

Asbestos-Related Rounded Atelectasis in Brazil: A Radiologic and Scintigraphic Evaluation

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Rounded atelectasis (RA) is a benign and unusual form of subpleural lung collapse described in some asbestos exposed workers. The objective of this study is to evaluate the positron emission tomography (PET SCAN) and the contrast enhancement at computed tomography (CT) in asbestos related rounded atelectasis (RA) in Brazil. **METHODS:** Between January 1998 and December 2000, high resolution computed tomography (HRCT) were performed in 1658 exposed asbestos workers. The preliminary diagnosis of RA was made on a history of prior asbestos exposure, the presence of characteristic (HRCT) findings and lesions which remained unchanged or slightly reduced in size over 2 years or more (Webb, Muller, Naidich in: HRCT of the Lung 2nd ed. Lippincott-Raven, 137-138, 1996). RA were recognized in 10. In three cases RA was verified by surgery. The dynamic contrast enhancement study, was adapted from Swensen et al. (Radiology 194: 393, 1995) and the PET Scan was performed in a hybrid camera. Statistical analysis: paired t test, significance < 0.05 **RESULTS:** Housefield Unit (HU) initial 61.3 ± 9.9 , HU final 126.0 ± 19.6 and median enhancement was 64.7 ± 19.4 HU (range 40 to 89 HU), with a uniform dense opacification, and all the PET images contrast study, all the RA showed opacification, and these patients

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Asbestos and Radiation as Combined Exposures in Pulmonary Fibrosis

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RATIONALE: Both asbestos and radiation are etiologic agents in pulmonary fibrosis. The aim of this study is to determine whether concomitant radiation exposure in asbestos workers increases the incidence of pulmonary fibrosis. **METHODS:** 1037 asbestos exposed former nuclear weapons workers from a medical surveillance program form the study cohort: PA chest radiographs and spirometry were performed. Fibrosis was defined by B-read opacity profusion category on chest radiographs $\geq 1/0$, or spirometric evidence of restrictive disease. The cohort is largely male (85.5%) with an average age of 64.9 years. 663 workers had complete work histories, including external radiation badge doses and laboratory data. **RESULTS:** The demographic and fibrosis endpoints were similar in the entire cohort vs. 663 analyzed. Asbestos exposure based upon years in a potentially exposed job was divided into low (< 13 years) and high (≥ 13 years) dose groups. 26 (8.0%) of the high dose vs. 12 (3.6%) of the low dose group had ILO scores $\geq 1/0$ indicating pulmonary fibrosis while 71 (21.8%) of the high dose group versus 51 (15.1%) of the low dose group have spirometry indicating restrictive disease consistent with pulmonary fibrosis ($p < 0.05$). In a 2 x 4 table analysis (binary fibrosis x binary asbestos and radiation exposure) 27 (38.6%) in the high asbestos/high radiation (> 20mSv) group met the cases definition for fibrosis vs. 74 (25.4%) in the low/low group. **CONCLUSIONS:** Worker protection standards are based upon single exposures not accounting for the constellation of exposures frequently encountered. Deep dose external radiation may add to the fibrotic effect of asbestos in workers exposed to both toxicants.

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Paraoccupational and Neighborhood Asbestos Exposures in a Family

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Introduction: Neighborhood and para-occupational exposures both increase the risk for mesothelioma. They are often combined and may start in childhood. Assessment of exposure levels is difficult.

Methods and Results: We report a cluster of mesothelioma cases in a family. A 63-year-old technical engineer died from an epithelial mesothelioma in 1987 after a 34 year-long exposure in an asbestos-cement factory. In 2000, his wife, 67-year-old, also died from an epithelial mesothelioma. As only exposures, she had washed her husband's clothes regularly and lived with him in a house located within less than 300 meters from the factory. Mineral analyses by light and electron microscopy of her lung tissue confirmed high asbestos fiber burden: 17380 asbestos bodies (AB) and 3.25 million amphibole fibers per gm dry tissue. This couple had five sons who lived in their house from birth to age of 18 to 23 years. In 2000, while aged between 35 and 41 years, all have pleural lesions at HRCT, as well as elevated AB counts in BALF. The son with the highest AB counts (16.8 AB/ml) eventually developed an epithelial mesothelioma in 2001, at the age of 42.

