Abstracts

Assocation Between Occupational Mechanical Exposures and Chronic Low Back Pain: A Systematic Review and Meta-Analysis

1Alexander Jahn Jensen, 2Johan H Andersen, 3David H Christiansen, 4Andreas Seldier, 5Annett Dalbaage, 6Department of Occupational Medicine, Aarhus University Hospital, Aarhus, Denmark; 7Danish Ramazzini Centre, Department of Occupational Medicine — University Research Clinic, Goedstrup Hospital, Helsing, Denmark; 8Department of Clinical Medicine, Aarhus University, Aarhus, Denmark; 9Elective Surgery Centre, Silkeborg Regional Hospital, Silkeborg, Denmark; 10Research, Regional Hospital Central Jutland, Viborg, Denmark; 11Department of Clinical Medicine, Aarhus University, Aarhus, Denmark; 12Institute and Polyclinic of Occupational and Social Medicine (RPHS), Faculty of Medicine, Technische Universitat Dresden, Fetscherstr. 74, 01307 Dresden, Germany

Introduction Low back pain (LBP) is a worldwide health problem and a predominant reason for years lived with a disability. LBP increases the risk of sick leave and is a common cause of early retirement from the labour market. Although LBP often is temporary, 4–20% of the adult population develops chronic LBP (pain >3 months). The aim of this systematic review was to synthesise the evidence on the association between occupational mechanical exposures (lifting/carrying, awkward postures, whole-body vibrations, standing/walking, sitting, and combined exposures) and chronic LBP.

Methods We used a systematic review conducted by The Swedish Council on Health Technology Assessment as basis to identify articles published from 1980 to January 2014. For studies published after January 2014, a systematic literature search was conducted in several databases. Two authors independently assessed the data extraction, risk of bias, and certainty of evidence. Random-effects model with weighted odds ratios was used in the meta-analysis and heterogeneity was assessed using I-squared statistics. Sensitivity analyses were conducted by dividing studies on study quality, study design, and outcome measurement.

Results Twenty-six articles were included in the meta-analysis, and the pooled odds ratios across all exposures ranged between 1.5 and 2.2. Lifting/carrying loads (OR=1.7), awkward postures (OR=1.5), and combined exposures (OR=2.2) were the only exposures rated as moderate certainty of evidence. The remaining exposures were rated either low or very low certainty of evidence. The sensitivity analyses comparing cohort and case-control studies revealed, in general, a higher odds ratio for case-control studies. Otherwise, no major differences between study quality or outcome measures were found.

Conclusion To our knowledge, this is the first systematic review and meta-analysis on the association between occupational mechanical exposures and chronic LBP. To ensure health and safety towards occupational mechanical exposures, high-quality studies are warranted with objective exposure assessments.

Radiation

Associations Between Occupational Ionizing Radiation Exposure and Cancer Mortality: An Update of the Pooled US Nuclear Workers Study

1Kaitlin Kelly-Reif, 2Stephen Bertke, 3Robert D Daniels, 4David B Richardson, 5Mary K Schubauer-Berigan. 1University of California, Irvine, USA; 2National Institute for Occupational Safety and Health, USA; 3University of California, Irvine, USA; 4International Agency for Research on Cancer, USA

Introduction Studies of nuclear workers provide insights into the health effects of ionizing radiation at levels relevant to contemporary workers and the general public. We evaluated the association between penetrating ionizing radiation exposure and cancer mortality subtypes in a large pooled cohort of US nuclear workers. Follow-up was extended an additional decade to improve power and examine cancers with longer latency.

Materials and Methods The pooled cohort includes 101,363 workers from five US Department of Energy and Department of Defense nuclear facilities, followed for causes of death between 1944 and 2016. Workers were individually monitored for ionizing radiation exposure with the use of personal dosimeter badges. The association between cumulative external penetrating ionizing radiation exposure and cancer subtypes were modeled as the excess relative rate per Sievert (ERR Sv-1) using Cox regression.

