

Interstitial Lung Disease of Occupational Origin: A Case Report

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Assessment of an illness attributable to an occupational or environmental exposure to radioactive materials is complicated since many human disorders in non-radiation workers display the same or similar clinical features. An autopsy of a former radiation laboratory worker, USTUR case 0420, indicated the primary cause of death as pulmonary insufficiency secondary to severe interstitial lung disease. Case 0240 worked as a sheet metal worker at the Rocky Flats facility in areas where the potential for exposure to beryllium, plutonium and uranium dust existed. Prior to his employment at Rocky Flats, he worked as a furnace installer and was routinely exposed to asbestos. He started smoking at the age of fifteen and smoked for 34 years at a rate of 1-1¹/₂ packs per day. Following the death of case 0240 in 1993, selected bone and soft tissue samples were collected at autopsy for radiochemical and pathological analysis. Additional lung tissue samples were sent to an independent laboratory for mineral analysis by histochemistry and electron microscopy (EM). Although extensive hemosiderin deposition throughout the lung tissue made it difficult to identify asbestos bodies, two classic beaded asbestos bodies were identified in five iron stained sections. Other lung tissue samples were digested on a filter with sodium hypochlorite and examined by light and EM microscopy. Compared to a background range of up to 1,000 asbestos bodies per gram of dry lung, one autopsy filter sample revealed 3,669 asbestos bodies per gram of dry lung. The first EM analysis disclosed an asbestos fiber concentration of 516,000 per gram of dry lung based on a detection limit of 258,000 fibers per gram of dry lung. A second EM analysis analyzed all fibers greater than 3 µm in length with a detection limit of 10,000 fibers per gram of dry lung. The second analysis revealed a total asbestos fiber concentration of 187,000 fibers per gram of sample. In addition the types of fibers detected were identified as: amosite, crocidolite, tremolite, and anthophyllite. The pathologist concluded that the asbestos exposure and tissue content was sufficient to be the cause of the interstitial fibrosis and death. Both Pu and asbestos are known to cause interstitial lung fibrosis, preliminary radiochemical results are being analyzed to help determine to what extent radiation dose/dose rate was involved.

USTUR-0172-01A