Conclusions: This observation emphasizes the risk associated with neighborhood and para-occupational asbestos exposures in childhood, since the risk for mesothelioma increases rapidly 30-40 years after first exposure. In this situation, retention of fibers in BALF or lung tissue is a biological marker that can help to confirm significant asbestos exposures in the absence of data about past ambient fiber levels.

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Clinical Correlation of Asbestos Bodies in Bronchoalveolar

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Asbestos bodies (AB) in bronchoalveolar lavage (BAL) markers of asbestos exposure. We retrospectively reviewed BAL slides of 30 patients with a history of asbestos exposure and 30 BAL cytospin slides were blinded and scanned under 40x light were found more frequently in patients with a history of a compared to normal volunteers (10/30, 33% vs. 0/30). The average seen in the AB-positive group was 2.7 per slide. Demographic comparable between AB-positive (n=10) vs. AB-negative patients (n=20), gender (all male), smoking history (90% vs. 80% current smoking (25 vs. 24 pack-year), and active smoking (20% vs. 15%); characteristics were also similar: duration (23 vs. 21 years), onset (35 vs. 37 years), severity (71% vs. 75% severe exposure), and use of a respirator (11 positive patients reported more respiratory symptoms (70% vs. 25%); chest CT scan of the AB-positive patients revealed a higher prevalence of pulmonary disease (70% vs. 25%). AB-positive subjects had reduced lung function tests (PFT): FVC (86% vs. 98% predicted), FEV1 (77% vs. 104% predicted), and DLCO (76% vs. 104% predicted). In subjects with a history of asbestos exposure, the presence of AB in BAL specimen is associated with more abnormalities, more respiratory symptoms, and reduced PFT. This occupational history did not correlate with the presence of AB.

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Mesothelioma after Administration of Vitamin A (Retinol) in Previous Exposure to Asbestos

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Introduction: In an effort to reduce the impact of mesothelioma previously exposed to crocidolite at Wittenoom in Western Australia, a prevention program using beta-carotene vs retinol was commenced in 1990. There was no reduction in the incidence of cancer in subjects randomized to beta-carotene but a significant reduction in incidence of mesothelioma assigned to retinol was documented (hazard ratio 0.24). Since 1990, 19 subjects have been given retinol 25,000iu daily. **Subjects:** 2,350 subjects who were enrolled over the past 5 years. **Methods:** All subjects were followed-up through death and cancer registries from the start of the 18th July 1997 to the 18th July 2002. Expected numbers of cases were based on the follow-up of Wittenoom workers who did not join the program. The lowest rate of mesothelioma was seen in those who had switched from beta-carotene to retinol (6 observed, 17 expected). This was significantly lower than in people not on the program (12 observed, 22 expected). No significant liver function or other serious side-effects of retinol were seen. **Conclusions:** Retinol had lowered rates of mesothelioma consistent with a protective effect. Serious side-effects were not seen.

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Urinary 8-EPG Levels in Asbestos-Exposed Construction Trades

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Rationale: Asbestos-induced oxidative damage is a putative mechanism by which asbestos causes lung disease. We hypothesized that the lipid product 8-epi-prostaglandin F2 α (8-EPG) is elevated in urine of asbestos workers with radiographic asbestos related lung disease (rARLD) compared to those without. **Methods:** We evaluated 88 asbestos-exposed construction workers with questionnaire and chest radiograph (2 or 3 B-reads). After extraction, urinary 8-EPG concentration was measured by ELISA. 50% subjects had rARLD, 31 had pleural changes only, 3 had parenchymal only, and 10 had both. 8-EPG levels did not differ significantly between those with or without rARLD (0.71 \pm 0.45 vs. 0.68 \pm 0.32 ng/mg creatinine). Asbestos exposure and current smoking were positively correlated with urinary 8-EPG levels ($p = 0.02$ and $p < 0.01$ respectively), adjusted for age. Increased levels of oxidative damage marker 8-EPG occurred in subjects with prolonged exposure duration and current smoking status but was not associated with radiographic asbestos-related abnormalities.

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