debate in print

Asbestos-Related Disorders*

A Realistic Perspective

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Millions of workers have had occupational exposure to asbestos throughout the last century. While the literature is replete with descriptions of asbestos-related disorders, it is difficult to accurately determine current prevalence and incidence rate of asbestosis. There are several reasons for this difficulty. First, since asbestosis is a dose-related disease and workplace asbestos exposures have decreased over the last several decades, past occurrence data for asbestosis do not apply to present cohorts.[1] Second, the clinical diagnosis of asbestosis encompasses criteria of variable specificity.[2] Therefore, the frequency of diagnosing asbestosis varies inversely with the degree of specificity applicable to the criteria utilized. Without utilizing uniform criteria, occurrence data between different studies are not comparable.

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Although various approaches to diagnosing asbestosis have been outlined,[3] three criteria should be emphasized.[4] First, asbestos exposure of significant intensity, duration, and latency must have occurred. A simple dichotomous response of "yes" to the question "have you been exposed to asbestos?" is insufficient in fulfilling this criterion. To assess whether significant exposure has taken place, a thorough understanding of the specifics of an individual's occupation is mandatory. This understanding encompasses determining the direct or indirect nature of the asbestos exposure, whether the work site was open or enclosed, what (if any) protective equipment was worn, etc.

Next, it is imperative to confirm that fibrosis exists. When the interstitial changes on chest radiograph are considered minimal or even absent, how is documentation of fibrosis made? It has been demonstrated that high-resolution CT (HRCT) is a sensitive tool for this purpose.[5,6] However, the linear and irregular parenchymal opacities present on HRCT in association with interstitial fibrosis lack specificity for diagnosing asbestosis.[7] A multitude of other diseases and conditions similarly affect the lung parenchyma, producing these abnormalities. Thus, while documenting the presence of fibrosis is essential, and HRCT is useful in this respect, the predictive value of these findings alone is low for establishing the existence of asbestosis. Obviously, their predictability increases when they occur in association with asbestos-related bilateral pleural plaques.

It follows from this discussion that a third criterion must be met when considering the diagnosis of asbestosis, namely the exclusion of confounders for the presence of pulmonary fibrosis. This criterion was outlined in the American Thoracic Society statement,[2] emphasized by Jones,[4] and shown to be important by Gaensler.[8] Gaensler investigated a population in which the diagnosis of asbestosis had been made on clinical grounds, but was not subsequently established pathologically. Rather, idiopathic pulmonary fibrosis, bronchiolitis obliterans, and other conditions accounted for the presence of fibrosis. As Gaensler pointed out, while the prevalence for nonasbestos-induced interstitial lung disease in this select study population was low (5.1%), the future occurrence of such cases will be increasing because asbestosis is a disappearing disease. It should be noted that among these individuals with nonasbestos-induced interstitial lung disease, when compared to matched controls, their work histories were consistent with indirect asbestos exposure of lower intensity.[3]

Thus, before establishing the diagnosis of asbestosis, asbestos exposure must have been deemed sig-

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nificant, the presence of fibrosis documented, and the absence of confounding factors confirmed. Fulfilling these criteria is also critically important when attempting to attribute asbestos exposure as a causative factor for the development of lung cancer. Failure to fully consider the presence or absence of these criteria has inadvertently led to the conclusion that past asbestos exposure is etiologically related to lung cancer even when chest radiograph documentation of asbestosis is absent.[9]

When the criteria for establishing the clinical diagnosis of asbestosis are considered "soft," more reliance should be placed on confirming the presence of this pneumoconiosis pathologically. Lung biopsies, including newer thoracoscopic techniques for the purpose of diagnosing interstitial lung disease, can be performed with minimal morbidity and mortality.[10-12] The pathologic criterion of finding more than one asbestos body in areas of fibrosis will establish the diagnosis of asbestosis.[13] Alternatively, other specific causes for the interstitial process can be determined and potential therapy given. While the quantitative analysis of lung tissue and bronchoalveolar lavage for asbestos fibers and bodies can verify the occurrence of significant past asbestos exposure, the variability of data generated between laboratories on the same specimen,[14] coupled with the limited number of qualified facilities able to perform the analyses, significantly narrows the clinical usefulness of this methodology in contributing to the diagnosis of asbestosis. At the present time, fiber burden analysis remains a useful research tool for studying asbestos-related disorders. This also applies to analyzing bronchoalveolar fluid for inflammatory mediators and cellularity.[15,16] The histologic examination of lung tissue remains the gold standard for confirming the existence of asbestosis.

Since most asbestos exposure is occupationally related, once an asbestos-related disease is diagnosed, a personal injury claim frequently follows. The specificity of the criteria utilized in establishing the presence of asbestos-related diseases directly influences the number of personal injury claims made. Before 1995, 120,000 asbestos-related claims were disposed of, either through the judiciary process or through negotiation.[17] It has been estimated that there are 135,000 pending asbestos-related law suits,[18] with estimates that up to 250,000 new claims will be made in the future.[17] Also, the specificity utilized in diagnosis probably has a direct bearing on estimates for asbestos-related cancer deaths. It has been projected that for the period 1985 to 2009, this figure will approach 131,200.[19]

The magnitude of asbestos-related personal injury claims (past, present, and future) and projected cancer deaths is staggering. However, quantifying risk for developing these disorders can also be done with actual asbestos-related mortality data. The 1994 *Work-Related Lung Disease Surveillance Report* published by the National Institute for Occupational Safety and Health (NIOSH) has determined that between 1968 and 1990, the total number of deaths associated with asbestosis in the United States was 8,215.[20] These data can be utilized to gauge a more realistic projection for the occurrence of asbestosis. It has been determined that approximately 20% of individuals certified as having asbestosis die of their pneumoconiosis.[21] With this understanding, the 8,215 asbestosis-associated deaths approximate the true occurrence of asbestosis between 1968 and 1990 as 41,000 (1,900 per year). Also, the studies of both Berry[21] and Coutts et al[22] determined that 39% of workers certified with asbestosis die of asbestos-related lung cancer. It follows that of the 41,000 individuals estimated as having asbestosis (between 1968 and 1990), approximately 16,000 of them died from asbestos-related lung cancer. Finally, the *Work-Related Lung Disease Surveillance Report*[20] determined that during this 22-year span, the total number of deaths from malignant pleural mesothelioma was 10,557. Adjusting this figure upward by 10% for additional cases of peritoneal origin,[23] the total number of malignant mesothelioma deaths during this period was around 12,000. Thus, between 1968 and 1990, the estimated total number of asbestos-related cancer deaths was 28,000 (1,300 per year).

The NIOSH surveillance data support the fact that while individuals clearly die of asbestos-related diseases, actual mortality figures suggest far smaller numbers than projected estimates have suggested. Also, due to inaccurate diagnoses, far fewer individuals probably have asbestos-related diseases than are implied by the number of personal injury claims that have been made. Consequently, greater specificity should be utilized in the clinical diagnosis of asbestos-related disorders. Becklake[24] feels this approach is particularly applicable when attempting to establish the presence of asbestosis for legal purposes. Arguments of legal attributability, which focus only on a few "selected" asbestosis criteria while negating or failing to consider others, lowers the predictability below acceptable standards for diagnosing asbestosis. Under such circumstances, the likelihood of an individual having asbestosis is too uncertain for sound legal or policy judgments.

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