The question raised here was: "Did this patient have emphysema or not?" If he merely had bronchial asthma, was he a candidate for antiprotease replacement therapy? We were confused by the normality of this patient's Dico measurements since we had believed that the diffusion capacity was probably the most sensitive indication of emphysema in the appropriate clinical setting.

We undertook to investigate the likelihood of emphysema in this patient by performing tests of compliance and a CT scan of his lungs. These test results showed that the patient most likely had pulmonary emphysema despite the normal Dco. His static lung compliance was abnormally high at 0.45 (predicted 0.20 ± 0.035, performed by the static distention method from total lung capacity with compliance measured 1 L above functional residual capacity), and the maximum negative pressure was abnormal at 12.5 (predicted 34.8 ± 8.2). CT scan showed hyperinflation with discrete blebs consistent with early emphysema (Fig 1).

From this experience we learned that some patients may have a diagnosis of pulmonary emphysema in the presence of a normal Dco. There may be a stage in the development of emphysema where the alveolar surface area and capillary blood volume appear to be substantially preserved, causing a normal diffusion test, but the elasticity and localized structure of the lungs are impaired.

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Transcutaneous Monitoring and Response to Handgrip Exercise

To the Editor:

Noninvasive transcutaneous Po2 and PcO2 monitoring devices are available for clinical use. Transcutaneous oxygen and carbon dioxide tensions (tcPo2 and tcPcO2) are sensitive indicators of oxygenation and local tissue perfusion.1 Recently, we have begun to use a combined tcPo2/tcPcO2 electrode monitor (TINA Radiometer, Copenhagen, Denmark) that allows continuous monitoring of tcPo2 and tcPcO2. Using the monitor in a normal subject breathing room air, we made an interesting observation. After calibration (Po2 155 mm Hg, PcO2 37 mm Hg, PcO2 correction PcO2/1.40, electrode temperature 44.0°C) and application of the electrode in the forearm, values for basal tcPo2 (68 mm Hg) and tcPcO2 (37 mm Hg) were obtained (Fig 1, A). At that time handgrip exercises were begun (Fig 1, B) on that side and, after 5 min of exercise, values for tcPo2 (144 mm Hg) and tcPcO2 (15 mm Hg) were stabilized (Fig 1, C). During exercise, minimal movement involved the electrode fixation area, and the fixation ring of the electrode was firmly secured to the skin without any leaks. After stopping the handgrip exercise, tcPo2 and tcPcO2 values were progressively stabilized at 95 and 38 mm Hg respectively (Fig 1, D). tcPcO2 had been linearly correlated with limb perfusion.2 In our case, increased flow to the exercising forearm was presumably responsible for tcPo2 changes. To our knowledge no such changes had been described on tcPcO2 values. It is interesting to note that tcPo2 and tcPcO2 values at 5 min of rest after the handgrip exercise were close to arterial values, suggesting that in a cooperative patient this handgrip maneuver allows a more precise delineation of oxygenation status.

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Figure 1