

Performance of the beryllium blood lymphocyte proliferation test based on a long-term occupational surveillance program

Ellen P. Donovan · Marc E. Kolanz ·
David A. Galbraith · Pamela S. Chapman ·
Dennis J. Paustenbach

Abstract

Objective Data from surveys of the general workforce and new employees at a beryllium manufacturer were used to evaluate the performance of the beryllium blood lymphocyte proliferation test (BeBLPT).

Methods Over 10,000 results from nearly 2,400 participants collected over 12 years were analyzed using consistent criteria to describe the performance characteristics of the BeBLPT.

Results Approximately 2% of new employees had at least one positive BeBLPT result at the time of hire, and approximately 1% of new employees with no known potential occupational or possible take-home exposures to beryllium were confirmed positive (two positive results) from the time of hire. Positive results were observed in some workers within weeks or months of initial exposure, and the median time to the first positive result in confirmed positive individuals was 5 months. The prevalence of positive BeBLPT results was greatest during the first year of employment with an apparent peak in months 4–8. At least one negative or borderline/negative result was observed in 100% of new workers who underwent follow-up testing after they had been confirmed positive. There was no correlation between time of employment and an increasing prevalence of confirmed positive BeBLPT results in individual

surveys; however, the cumulative incidence of confirmed positive results in subsets of workers that participated in multiple surveys increased over time.

Conclusion The detection of confirmed positive results in non-occupationally exposed persons, the apparent reversions of previously confirmed positive results, the identification of a positive BeBLPT peak prevalence period, and the variation in intra- and inter-laboratory test methods and interpretation should be considered when interpreting results from studies utilizing the BeBLPT, especially when considering worker-specific interventions. Additional research to refine the BeBLPT or develop a new test is needed to properly characterize the relationship between sensitization and subclinical or clinical indicators of chronic beryllium disease.

Keywords Beryllium · Lymphocyte · Surveillance · Hypersensitivity · Industrial hygiene