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Respiratory Health Effect of Persons Accidentally Expose to High Concentration of Chlorine Gas

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Abstract

Objective: To evaluate the short term and long term respiratory health effects of subjects who accidentally exposed to high concentration of chlorine gas.
Material and Method: There was an accidental leakage of sodium hypochlorite from an industrial factory in Rayong province in June 2010. Medical records of those who developed severe symptoms after exposed to high concentration of chlorine gas were reviewed. Prospective observational study was conducted after hospital discharge by interviewing with respiratory health questionnaires, physical examination, spirometry, methacholine challenge test, and home peak expiratory flow (PEF) monitoring at 2, 5 and 8 months after the event.
Results: Among 1,434 persons exposed to chlorine gas, 92 developed severe symptoms required hospital admission and 21 participated in the follow-up study at 2 months there after. Respiratory symptoms were noted in 18 participants. Three most common symptoms were dyspnea (81%), chest tightness (71%), and cough (67%). Obstructive defect from spirometry was identified in 2 participants, one of which also had bronchial hyper responsiveness (BHR) compatible with reactive airway dysfunction syndrome (RADS). Seven participants had abnormal PEF variability. There were 10 and 5 participants left in the follow-up visit at 5 and 8 months respectively. Two participants had persistent obstructive defect with additional two subjects were noticed. Those who had BHR and abnormal PEF variability remained unchanged.
Conclusion: Acute exposure to high concentration of chlorine gas causes both significant short and long term respiratory health effects. Most of the patients although have gradual improvement of respiratory symptoms, but some symptoms remain persistent. Few patients have lung function impairment lasting for at least 8 months.

Keywords: Chlorine, Respiratory symptoms, Spirometry, Bronchial hyperresponsiveness, Peak expiratory flow variability, Lung function impairment

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