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Title: Chest CT findings and the long-term effects of exposure to poisonous gases among former workers at a poison gas factory

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Body: Introduction: Previous studies in our laboratory revealed a high incidence of respiratory tract cancer and chronic bronchitis among workers who had worked in a factory producing poisonous gases. However, computed tomography (CT) findings for such workers have not been adequately evaluated to date, and the long-term effects of these poisonous gases are unclear. Objectives: We aimed to assess chest CT findings in workers who had worked in a poison gas factory and elucidate the long-term effects of poisonous gases that cause respiratory diseases. Methods: We performed a cross-sectional study among 325 former poison gas workers who underwent both chest CT scans and pulmonary function tests between 2009 and 2012. All the patients had worked at a poison gas factory in Okuno-jima, which produced gases such as sulfur mustard, lewisite, and diphenyl cyanoarsine from 1929 to 1945. Results: Among the 325 patients included in this study, 180 (55%) showed abnormal findings in chest CT. The prevalence of specific CT findings was as follows: emphysema, 21%; micro-nodules, 16%; bronchiectasis, 13%; subpleural line, 10%; bronchial wall thickening, 9%; and ground glass opacity, 6%. There was no significant difference in the prevalence of CT findings between smokers and non-smokers, except for emphysema ($p < 0.001$). The prevalence of emphysema and bronchial wall thickening was significantly higher in patients with FEV1/FVC $< 70\%$ than in the others ($p = 0.001$). Conclusions: Our long-term follow-up data demonstrated that occupational exposure to poison gas is associated with various chest CT abnormal findings even in workers with no history of smoking.