Received: 7 July 2020 | Revised: 9 July 2020 | Accepted: 13 July 2020

DOI: 10.1002/1348-9585.12156

EDITORIAL

Journal of Occupational Health Open Access WILEY

Progress in educational program for diagnosis of occupational respiratory disease in Japan -Activity of Asian Intensive Reader of Pneumoconioses (AIR Pneumo)-

Nogami et al investigated the diagnostic performance of digital radiography evaluated by Asian Intensive Reader of Pneumoconioses (AIR Pneumo) readers using thin-section computed tomography (CT) as the gold standard, which showed considerably good specificity for detecting both parenchymal and pleural abnormalities of occupational lung disease.[1]

Pneumoconiosis, occupational exposure of mineral dust induced irreversible lung disorder, is representative occupational diseases, and the number of pneumoconiosis cases increased by a measure of 66.0% from 36 186 in 1990 to 60 055 in 2017 globally.[2] Among them, more than half of pneumoconiosis cases were observed in East Asia.

Furthermore, lots of countries in Asia do not have sufficient surveillance and screening system of occupational respiratory diseases, and there are some enterprises which did not strictly follow regulation, standards, and technical guidelines on occupational health management.[3] Therefore, many cases with occupational respiratory disease may be potential present.

The movement to eliminate pneumoconiosis is in progress worldwide, and International Labour Organization (ILO) and World Health Organization (WHO) jointly promote pneumoconiosis screening and surveillance system using ILO Classification of Radiograph of Pneumoconioses (ILO/ICRP).[4,5] In Japan, Occupational Lung Disease Study Group in Japan Society for Occupational Health has established the AIR Pneumo to educate physicians in the world to improve proficiency in reading radiographs of pneumoconiosis with collaboration with ILO and the United States National Institute of Occupational Safety and Health (NIOSH).[6] This education program system was originally started at 2006 as an international medical collaboration with the Government of Thailand in order to find and raise up experts for the diagnosis of pneumoconiosis in the country. The AIR Pneumo is superior educational curriculum for pneumoconiosis by certifying physicians with acceptable proficiency after assessing their detecting ability for abnormal opacities on the chest radiographs (CXR), such as small opacities (rounded and irregular), large opacities, and pleural abnormalities based on diagnosis of pneumoconiosis. The AIR Pneumo certification examination is comparable to NIOSH B reader certification.[7]

The AIR Pneumo provides the 3 days' training course composed of view box seminar for two day on CXR reading and following half-day examination using 60 radiographs. The main content in seminar is short lectures of pneumoconiotic opacities and, hands-on observation of CXR on the view box, which allows participants to see the same image as in the clinical practice.[8)] The AIR Pneumo has been expanding its role as certification curriculum for a single country to one for ASEAN nations.

This paper also scientifically proves that this educational activity of Air Pneumo could promote a physician's proficiency in classifying CXR of pneumoconiosis. The objective of this paper was whether or not the prevalence of occupational environmental pulmonary disease findings on low-dose thin-slice chest CT is evaluated, and to compare the diagnostic performance with CXR evaluated by AIR Pneumo-trained physicians. The abnormalities in low-dose thin-slice CT images of 97 male construction workers as reference were assessed by Japan Society for Occupational Health board-certified occupational health physician with expert of interpretation of image, NIOSH B reader certification and a Japan Radiological Society board-certified radiologist, and the consistency of the image findings was analyzed. The rates of parenchymal abnormal findings in CT in construction workers are 9.3% of irregular opacities, 1.0% of ground glass opacities, 18.6% of emphysema, 1.0% of honeycombing, 1.0% of lung cancer, and of them pleura are 45.4% of pleural plaque, and 6.2% of pleural calcification. Regarding that irregular opacities and pleural abnormalities, which is observed on CT image, are compatible with asbestos-related diseases, it is considered that the CXR taken at same day is suitable picture for the diagnosis of asbestosis. The abnormalities in CXR of male construction workers were assessed by four physicians composed to AIR Pneumo-trained physicians

