Lung ultrasound to detect ventilator-associated pneumonia in COVID-19 patients

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Background

Lung ultrasound (LUS) is a useful tool in the management of ARDS; a lung ultrasound score can be computed to quantify lung loss of aeration and monitor response to treatment, in particular in ventilator-associated pneumonia (VAP)[1].

Methods

Retrospective monocentric study. LUS was performed daily computing the lung ultrasound score in 12 standard thoracic areas according to the visualized pattern as previously described[1-3]. We collected the ultrasound features (LUS score and specific signs of VAP i.e. linear/arborescent dynamic air-bronchogram, subpleural consolidations, lobar consolidations[4]) the day of the VAP and 48h earlier (basal value). VAP was confirmed by a closed-system deep tracheal aspirate with a load >10^4 CFU. Median [IQR] were used for quantitative variables, number (percentages) for categorical ones. Comparisons among categorical variables were evaluated with Pearson chi-square/Fisher's exact test; Wilcoxon/Mann-Whitney U-test was used for quantitative variables. P-value ≤0.05 was considered significant (two-sided).

Results

We present preliminary data on 17 VAP in 15 patients (male 86.7%; age 60.0 [58.0-69.0] year-old, mortality 53.3%). Isolated pathogens are displayed in Tab.1. Median LUS score at VAP event was 18.0 [16.0-20.0], significantly higher than basal value (13.5 [8.5-19.0]; p=0.0018 – median score-increase of 3.5 [2.5-7.0]). 82.4% of patients presented a new lobar consolidation, 70.6% showed a new subpleural consolidation, 41.2% had a newly appeared linear/arborescent dynamic air-bronchogram. All the patients presented at least one of these signs.

Conclusions

LUS is a promising tool for early detection of VAP in COVID-19 patients.

Isolated pathogens	
Bacteria	N (%)
Gram negative bacteria	
Acinetobacter Baumanii	7 (47.0)
Pseudomonas Aeruginosa	4 (23.5)
Klebsiella Pneumoniae	1 (5.9)
Stenotrophomonas Maltophilia	1 (5.9)
Enterobacter Asburiae	1 (5.9)
Enterococcus Faecalis	1 (5.9)
Gram positive bacteria	
Staphylococcus Aureus	1 (5.9)
Enterococcus Faecalis	1 (5.9)
Corynebacterium Striatum	1 (5.9)
Fungi	
Aspergillus Fumigatus	2 (11.8)

Table 1: pathogens isolated in broncho-alveolar lavages

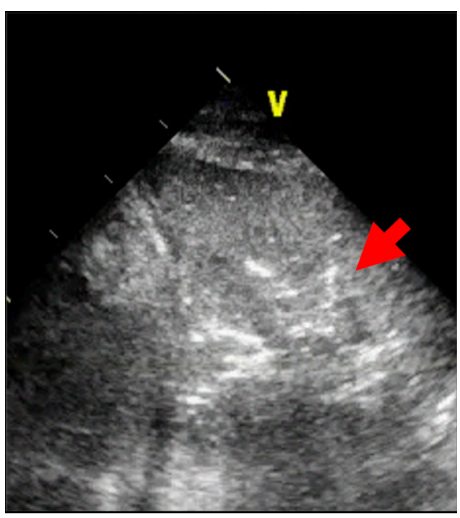

Fig.2: Arborescent dynamic air-bronchogram (red arrow) within a lobar consolidation

Fig. 3: Subpleural consolidation in anterior thoracic area

References

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