CASE REPORT

Lung ultrasound artifacts in a case of *P. Jirovecii* pneumonia : Coexistence of A and B lines

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Abstract

This article presents lung ultrasound findings in a proven case of *P. Jirovecii* pneumonia. Ultrasound-based diagnoses of lung pathology are largely based on the patterns of artifacts encountered. The expected finding in an interstitial pneumonia is a B profile (multiple B lines). The original description of B lines stated that they should erase A lines, thus A and B lines where tought as being mutually exclusive. This case is a clear example of interstitial syndrome presenting with both A and B lines on lung ultrasound. It suggests that the absence of A lines should not be a formal criterion for the identification of B-lines.

Keywords

Bedside/point-of-care ultrasound, Pneumonia, Lung, Pneumocystis Jirovecii, Artefacts, B-lines, A-Lines

1 Introduction

Over the past two decades, lung ultrasound has been developed as a valuable tool in the diagnosis of intrathoracic pathology in the critical care patient. Given its relatively recent emergence as a key tool in the critical care setting, the criteria for ultrasound-based diagnoses in the lung are still being refined.

Ultrasound-based diagnoses of lung pathology are largely based on the patterns of artifacts encountered. Two major artifacts are “A lines” and “B lines”, first formally described by Lichtenstein et al in 2004 [1]. A lines are described as thin, roughly horizontal, echogenic lines, present between the rib shadows when the probe is positioned longitudinally at an intercostal space [2]. They occur at regular intervals across the depth of the image, and represent reverberations of the pleural line. A lines suggest the presence of either aerated lung or the absence lung parenchyma, as in pneumothorax [2-5]. B lines, previously termed “comet tail artifacts”, have been shown to indicate the presence of interstitial fluid or airspace disease [3, 6-8]. They are described as meeting the following seven mandatory criteria: “a hydroaeric comet-tail artifact; arising from the pleural line; hyperechoic; well defined; spreading up indefinitely; erasing A lines; and moving with lung sliding when lung sliding is present” [3].

Given the criterion of B lines erasing A lines, the A and B profiles were erstwhile thought to be mutually exclusive at any given point of the lung. However, in this article, the authors note that the recent International Evidence-Based

Recommendations for Point-of-Care Lung Ultrasound expert consensus [9] does not include "erases A lines" as one of the mandatory criteria for B lines, thereby qualifying the A and B profiles as potentially overlapping. To illustrate this point, we present the case of a critical care patient with the coincident appearance of both A lines and B lines (see Figure 1).

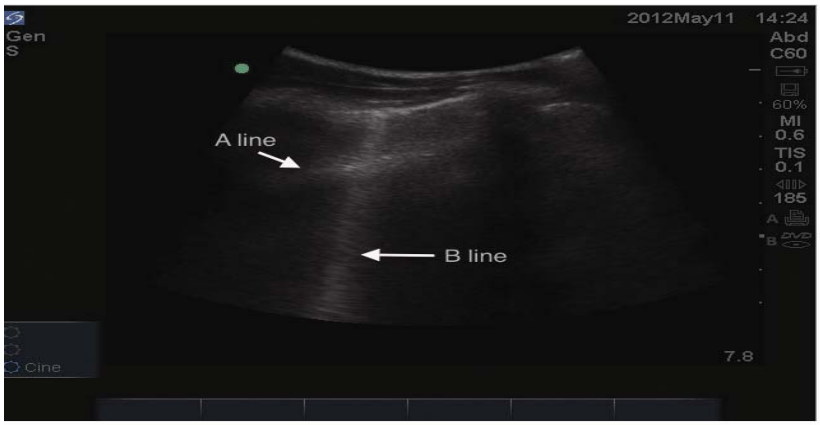

Figure 1. Lung ultrasound showing A and B lines in the same ultrasound field.

2 Case presentation

A 44 year-old male with known HIV presented to our hospital in respiratory distress. He was intubated and admitted to the ICU with a presumed diagnosis of by *Pneumocystis Jirovecii* pneumonia. The patient's chest x-ray (see Figure 2) and CT scan (see Figure 3) showed diffuse interstitial infiltrates and subsequent bronchoalveloar lavage confirmed the suspected diagnosis. Serial lung ultrasounds (see Figure 4) clearly demonstrated a bilateral interstitial syndrome, defined by the presence of more than three B lines within a given intercostal space. The B lines largely met the classical description, as detailed above. However, it was noted that A lines were simultaneously present. The simultaneous presence of both A and B lines has been noted in a relatively small but significant number of cases of interstitial syndrome patients.

