Summary and conclusion

Advances in technology have greatly improved the imaging capabilities of ultrasound. US has been proved to be a reliable, efficient, and informative imaging modality for the evaluation of a wide variety of chest diseases and is particularly sensitive in imaging the chest wall, pleura, and subpleural space because of their superficial locations**.**

Major advantages of US include the absence of radiation, low cost, flexibility and beside availability, and short examination time compared with computed tomography. Invasive procedures such as aspiration, needle biopsy of the pleura, and closed tube placement for effusion drainage can be performed with more accuracy and safety under US guidance. US is notably helpful for critically ill patients because of its portability and simplicity. The indications and uses of chest US examination for pleural, pulmonary and mediastinal diseases are summarized as follows.

1) To clarify the nature of unknown pleural densities
2) To detect pleural effusion and guide thoracentesis and drainage, especially in minimal or loculated effusions
3) To differentiate subpulmonary effusion from subphrenic fluid accumulation and diaphragm paralysis in radiographically elevated hemidiaphragms
4) To localize pleural tumors or pleural thickening and guide needle biopsy of the pleura
5) To assist the evaluation of patients with chest pain

6) To assess the invasion of tumors to the pleura and chest wall, and guide the transthoracic needle biopsy of the tumors
7) To recognize pneumothorax, especially for emergency situations, or when roentgenography equipment is not readily available
8) To diagnose pulmonary consolidation, collapse and lung abscess

Examination of the chest is a rapidly developing application of ultrasound and may be used to evaluate a wide range of peripheral parenchymal, pleural and chest wall diseases. The technique is particularly suited to bedside use in the intensive care unit, where suboptimal radiography may mask or mimic clinically significant abnormalities and where differentiation of pleural from parenchymal changes can be challenging**.**

Furthermore, US are increasingly used to guide interventional procedures of the chest, such as biopsy and placement of intercostal chest drains. We present a review of the clinical uses and sonographic findings in a variety of pleural, parenchymal, chest wall, diaphragmatic, and mediastinal abnormalities.

The role of ultrasound is identification and evaluation of chest diseases such as pleural abnormalities as pleural effusion and pleural masses and opaque chest as consolidation and collapse.

The value of ultrasound in the diagnosis of pleural and pleural based pulmonary lesions as a recent recommendation.

In pleural lesions, plain radiography is able to detect and is more specific in diagnosis of hydropneumothorax than ultrasound, while in simple pleural effusion, encysted empyema, pleural mesotelioma,

metastatic pleural effusion and pleural fibrosis, ultrasound is more accurate and specific in detecting the nature of the lesions than plain radiography.

In pulmonary lesions, plain radiography describes them more accurate and specific than ultrasound.

In pleural lesions, CT is able to diagnose a case of Hydropneumothorax more accurate than ultrasound , while in free pleural effusion ultrasound is more specific in detecting the nature of the lesion than CT. An encysted empyema and metastatic pleural effusion both CT and ultrasound are equal in diagnosis of the lesion. Pleural mesotheliomas are diagnosed by both ultrasound and CT, but CT is more specific than ultrasound. In pleural fibrosis, ultrasound is more specific than CT.

In pulmonary lesions, CT is more sensitive and specific in diagnosis of the lesions than ultrasound.

Ultrasound is much more sensitive in detecting pleural effusion than the supine chest x-ray, and is useful in determining the nature of pleural effusion.

The technique is simple, non invasive, and now widely available.

Ultrasound has many advantages, including examination in multiple planes, the absence of ionizing radiation, high sensitivity in detecting pleural lesions and differentiating pleural disease as pleural effusions and pleural mesothiliomas from the parenchymal diseases as consolidation, abscess or tumors.

Ultrasound guided aspiration biopsy and thoracocentesis can be performed accurately and, easily, of lower cost, it is easily performed at bed side, flexibility and short examination time as compared with computed tomography scans has to be considered.

These advantages make chest ultrasound a useful diagnostic tool with great potential in assisting decision making for and management of critically ill patients, especially when transport of them is risky, moreover, the cost of computed tomography scan which makes repeating examinations inconvenient or impractical, and the lack of real time guidance and bed side availability show the superiority of chest ultrasound to computed tomography.

Therefore, chest ultrasound has a role in the diagnosis and therapeutic management of chest diseases somewhere between chest x-ray and the more expensive imaging technique as computed tomography scan.