

Pleural Disease: Diagnosis and Management

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Detection of Pleural Effusion by An Acoustic Image of The Lung, Assembled by The PALIScope: A Novel Imaging Device

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PURPOSE: Pleural effusion (PE) produces relatively distinct physical findings, but imaging is essential for confirmation, especially prior to taping. Chest X-ray and other modalities used are relatively expensive, cumbersome, cannot be readily done at the bedside and some involve radiation. Our objective is to confirm that the PALIScopic image of the lung allows detection of PE.

METHODS: Recently, a novel acoustic imaging technology (PALIScope) was developed that processes breath sounds to assemble an image of the lung. The PALIScope is easy to use, is inexpensive and is free of radiation. The acoustic energy from 42 specially designed sensors that are attached to the patient's back is processed during tidal breathing. A dynamic image of the lungs is created instantaneously by capturing the energy of a sequence of 0.17 seconds frames during the breath. The presence of fluid, the compression and the displacement of the lung by PE modify the image. 3 pre-trained physicians analyzed PALIScopic images from 32 sequential adults, (23 males) with mean age of 66 ± 12 years, with PE, that was confirmed by a standard chest-X ray. In 3 patients, imaging was repeated following drainage. Pool Images from healthy subjects served for comparison.

RESULTS: In all cases with PE (but not in healthy subjects), the PALIScopic dynamic and static images showed characteristic, easily recognizable, meniscus shape, cross-segmental, absence and adjacent attenuation of the image, at a region corresponding to the PE, images 1-2. The low signal area was proportional in size to the amount of the fluid, as determined by the X-ray.

CONCLUSION: The PALIScope provides a simple, radiation free approach to detect the presence of pleural effusion and to follow its course.

CLINICAL IMPLICATIONS: This tool has the potential to simplify, facilitate and improve cost effectiveness of bedside evaluation and monitoring patients with suspected or documented pleural effusion.

DISCLOSURE: I. Ben-Dov, Deep Breeze Ltd.

Images are shown at: <http://www.sheba.co.il/lung-image>.

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