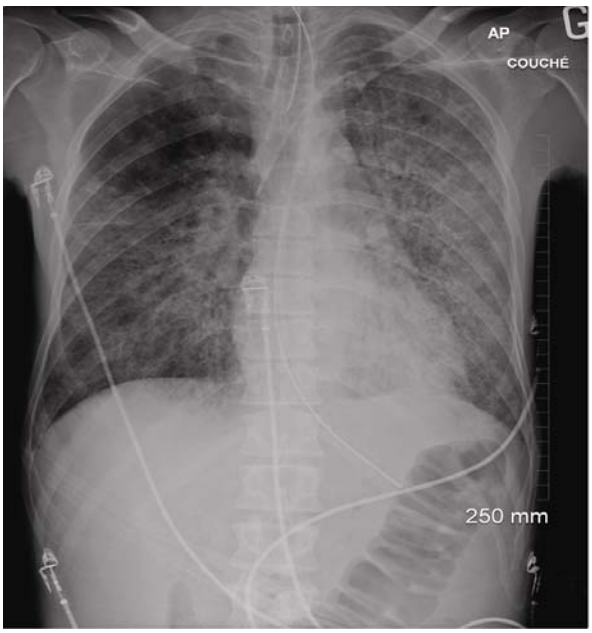

Figure 2. Chest X-ray showing bilateral diffuse interstial infiltrates.

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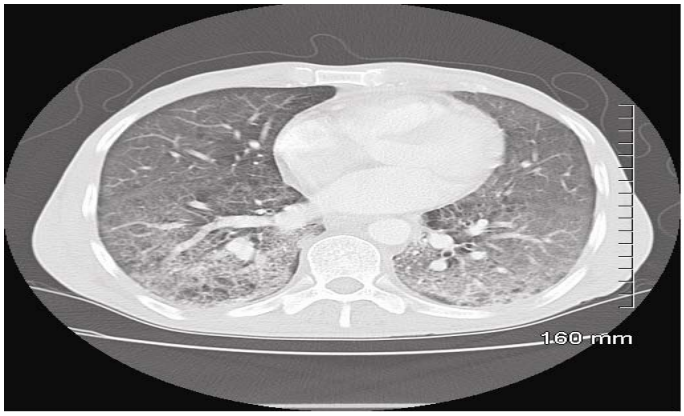

Figure 3. CT-scan of the same patient.

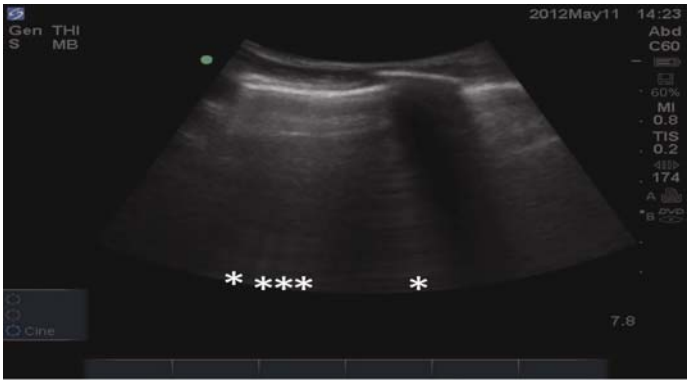

Figure 4. Lung ultrasound showing multiple B lines (*)

3 Discussion

This case is a clear example of interstitial syndrome presenting with both A and B lines on lung ultrasound. In our experience, as illustrated in this case, A lines and B lines are not consistently mutually exclusive. Further, having taught numerous courses in critical care ultrasound, we find that this concept tends to confuse new learners. This confusion is compounded by the varying presence of this criterion in point-of-care ultrasound literature.

We propose that, in accordance with the recently published International Evidenced-Based Recommendations for Point-of-Care Lung Ultrasound Expert Consensus[9], the absence of A lines should not be a formal criterion for the identification of B lines.

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