*Project SENSOR News

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Work-Related Asthma: Confirming the Clinical History

Confirmation of work-related asthma with objective pulmonary function tests remains problematic. Specific antigen challenge testing, the diagnostic gold standard, is not available in routine clinical practice. Yet the physician must reach a diagnosis that may have significant economic and legal consequences in the absence of definitive testing.

Table 1 summarizes the sensitivity and specificity of various approaches to diagnosing work-related asthma. In Michigan, the clinical history of the onset of symptoms after a period of sensitization and improvement when away from work is the approach most practitioners are using to diagnose work-related asthma. Difficulties arise because the patient may have early (<1 hour), late (>6 hours), dual (<1 hour and >6 hours) or recurrent late symptoms (every day for more than 2 days) after a single exposure. With repeated exposure the temporal association with work may become even less obvious (figure 1) and the patient may have little improvement when permanently removed from work. Despite these difficulties with the sensitivity of the clinical history the major problem with the clinical history is its lack of specificity (less than 50%).

In previous editions of this newsletter we have advocated the use of peak flow monitoring every 2 hours while awake for a period of 2 weeks at work and 2 weeks off work to provide objective testing. (Vol. 4, no.1, Winter 1992-1993 and Volume 3, no. 2, Spring 1992). Peak flow monitoring is the most economical and available method for obtaining objective pulmonary function testing and provides a reasonably high sensitivity and specificity (table 1). Standard methods for performance and interpretation in peak flow results in relation to work have been developed (1,2,). The use of peak flow methodology for confirming work-relatedness, however, is complicated.

Table 1. Sensitivity and Specificity of Diagnostic Tests For Work-Related Asthma

	Sensitivity	**Specificity**
Clinical History	94%	33-45%
Pre-Post Work Change in FEV_1 (>5-10%)	22-85 %	56-89%
Serum IgE Tests	17-72%* (>90%)**	60-85%
Peak Flow (q2h)	73%	74-100%
Serial Methacholine	62-67%	54-78%

The range of percentages for the sensitivity and specificity reflect the results from different studies.

*low molecular weight (chemical)

**high molecular weight (animal, plant)

Problems in interpretation include:

