Localization of Emphysema within the Lung

To the Editor:

Drs. Cockcroft and Horne put forward an ingenious hypothesis for the differing localization of centrilobular and panlobular emphysema (Chest 1982; 82:483). While their hypothesis provides a partial explanation, they make no mention of some very simple and persuasive facts that provide an even better reason for the anatomic localization of centrilobular emphysema. I assume they eschew the pernicious weed if it were poison—which it is—and in doing so may not have noticed that cigarette smokers invariably place the cigarette between their lips as they are about to take a breath in. The timing of is paramount importance, and is exemplified by the trade union dogma of “first in, last out,” a dictum that governs every breath. Thus, the bolus of cigarette smoke is inhaled at the start of the breath and is carried by the convection stream to the upper lobe where it remains almost to the end of expiration. The increased concentration of the smoke in the upper lobes, plus the increased residence time, would seem to be the most important factors in deciding the site at which centrilobular emphysema develops, although the factors described by Cockcroft and Horne may also play a role.

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To the Editor:

We agree that the pattern of smoking is of paramount importance in determining the distribution of cigarette smoke within the lung, and also with the “first in, last out” dogma. However, the concept that a bolus will be carried by the convection stream to the upper lobe . . . appears to be in error, except for unusual circumstances. The fate of inhaled boluses (of radioactive gases) in upright normal man has been well documented.13 When a bolus is inhaled at any point in the vital capacity (VC) from around 20 percent1 or 25 percent above residual volume (RV) to total lung capacity, the lower lobes receive a greater proportion of the bolus than do the upper lobes. Only between RV and 15-20 percent of VC above RV will a bolus be preferentially distributed to the upper lobes.13 It is important to note that this point is well below functional residual capacity (FRC), the lung volume at which most inhalations begin. Thus, a bolus of cigarette smoke at the beginning of an inhalation from FRC or even substantially below FRC should preferentially go to the bases of the lungs. In order for an upright normal man to direct a bolus of smoke to the upper lobes, he would first have to exhale to, or almost to, RV. Although we do indeed personally “eschew the pernicious weed,” we have not commonly witnessed practitioners of this foul habit performing such an exhalation prior to smoking. We therefore continue to believe that most smokers most of the time will, with normal lungs, distribute more cigarette smoke to the bases than to the apices. In fact, it is the paradoxical appearance of smoking-related emphysema in the apices that led to the development of our hypothesis.

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REFERENCES


Intrapleural Tetracycline for Recurrent Pneumothorax

To the Editor:

Referring to Macoviak’s article (Chest 1982; 81:78-81), we would like to point out that for three years we have been using endopleural instillation of tetracycline, according to Wallach’s method,1 in all patients with a second recurrence of pneumothorax.

Until now, 20 patients have been under treatment (time from treatment: one to three years) and we have noticed only one relapse, with a small pulmonary collapse. In another case, complete re-expansion of the lung has not been achieved. For this reason, after five days from instillation of antibiotic, a thoracotomy with pleuroscopy was needed. Figure 1 shows modifications caused by tetracycline on our patient’s pleura.

Although these results are preliminary, we believe that tetracycline pleurodesis must be applied to recurrent pneumothorax.

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REFERENCE

1 Wallach HW. Intrapleural tetracycline for malignant pleural effusions. Chest 1975; 68:510-12

Figure 1. The surface of the pleura is covered by a thick film of fibrinous and hemorrhagic exudate underlined by granulation tissue.