Diagnosis of Pneumothorax by Ultrasound Immediately after Ultrasoundically Guided Aspiration Biopsy

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We report two cases of pneumothorax detected by echographic examination immediately after ultrasonically guided aspiration biopsy and confirmed by chest x-ray film. The pneumothorax was characterized by the disappearance of the lung tumor. In the real-time image, the respiratory excursions of the visceral pleura also disappeared.

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In the diagnosis of pneumothorax (PN) after a thoracic puncture, chest roentgenography (CXR) or computed tomography (CT) is the method of choice. However, peripheral pulmonary tumors are more often punctured under ultrasonically guided aspiration biopsy (UGAB). Because the needle position can be followed in real time, UGAB is an accurate and safe technique. No publication has ever mentioned the possibility of PN diagnosis by ultrasound (US) after pulmonary puncture. The value of PN diagnosis by US after UGAB and then confirmed by CXR was assessed in 66 patients with peripheral pulmonary lesions. We present two cases (2/66) of PN detected by echographic examination immediately after UGAB.

CASE REPORTS

CASE 1

A 55-year-old man was admitted for the diagnosis of a peripheral lung lesion (2.1 × 0.9 sq cm) in the upper left lobe. Other diagnostic techniques, such as sputum cytology and/or culture or brushing and biopsy using the fiberoptic bronchoscope, had failed to diagnosis disease in this patient.

After obtaining informed consent, UGAB was assessed. All examinations were performed using an ultrasonic unit (model 650 Aloka) with 3.5-MHz and 7.5-MHz linear array scanners before and after the puncture. During UGAB, we used a linear scanner provided with a central guide channel to introduce a fine needle. Biopsy was performed with a Wetcott (20-gauge) needle. Ultrasonogram revealed a hypoechoic tumor with no tapered edges. Movement of the tumor during breathing and respiratory excursions of the visceral pleura (or lung surface) can be discerned in the real-time image (Fig 1). The UGAB was successful in this case (adenocarcinoma) but immediately after the puncture, the development of PN was detected by US examination and confirmed by CXR. The PN was characterized by the disappearance of the lung tumor. The respiratory excursions of the visceral pleura also disappeared (Fig 2). The patient had little pain and required no treatment.

CASE 2

Roentgenograms and CT scans of a 69-year-old man revealed a lung mass (2 × 1.8 sq cm) and its contact with the posterior chest wall. The mass was easily identified by sonography in the right

FIGURE 1. Case 1. Ultrasonogram of peripheral adenocarcinoma of the lung, using 7.5-MHz scanner. Transverse scan from posterior fourth intercostal space showed a well-defined hypoechoic tumor (T). Movement of the tumor and respiratory excursions of the visceral pleura (VP) can be clearly discerned in real-time image.

FIGURE 2. Case 1. Immediately after UGAB, the disappearance of the lung tumor revealed the development of PN. The respiratory excursions of the visceral pleura also disappeared.

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UGAB = ultrasonically guided aspiration biopsy
are more often punctured under US control. In 1976, Chandrasekhar et al first stressed the usefulness of US for guiding the percutaneous biopsy of peripheral pulmonary masses in four patients. In our study, definitive histologic diagnosis was made in 55 of the 64 patients (85.9 percent). Of the 55 patients, 48 had malignant lesions and seven had benign. The only complications were two PN which resolved spontaneously. These were detected by US and confirmed by CXR.

Wernecke et al reported the preliminary results in the diagnosis of PN by US in eight patients. In healthy control subjects, respiratory excursions of the visceral pleura were discerned from the movement of discrete hypoechoic heterogeneities with comet tail artifacts. The PNs were demonstrated by the absence of pleural movements and comet tail artifacts within the high echo band of pleural reflection. However, no publication has ever mentioned the use of US in the diagnosis of PN after UGAB. A lesion adjacent to the chest wall with no intervening aerated lung was clearly identified by US. Furthermore, in the real-time image, respiratory movements of the tumor and the visceral pleura can be discerned.

Since air in the pleural space totally reflects sound waves, PN appearing immediately after an echo-guided thoracic puncture was characterized by the disappearance of the lung tumor seen by US examination. The respiratory excursions of the visceral pleura, clearly identified at the boundary of the tumor, also disappeared. It is impossible to assess the thickness of the PN, but it is possible to determine its area. In our study, two patients (2/66) suffered minor PN which did not require any intervention. No other complications were reported. Ultrasonography can identify peripheral lung tumors adjacent to the chest wall with no intervening aerated tissue and can explain the low risk of PN in this procedure.

In conclusion, echography appears to be a new method in the diagnosis of pneumothorax after US guided biopsy. In addition to its simplicity, it can be particularly useful during the process of thoracic puncture for emergency situations and/or those in which no roentgenographic equipment is available.

REFERENCES
4 Pedersen OM, Aasen T, Gulsvik A. Fine needle aspiration biopsy of mediastinal and peripheral pulmonary masses by real-time sonography. Chest 1986; 99:504-07

Flurbiprofen (Ansaid) Cross-Sensitivity in an Aspirin-Sensitive Asthmatic Patient*
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Flurbiprofen (Ansaid) is a newly released nonsteroidal anti-inflammatory drug (NSAID) that is a potent inhibitor of prostaglandin synthesis. We report the first case (to our knowledge) of a flurbiprofen-induced asthmatic reaction confirmed by single-blind oral challenges. Cross-sensitivity and cross-desensitization between aspirin (ASA) and flurbiprofen were also demonstrated in this patient with rhinosinusitis and asthma, thus reinforcing the observation that NSAIDs capable of cyclooxygenase inhibition cross-react with ASA in producing characteristic respiratory reactions.

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Flurbiprofen (Ansaid) Cross-sensitivity in Asthmatic Patient (Bosso, Creighton, Stevenson)

**Flurbiprofen** is a newly released nonsteroidal anti-inflammatory drug (NSAID) (Ansaid, Upjohn Co, Kalamazoo, MI) that has anti-inflammatory, analgesic, and antipyretic activities. It is a potent cyclooxygenase inhibitor and thereby blocks prostaglandin synthesis. NSAIDs that inhibit cyclooxygenase are known to regularly cross-react with aspirin (ASA), inducing respiratory reactions in ASA-sensitive asthmatic subjects. Review of the drug experience database from the manufacturer (Upjohn Pharmaceutical Company) revealed one anecdotal report of flurbiprofen-induced asthma in a patient with a history of ASA sensitivity. In addition, another case report was identified in the international literature, describing a patient with mild asthma and a history of asthmatic flares following salicylate ingestion, who developed a near-fatal bronchospastic reaction after ingestion of flurbiprofen (Froben, Boots). Flurbiprofen oral challenges were not performed. We report the first case (to our knowledge) of a flurbiprofen-induced asthmatic reaction that was confirmed by provocative oral challenge.

**CASE REPORT**

A 60-year-old man was evaluated for ASA sensitivity in November 1988. He reported a history of perennial sneezing, nasal congestion, and postnasal drainage since 1986, and a history of persistent coughing with five episodes of documented acute asthma. In September 1988, while caught in a dust storm, he began having upper and lower respiratory congestion. For these symptoms he self-administered one cold medicine tablet (Alka Seltzer Plus) (324 mg ASA contained in this preparation at that time). Shortly thereafter, he vomited most of this medication and within 1 h developed severe dyspnea, chest tightness, and audible wheezing. On presentation to a community hospital's emergency department, he was cyanotic and tachypneic. He was intubated and admitted to the intensive care unit for respiratory arrest.

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