Results There were 13,568 cancer deaths during follow-up. We observed positive associations between ionizing radiation exposure and all solid cancer mortality (ERR Sv-1=0.19; 95% CI: -0.10, 0.52), and all lymphatic and hematopoietic cancers (ERR Sv-1=2.10; 95%CI: 0.97, 3.48). These associations were stronger among a contemporary sub cohort of workers first hired 1960 or later for both solid cancer (ERR Sv-1= 2.23; 95% CI: 1.13, 3.49) and all lymphatic and hematopoietic
Respiratory effects/Diseases

**O-118 RETROSPECTIVE EXPOSURE ASSESSMENT AND MiRNA IN THE EXHALED BREATH CONDENSATEIN MONITORING PAST EXPOSURE TO ASBESTOS**

1Pierluigi Cocco, 2Sara De Matteis, 3Claudio Colosio, 4Silvia D Visonà, 5Sandro Orù, 5Roberto Cusano, 6Roberto Cherchi. 1Centre for Occupational and Environmental Health, Division of Population Health, Healthcare Research and Primary Care, University of Manchester, UK; 2Department of Medical Sciences and Public Health, University of Cagliari, Italy; 3Department of Health Sciences, University of Milan, Italy; 4Department of Public Health, Experimental and Forensic Medicine, University of Pavia, Italy; 5Centre for Research, Development, and Superior Studies in Sardinia (CRS4)-NGS Core, Pula – Cagliari, Italy; 6Operative Unit of Chest Surgery, A. Businco’ Hospital, Cagliari, Italy

**Introduction** Currently, the health surveillance of past exposure to asbestos conveys scarce hope of improving life expectancy and quality. To uplift the screening capability, we validated our retrospective exposure assessment techniques and explored the feasibility of using the miRNA profile in the exhaled breath condensate (EBC) as a biomarker.

**Material and Methods** We first classified lung fibrosis in the chest HRCT scans of 115 workers formerly exposed to asbestos and retrospectively estimated their exposure. We also assessed past exposure to asbestos and its correlation with the fibre count in the autopic lung of 24 subjects who died from asbestos-related diseases. Finally, we used an NGS platform to detect miRNAs previously linked to lung cancer and pleural mesothelioma in the EBC of six subjects with no history of past exposure to respiratory hazards.

**Results** The risk of lung fibrosis increased linearly with time-weighted average (TWA, p = 0.009). An estimated cumulative exposure ≥ 10 fibre/ml-year conveyed an almost 11-fold (95% CI 1.08–75.7) excess risk of lung fibrosis. Cumulative exposure to asbestos correlated well with the fibre count in the autopic lung (p < 0.0001).

There was a good agreement between the miRNA detection rate in the EBC and plasma samples. The Spearman’s correlation between EBC and plasma miRNA counts was significant in 5/6 subjects (p = 0.001 – <0.001). The miRNA profile was consistent among the six participants.

**Conclusions** Retrospective exposure estimates can reliably reflect past exposure to asbestos. Parenchymal lung alterations show up in relation to estimates of past asbestos exposure much lower than previously thought. EBC sampling is a non-invasive, easily repeatable method to monitor the miRNA profile. It might be profitably used to detect early treatable effects even in subjects with low-level exposure to asbestos.

**Semi-plenary symposium**

**O-120 WHAT ORIGINATES SO DIFFERENT INTERPRETATIONS OF THE RESULTS OF STUDIES ON GLYPHOSATE AND NON-HODGKIN’S LYMPHOMA?**

Pierluigi Cocco. Centre for Occupational and Environmental Health, Division of Population Health, Healthcare Research & Primary Care, University of Manchester, UK

10.1136/OEM-2023-EPICOH.150

**Introduction** The overall epidemiological evidence on the risk of non Hodgkin’s Lymphoma and occupational exposure to glyphosate has led to opposite interpretations. This presentation will discuss the reasons for such inconsistent opinions.

**Material and Methods** We conducted a new meta-analysis of the original case-control studies and compared its results with five other meta-analyses, and three pooled analyses.

**Results** Four meta-analyses and two pooled analyses of case-control studies concluded for an association between the risk of NHL and ever exposure to glyphosate. Those reaching opposite conclusions were two and one, respectively. Associations were stronger between specific NHL subtypes and prolonged/lagged exposure. In the Agricultural Study, the risk of a few NHL subtypes, but not NHL overall, tended to increase by intensity weighted lifetime days of exposure to glyphosate lagged 20 years. In the meta-analysis of the original case-control studies, including the recently published InterLymph study and a new Italian case-control study, the random estimate for ever-exposure to NHL was 1.4 (95% CI 1.08–1.81), based on six studies, and that for follicular lymphoma was 1.6 (95% CI 1.08–2.44), based on three studies, with no significant heterogeneity detect across studies. Risk of follicular lymphoma increased with exposure lagged 10 years, but not by the duration of exposure, in the InterLymph study, and by intensity, frequency, and probability but not duration of exposure in the new Italian case-control study.

**Conclusions** The dilution of the potentially associated B-cell lymphoma subtypes within the generic NHL definition, and the difficulty in isolating the few severely exposed to glyphosate from the large ever-exposed category, might account for the association in the AHS study and in the two negative case-control studies. The upward trends in risk for several NHL subtypes with different exposure metrics lend credibility to the association.