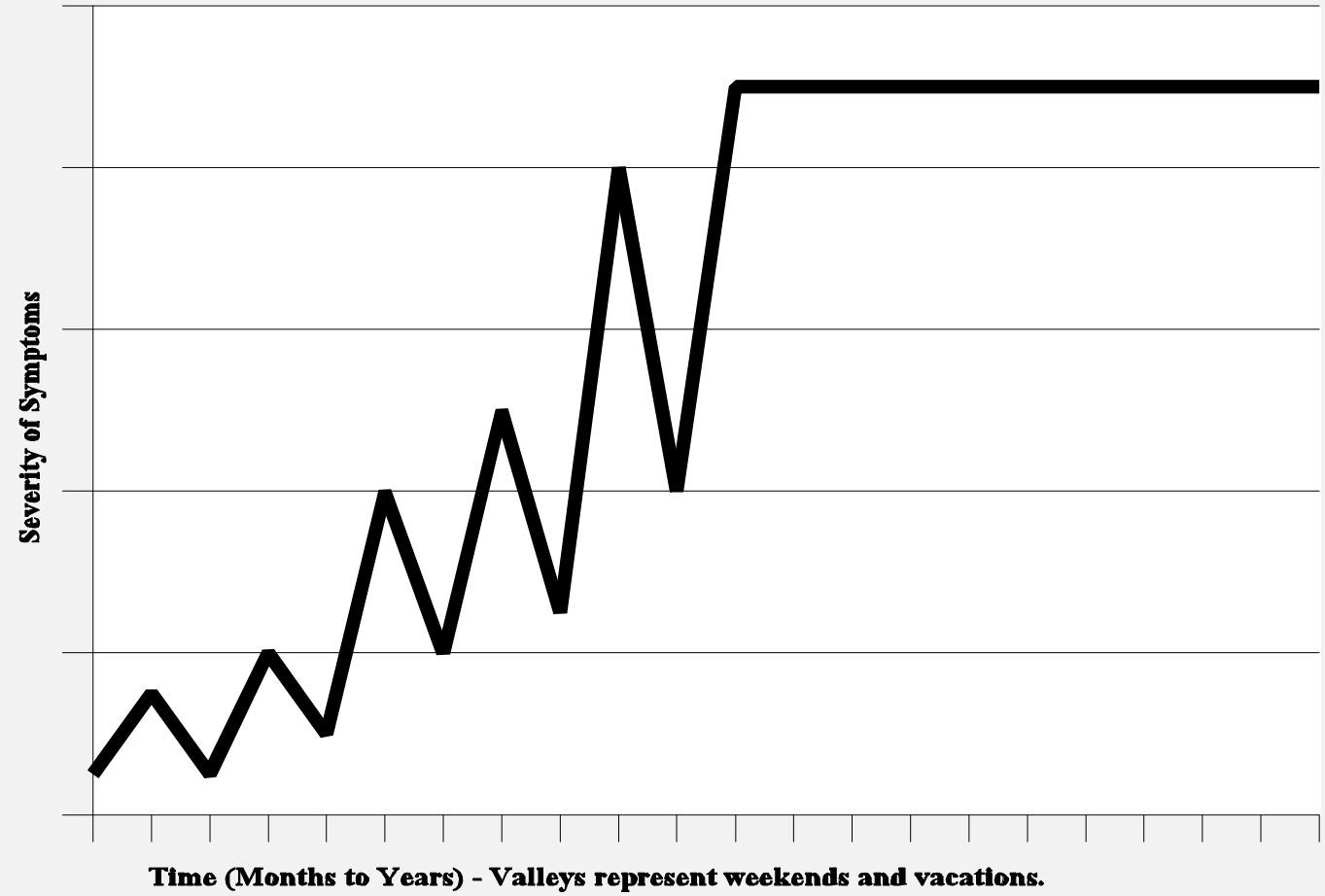
1. intermittent exposure to the suspect agent at work;
2. change in medication usage during testing;
3. change in health status during testing (i.e. development of an upper respiratory infection); and
4. peak flow measurements are not supervised.

Because peak flow measures are not performed in the presence of health care personnel there has been concern about the reliability of the results both because of quality and out-right fraud. Two studies, one on 17 patients and one on 21 patients, conducted with peak flow meters and portable computerized equipment that measured peak flow have suggested that approximately 25% of peak flow values were made up by the patient (3,4,).

Another approach that has been suggested is the use of serial FEV_1 rather than PEF measurements. A recent study of individuals diagnosed with work-related asthma by specific antigen challenge testing compared FEV_1 to PEF. FEV_1 proved not to be as good a measure as PEF in diagnosing work-related asthma (FEV_1: sensitivity 55%, specificity 89%; PEF: sensitivity 73%, specificity 100%) (5). The reduced sensitivity and specificity of serial FEV_1 in this study was consistent with the reduced sensitivity and specificity found in studies performing spirometry and measuring FEV_1 before and after work or before and after vacations (table I).

Balancing the adverse economic consequences of

Figure I. Relationship of Asthma Symptoms to Work Over Time After Onset of Sensitization



leaving work (such as loss of health insurance, loss of income) is the medical benefit of leaving work when a patient has become sensitized (need for less medication, fewer symptoms) (5). Some objective measure is important to assure that it is truly indicated the person should leave work and if they do that they are able to obtain workers' compensation benefits to off-set the economic consequences. Serum IgE or skin tests for the high molecular weight allergens are readily available. Pre- and Post-work spirometry and/or serial methacholine challenge test are available although cost is an issue. Sometimes arranging pre- and post- work spirometry may be a problem depending on when the pulmonary function laboratory is open in relation to the patient's work shift and symptoms. Peak flow monitoring remains the most cost-effective approach but as outlined above interpretations can be tricky.

The SENSOR program offers its services to physicians faced with making this difficult clinical diagnosis. Kenneth Rosenman, M.D. is available for phone consultations. We have a large literature file and are happy to provide needed references and articles. Finally, when available we can provide information on the type and levels of exposures in the workplace. All of the above services can be obtained by calling our toll free telephone number at 1-800-446-7805 or e-mailing us at Rosenman@pilot.msu.edu.

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