ACOUSTIC IMAGING OF THE CHEST
Raymond Murphy, MD and Andrey Vyshedskiy, PhD, Faulkner/Brigham and Women Hospitals, Boston, MA

OBJECTIVE

To examine the relationship of lung sounds detected in 3 dimensions to the spatial distribution of disease processes in the lung.

BACKGROUND

The stethoscope has been used for nearly two centuries to obtain acoustic information from the chest that is helpful in the diagnosis of pulmonary conditions. In recent years computerized methods have been developed to obtain this information more objectively and with greater precision.

METHODS

We developed a multichannel lung sound analyzer (STG) that records and analyses sounds from 16 microphones simultaneously. Arrival time differences are used to locate the origin of the sound. Both normal and abnormal (adventitious) sounds can be analyzed with this device. We compared the acoustic analyses with chest X-ray and CT findings in normals and in patients with lung disorders.

RESULTS

Sound origin as detected by the STG correlated with chest X-ray and CT analysis in a variety of conditions as illustrated in figures 1-6.

CONCLUSION

3D displays of lung sounds correlate with chest X-ray and CT in certain lung conditions. The method has the promise of supplementing information obtained with computerized tomography and/or with magnetic resonance imaging. It has the particular advantage of being noninvasive.