačudová, L Legáth. *Department of Occupational Medicine and Clinical Toxicology, Faculty of Medicine, P. J. Šafárik University and L. Pasteur University Hospital Introduction, Košice, Slovakia*

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Introduction Silicosis belongs to the interstitial lung diseases, a heterogeneous group of many diseases of a different aetiology. Common symptom of all these diseases is dyspnoea. Lung function tests usually show restrictive defect with decreased diffusion capacity (DLCO). However, the heterogeneity of these diseases brings a question, if silicosis, a typically occupational disease, differs from other non-occupational interstitial diseases in the pathogenesis of symptoms and lung function impairment. The aim of study was comparison of lung functions in patients with silicosis and non-occupational interstitial lung diseases.

Methods In total, 30 patients with simple silicosis, 32 patients with complicated silicosis and 30 patients with non-occupational interstitial lung diseases underwent spirometry, bodyplethysmography and DLCO examination. We compared vital capacity (VC), forced expiratory volume in one second (FEV₁), FEV₁/VC ratio (Tiffeneau index), total lung capacity (TLC), residual volume (RV) and DLCO between these 3 groups of patients.

Results Vital capacity was more decreased in silicosis, both simple and complicated compared to the non-occupational interstitial lung diseases ($p < 0.001$). However, TLC was the highest in complicated silicosis because of high residual volume which did not change significantly in non-occupational interstitial lung diseases ($p < 0.001$). In the group of patients with silicosis, the decrease of airflows has been shown. The highest decrease of DLCO occurred in patients with non-occupational interstitial lung diseases (63%) in comparison to simple ($p < 0.001$) and complicated ($p < 0.01$) silicosis. Only 10% of patients with non-occupational interstitial lung diseases had normal DLCO compared to 75% in simple silicosis and 45% in complicated silicosis.

Discussion Study confirmed differences in the pathogenesis of symptoms in silicosis and patients with non-occupational interstitial lung diseases. Apparently, in the case of simple silicosis, the symptoms are the result of bronchial obstruction without severe lung parenchyma destruction. In the case of non-occupational interstitial lung diseases, a predominant sign was decreased DLCO as a result of alveolocapillary membrane impairment without significant changes in lung volumes and airflows. However, complicated silicosis was characterised by significant volumes and airflows impairment and lung hyperinflation with decreasing DLCO.

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RESPIRATORY SYMPTOMS AND ILLNESSES AMONG BRICK KILN WORKERS IN KATHMANDU VALLEY, NEPAL

¹SK Joshi, ²S Sanjel, ³SN Khanal, ⁴SM Thygerson, ⁵WS Carter, ⁴JD Johnston. ¹Department of Community Medicine, Kathmandu Medical College, Kathmandu, Nepal; ²Department of Community Medicine, Kathmandu University School of Medical Sciences, Kavre, Nepal; ³Department of Environment Science and Engineering, School of Science, Kathmandu University, Kavre, Nepal; ⁴Environmental and Occupational Health, Department of Health Science, Brigham Young University, UT, USA; ⁵Environmental Management, University of Findlay, Findlay, OH, USA

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Introduction Bricks have been manufactured in Nepal for hundreds of years. Large quantities of hazardous materials including high concentrations of particulate matter are emitted daily from brick kilns. Exposure to these hazardous materials can lead to adverse environmental and human health consequences. This study was conducted to estimate the prevalence of respiratory symptoms/illnesses and the magnitude of respirable and total dust exposures among Nepalese brick kiln workers.

Methods Respiratory symptoms/illnesses were evaluated by questionnaire among brickfield workers (n=400) and a referent group of grocery workers (n=400) in Kathmandu valley. Work zones (WZs): green brick moulding (GBM), green brick stacking/carrying (GBS/C), red brick loading/carrying (RBL/C), coal preparation (CP) and firemen (FM) were the similar exposure groups (SEGs) from where personal air samples and interviews were taken, among brickfield workers, personal monitoring was conducted across SEGs for total (n=89) and respirable (n=72). Applying multi-stage probability proportionate to size sampling technique, 16 kilns and 400 brick workers for interview were selected.

Result Chronic cough (14.3%), phlegm (16.6%) and bronchitis (19.0%) were higher ($p < 0.05$) among brickfield compared with grocery workers (6.8, 5.8 and 10.8%). Mean respirable (5.888 mg/m³) and total (20.657 mg/m³) dust exposures were highest for red brick loading tasks. The prevalence of chronic cough, chronic phlegm, chronic bronchitis, wheezing and asthma were significantly higher for other WZs workers ($p < 0.05$) compared with CP; for GBM: 22.9, 34.6, 15.0% and 7.5%; for GBS/C: 13.5, 15.8, 10.0, 8.8 and 7.5%; for RBL/C: 11.1, 17.1, 27.4, 19.0% and 11.9%; for FM: 18.4, 12.5, 28.4, 4.9 and 0.0%; and for CP: 4.9, 6.3, 13.3, 9.3 and 4.0% respectively.

Discussion High dust exposures identified in this study may explain the increased prevalence of respiratory symptoms/illnesses among Nepalese brickfield workers, warranting action to reduce exposures.