A picture's worth a thousand words: speckle tracking for quantification and assessment of lung sliding

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Lung sliding assessment and quantification with speckle tracking technology.

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A 19 years-old female admitted to our intensive care unit for a blunt chest trauma due to road traffic accident. The whole-body computed tomography scan revealed left side costal fractures and a left pneumothorax. Two days after pleural drainage, chest tube was set in gravity causing a decrease in oxygen saturation. We performed a lung ultrasound examination with linear probe (4 MHZ) from Vivid IQ (General Electrics, Chicago, Illinois, USA). Due to the poor echogenicity, we used a speckle tracking evaluation in order to quantify lung sliding in spontaneous breathing (Figure 1). Hence, the quantification of lung sliding is feasible with an important ratio (x10) between normal and abolished lung sliding during spontaneous breathing. To our knowledge, this case is the first assessment of lung sliding using speckle tracking technology. Lung sliding assessment can be challenging in B-mode ultrasonography. Its quantification with speckle tracking technology could help for the diagnosis of pneumothorax, opening new perspectives in the field of lung ultrasound.

Figure 1

The figure presents speckle tracking of segmental longitudinal strain and M-Mode lung ultrasonography from contralateral (normal) lung (A) and left (blunted) lung with a lung-point view (B) and a pneumothorax view (C). Upper side of the picture shows maximal longitudinal strain value of 3 segments (yellow, blue and green). Middle side of the picture shows longitudinal strain variations during respiratory cycle of each segment symbolized with a curve of the corresponding color (yellow, blue or green). Low side of the picture shows M-Mode evaluation of pleural sliding on the same lung ultrasound view.

Normal lung evaluation (longitudinal scan) (A) shows maximal longitudinal strain segmental values of around 10 symmetric segmental curves after respiratory cycle and a classic lung sliding or “seashore sign” picture in M-Mode. Lung point view (transversal scan) (B) shows a normal longitudinal strain value of yellow segment (sliding lung) and low values of blue and green segment (the pneumothorax part of the view) with their respective curves. M-mode

shows the sequence of a typical “stratosphere sign” (abolition of lung sliding) with a normal lung sliding image (“seashore sign”). Pneumothorax view (longitudinal scan) (C) shows altered longitudinal strain value for all segments with associated curves showing no variation during respiratory cycle. M-Mode shows absence of lung sliding (“stratosphere sign”).