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Lung Ultrasound B Lines: Etiologies and Evolution with Age

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Lung ultrasound is a field of growing importance in respiratory medicine [1, 2]. B lines, previously termed "comet tails," are vertical hyperechoic reverberations moving synchronously with the lung and represent key artifacts in interpreting pulmonary ultrasound findings [3, 4]. The physiologic basis of B lines relates to decreased lung aeration [5], a finding that is nonspecific. Here, we aimed to explore the specific clinical diagnoses associated with the B-line pattern and their evolution with age. We therefore undertook a secondary analysis of a 2-year audit of consecutive pulmo-

nologist-performed lung ultrasounds in an Italian university hospital [2]. We included all lung ultrasound examinations showing a B-line pattern (multiple close B lines visible in 1 single scan) in at least 1 lung field. Ultrasound findings were standardized according to guidelines [4], and final diagnoses were adjudicated by the attending physician at patient discharge [2]. Overall, a B-line pattern was reported in 397 cases (34.5%) of the 1,150 examinations performed. Of these, 54 were obtained in children (18 females, [mean $\pm$ standard deviation] 4 ± 3 years old), 69 in adults between 19 and 64 years of age (29 females, 46 ± 13 years old), 178 in patients aged >64 years (68 females, 75 ± 5 years old), and 96 in patients >80 years (50 females, 86 ± 5 years old). Figure 1 shows that community-acquired pneumonia represents the main cause of B-line patterns in children (89%) and middle-aged adults (51%), whereas acute heart failure prevails in the elderly (37% between 64 and 80 years old, 50% if older than 80 years). However, etiologies are heterogeneous since interstitial lung diseases, lung cancer, empyema, atelectasis, pulmonary infarction, and even the normal lung may show lung areas with a B-line pattern in about half of the adult population.

In conclusion, when a large population and multiple conditions are considered, we should expect that one-third of the lung ultrasound studies show a B-line pattern in at least 1 thoracic area, with etiology varying throughout different age groups. Since this pattern could be attributed to a wide range of conditions, its interpretation cannot withstand analysis of the distribution, extension, and severity of the B-line pattern together with an accurate clinical correlation.

Fig. 1. B-line pattern lung ultrasound diagnoses according to patient age. AHF, acute heart failure; CAP, community-acquired pneumonia; ILD, interstitial lung disease; TEP, pulmonary thromboembolism with pulmonary infarction.

Financial Disclosure and Conflicts of Interest

All authors declare that they have no conflicts of interest concerning this paper.

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