IMAGING IN INTENSIVE CARE MEDICINE

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

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A 19-year-old female was admitted to our intensive care unit for a blunt chest trauma due to a road traffic accident. The whole-body computed tomography scan revealed left-side costal fractures and a left pneumothorax. Two days after pleural drainage, a chest tube was set in gravity causing a decrease in oxygen saturation. We performed a lung ultrasound examination with a linear probe (4 MHz) from Vivid IQ (General Electric, Chicago, IL, USA). Due to the poor echogenicity, we used a speckle-tracking evaluation to quantify lung sliding in spontaneous breathing (Fig. 1). Hence, the quantification of lung sliding is feasible with an important ratio ($10\times$) 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 make the diagnosis of pneumothorax, opening new perspectives in the field of lung ultrasound.

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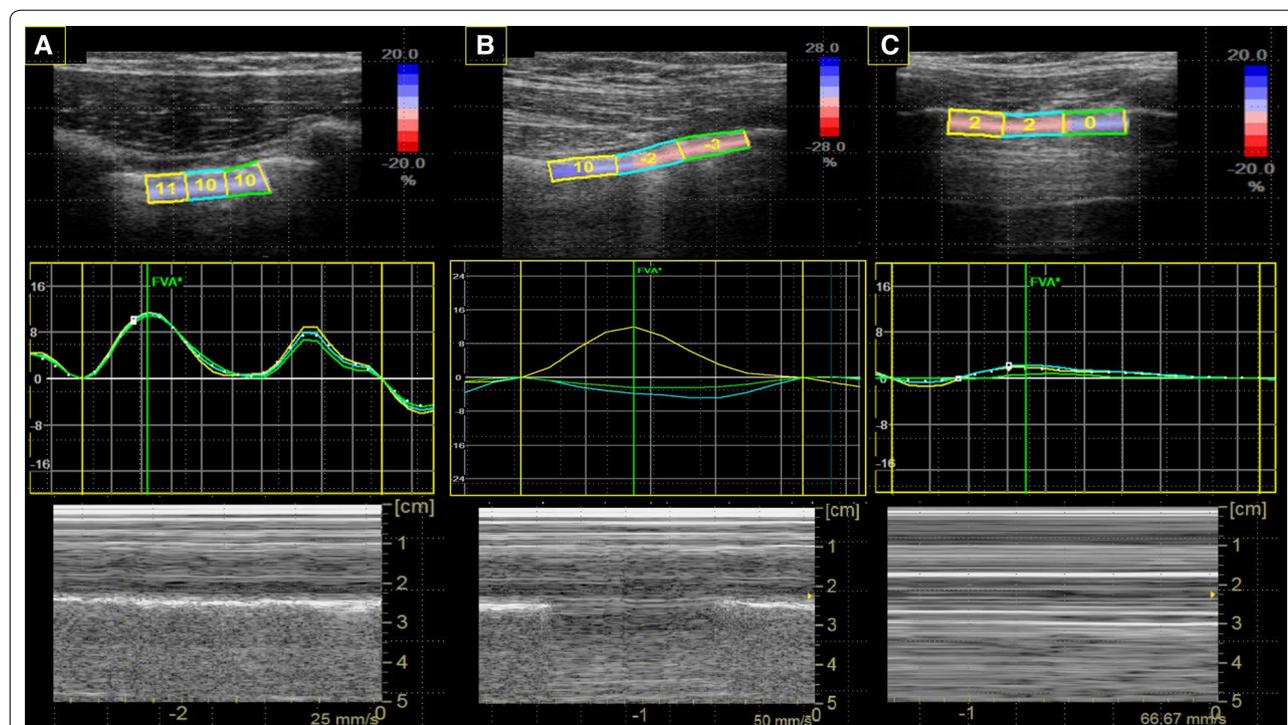Full author information is available at the end of the article

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Fig. 1 The figure presents speckle tracking of the segmental longitudinal strain and M-mode lung ultrasonography from the contralateral (normal) (**a**) and left (blunted) lung with a lung-point (**b**) and a pneumothorax view (**c**). The upper side of the picture shows the maximal longitudinal strain value of three segments (yellow, blue and green). The middle side of the picture shows longitudinal strain variations during the respiratory cycle of each segment symbolized with a curve of the corresponding color (yellow, blue or green). The 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 approximately ten symmetric segmental curves after the 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 the yellow segment (sliding lung) and low values of the 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 an altered longitudinal strain value for all segments with associated curves showing no variation during the respiratory cycle. M-mode shows an absence of lung sliding ("stratosphere sign")

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Compliance with ethical standards

Conflicts of interest
Dr. Gary Duclos, Laurent Muller and Marc Leone denied any conflict of interest regarding this article. Dr. Laurent Zieleskiewicz declares having received fees for ultrasound teaching from General Electric Healthcare.

Informed consent
The patient in this article provided consent.