MediPines Publication Summary: Impaired Pulmonary Gas Exchange

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Title: A New, Noninvasive Method of Measuring Impaired Pulmonary Gas Exchange in Lung Disease: An Outpatient Study

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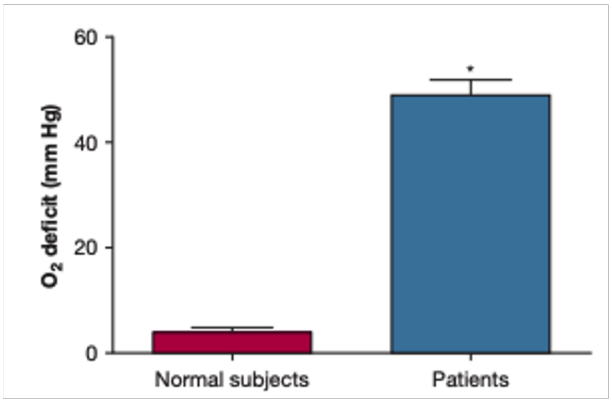
Participating Universities: The University of California, San Diego

Background: It would be invaluable to have a noninvasive method of measuring impaired pulmonary gas exchange in patients with lung disease and thus reduce the need for repeated arterial punctures. This study reports the results of using a new test in a group of outpatients attending a pulmonary clinic.

Research Question: To what extent the oxygen deficit changes in patients with healthy lungs compared to patients with diseased lungs?

Study Design and Methods: 17 patients attending a pulmonary outpatient clinic of the UC San Diego Health System were selected as representative common lung diseases. For the procedure, the patients sat in a chair and a nose clip was applied; they were then asked to relax and breathe normally through a mouthpiece. A sampling tube was connected from the mouthpiece to a small box that contained the miniature, rapidly responding PO2 and PCO2 sensors and a screen. The result was a continuous analysis of the inspired and expired PO2 and PCO2. These findings were then compared to another previously performed study that involved 31 normal patients with healthy lungs.

Results: The difference between outpatients and normal subjects were striking. This new index of impaired gas exchange, the oxygen deficit, seems to be very sensitive in detecting abnormal lung function. This outcome is consistent with the results of the same, previously performed study with healthy subjects. This figure (right) emphasizes the large effect of pulmonary disease on the oxygen deficit.



P value < 0.0001, n= 48

Conclusion Summary: This new, noninvasive method of measuring impaired gas exchange in patients with lung disease is very sensitive to the presence of disease and may obviate the need for arterial punctures in many instances. Furthermore, because the measurement of Oxygen Deficit is made noninvasively without the necessity of sampling arterial blood, it may be of considerable clinical value. Although we initially chose to study patients with well-established disease as would typically be seen in an outpatient clinic, it will now be important to look at patients with early disease. The test is noninvasive, and only takes a few minutes to perform, it may be particularly valuable in following the progress of a patient with lung disease who is undergoing treatment.

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