Comparisons of Rates of Aberrancy

Clearly, a number of factors are associated with lower mean FEV₁%. However, some of these differences are small. In fact, it might be argued that a 2 percent difference in the FEV₁% of a patient is trivial. On the other hand, if the FEV₁% has even minor shifts in the mean, given the same variance, marked differences in the numbers of subjects in the tails of the distribution may be involved. For this reason, we calculated adjusted rates of aberrancy, that is, the proportion of subjects with FEV₁% < 68, for the groups and compared those rates in terms of ratios. Results are shown in Figure 3. Note that subjects 45 years of age or older have 3.8 times as large a proportion of individuals with an FEV₁% < 68 as subjects 20-44 years old when adjustments for other factors are made. The rate of aberrancy for cigarette smokers (1 packs daily) is more than three times that of non-smokers; for those from the lowest SES it is 2.4 times that of those from the highest SES; for 1¹ relatives of COPD patients, 1.7 times that of 1² relatives of non-pulmonary patients and other controls; for men, 1.6 times that of women; and for nonsecretors, 1.4 times that for secretors. Relative rates of aberrancy of PI variants, subjects with A blood type, whites, and heavy drinkers were closer to one, and only ABO type attained statistical significance.

Thus, it appears that even small decreases in the mean FEV₁% of a group may be associated with large increases in the numbers of individuals having aberrant values. While interactions of the various risk factors are not considered in this report, it is quite clear that important factors related to the development of COPD include age, smoking, SES, family relationship, sex, and secretor status.

REFERENCES


Q. (Flenley): Because cigarettes produced a number of years ago had more toxic materials than those manufactured now, can this be a factor in the association between age and lower FEV₁% percentage?

A. (Cohen): It is possible that this is responsible for part of the association; however, our study has not addressed this point.

Q. (Mittman): Is the FEV₁/VC the best variable to use?

A. (Cohen): We believe that the absolute FEV₁ is useful; but for cross sectional data, we feel, FEV₁/FVC is the most suitable index because height adjustments are not necessary and patients with low FEV₁ because of restrictive disease are not mislabelled.

A Longitudinal Study of Smokers and Nonsmokers*

5-6 Year Follow-up Using Spirometry and the Single Breath N₂ Test

Sonia Buist, M.D., and J. Nagy, M.D.

Three hundred forty-two smokers and nonsmokers, first tested at an emphysema screening center in Portland in 1971/72, were followed-up for five to six years, using a respiratory symptom questionnaire, spirometric tests and the single breath N₂ test. Subjects were tested three times during the study period. Since the major objective of this study was to evaluate the role of the single breath N₂ test in identifying the smoker most likely to progress to chronic airflow obstruction, only nonsmokers and smokers without clinical airflow obstruction (defined as an abnormal 1-sec forced expiratory volume [FEV₁]) were included.

Lung aging, as measured by spirometric variables, was very slow in the nonsmokers. The fastest rate of decline in function was seen in male smokers who initially had mild function impairment, defined as an abnormal single breath N₂ test. Nine male smokers (7% of all male smokers and 10% of male smokers with an abnormal single breath N₂ test) developed an abnormal FEV₁ during the course of the study; all had had an abnormal single breath N₂ test at the start of the study.

We conclude that men are more at risk of developing clinical airflow obstruction than are women, and that the single breath N₂ test is usually abnormal for several years before the FEV₁ becomes abnormal. However, since not all smokers with an abnormal single breath N₂ test subsequently develop an abnormal FEV₁, the predictive value of the test, in terms of accurately identifying the susceptible smoker, is still in question. It seems likely that other factors which interact with smoking need to be identified and used in association with the single breath N₂ test in order to identify the susceptible smoker during the preclinical stage of the disease process.

Q. (Mittman): Because many smokers have abnormal closing volume measurements, yet only a minority develop clinical disease, doesn’t this reduce the value of the single breath nitrogen test as a predictor for lung disease?

A. (Buist): The predictive value of the single breath N₂ test appears to be very poor. On the other hand, it may well give important information concerning the natural history of chronic airflow obstruction. At this point, I don’t think the longitudinal studies using this test have gone on for long enough to adequately answer the question of the predictive value. It may turn out, for example, that a combination of the single breath N₂ test and spirometry may be a good predictor.

Q. (Mittman): Wasn’t the single breath test as a predictor of disease doomed to failure from the start because you saw many smokers with abnormal tests, yet we all know only a few get disease?

A. (Buist): Your question is difficult to answer. We believe many factors are important in predicting development of disease.

*From the University of Oregon Health Sciences Center, Portland.

Supported by a contract from the Division of Lung Disease, National Heart, Lung and Blood Institute, NIH-FHS.

Downloaded From: http://journal.publications.chestnet.org/pdftoaccess.ashx?url=/data/journals/chest/21112/ on 06/26/2017