

# **Evaluation of Ultrasonography in Diagnosis of Hemopneumothorax in Suspicious Traumatic Patients Admitted in Trauma Ward in Imam Reza Hospital**

**Reza Sarkhoshi Khiavi**

**Seyyed Hossein Ojaghi Haghghi**

Department of emergency medicine, Imam Reza Hospital, Tabriz Medical Faculty, Tabriz University of Medical Sciences, Tabriz, Iran.

**Background:** Bleeding into the pleural space and trapping of air in pleural space are called hemothorax and pneumothorax, respectively. In cases of delay in diagnosis and treatment, the mortality rates due to hemopneumothorax can be significant. Hemopneumothorax is characterized by decreased lung sounds, chest percussion findings, and subcutaneous emphysema. Diagnosis of pneumothorax and hemothorax can be achieved by portable CXR, CT-Scan, or ultrasonography. Portable CXR and CT-Scan have their own drawbacks. CXR has high percent of false negative results and CT-Scan is time consuming and less cost-effective; in addition, both modalities force radiation to the patients. Therefore, introduction of ultrasonography as an easily available and highly accurate diagnostic modality has particular importance.

**Objectives:** The aim of this study was to evaluate the sensitivity and specificity of ultrasonography in the diagnosis of pneumothorax and hemothorax in comparison with the other two methods, namely portable CXR and CT-Scan.

**Method:** patients with multiple trauma that were suspected of chest injury and had indications of chest CT-Scan according to ATLS algorithms were included in study. All patients underwent portable CXR, CT-Scan, and ultrasonography.

**Results:** overall, 163 patients were included in this study; pneumothorax in 29, hemothorax in 24, and hemopneumothorax in 23 patients was confirmed. The study revealed a sensitivity of 96.15%, a specificity of 100%, a positive predictive value of 100%, and a negative predictive value of 98% for ultrasonography in the diagnosis of pneumothorax and a sensitivity of 82.97%, a specificity of 98.05%, a positive predictive value of 90%, and a negative predictive value of 92.66% for ultrasonography in the diagnosis of hemothorax. Portable CXR for pneumothorax detection had a sensitivity of 34.61%, a specificity of 97.95%, a positive predictive value of 90%, and a negative predictive value of 73.84%. In detection of hemothorax, CXR had a sensitivity of 25.53%, a specificity of 95.14%, a positive predictive value of 70.58%, and a negative predictive value of 73.68%.

**Conclusion:** Ultrasonography sensitivity and specificity for diagnosis of hemopneumothorax was high. Nevertheless, the sensitivity of portable CXR was low despite its high specificity for the detection of hemothorax and pneumothorax.

**Keywords:** Pneumothorax; Hemothorax; Ultrasound; Trauma; CT scan; eFAST