and NIOSH B reader. As comparison with abnormal findings of CXR under the ILO/ICRP guided reading between AIR Pneumo- or NIOSH-certified physicians, specificities for irregular opacities ranged from 94% to 100% and pleural plaques were from 86% to 96%. In particular, the former abnormal findings, irregular opacities, were evaluated at 1/0 or 0/1, which is the boundary line between cases of pneumoconiosis and normal subjects, and the high specificities indicates that CXRs of construction worker are also useful educational tool for the diagnosis of pneumoconiosis.

There are differences in experience period of reading of CXRs for four physicians participated in this study. NIOSH B reader has a 15 years' experience of occupational physician, AIR Pneumo-trained occupational physician with six years' experience of interpretation of CXR, other AIR Pneumo-trained physicians with a six years' and one years' experience, respectively. The certain level of agreement of abnormal findings in CXR between four physicians, despite the difference in experience, suggests that AIR Pneumo is effective for initial education program in classifying CXR of pneumoconiosis.

The other important point in this paper is that the chest CT and CXR of asbestos-exposed workers could be taken in the same day, and the consistency of abnormal findings between CT and CXR could be verified. Even if abnormal findings in CXR are compatible with pneumoconiosis, the abnormal opacities may be recognized not to be related to pneumoconiosis by comparison of findings by CT. Abnormal opacities that were not compatible with pneumoconiosis on CXR may be re-recognized to be pneumoconiotic opacities on the CT image. Figures show example of discrepancy between CXR and CT reading results. In Figure 3, old pleurisy misclassified as pleural plaque by a NIOSH B reader and an AIR Pneumo reader. Pneumo reader correctly classified this as diffuse pleural thickening, pleural abnormalities. In Figure 4 CXR showed a pleural thickening, but CT showed it to be fractured rib. The combination of CXR and CT also lead to motivation to read CXR and CT in detail.

Air Pneumo has being promoted by a group centered on University of Fukui, and Kochi University. As for other Japanese group, as WHO collaborating centers, University of Occupational and Environmental Health, Japan and National Institute of Occupational Safety and Health, Japan, in collaboration with the Catholic University in South Korea, have held workshop under the control of WHO, and performed the training program on diagnosis of occupational respiratory diseases by reading of CWR and ways to manage occupational health in the workplace in east Asia such as Vietnam and Lao PDR. At present, there is still a lack of education programs, and many institutions are expecting to implement education programs.

Recently, young pneumoconiosis who have had a shot-term occupational exposure to chemicals has also been reported. Prevalence of pneumoconiosis among young aged 24-44 was 21.6% and has become an important issue of occupational health in one province in China.[9] A total of 1519 new cases of diagnosed from 2001 to 2015 as pneumoconiosis indicated that pneumoconiosis tended to be accelerated among young pneumoconiosis cases with shorter duration of exposure due to the high proportion of silicosis and the insufficient occupational health management in small and medium enterprises. In Japan, indium-exposed workers were also reported to have developed pneumoconiosis due to short-term exposure.[10,11] The early stages of pneumoconiosis are interstitial pneumonia, but this inflammation then disappears, while emphysema progresses according to time. Progressive emphysema depends on the concentration of indium in the blood.

Ensuring employment after diagnosis of occupational respiratory disease is also a serious issue. The cross sectional study in Turkey[12] revealed that diagnosis with occupational disease increased the likelihood of quitting the job after a diagnosis of occupational disease. It has been chosen to dismiss workers diagnosed with occupational disease rather than eliminate potential toxic factors in the workplace.

As described above, there are many issues in occupational safety and health in the dust workplace, and these issues must be solved one by one. For that purpose, it is important to understand the current situation in each country, find the underlying problem, and seek a solution that suits for each country.

DISCLOSURE

None.

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