

Imaging in COVID-19 - a protocol for echocardiography & lung ultrasound in the follow-up

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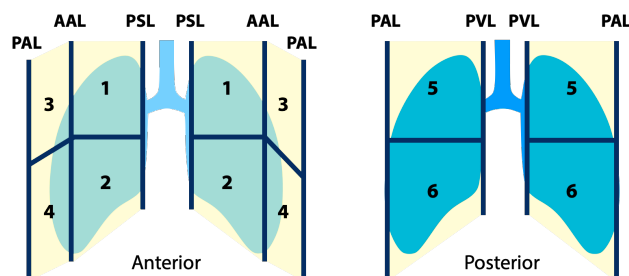
The global crisis of the current pandemic of COVID-19 is holding the world hostage and health care professionals are facing a true burden (1).

Imaging plays a key-role in diagnosing and the follow-up examinations (2). Lung ultrasound has proven to be a tool for the emergency and acute setting, in the follow-up there is a lack of information on how lung ultrasound can be utilised (3).

In echocardiography strain imaging could be of help in the follow-up after COVID-19 (4).

In lung ultrasound a 12-zone scanning protocol is used in the acute setting which can be adapted to a point of care approach and in case of a follow-up exam the correct documentation might lead to comparable images (3). In echocardiography in the follow-up a standardised comprehensive echocardiographic approach should be chosen and strain imaging should be implemented (4,5).

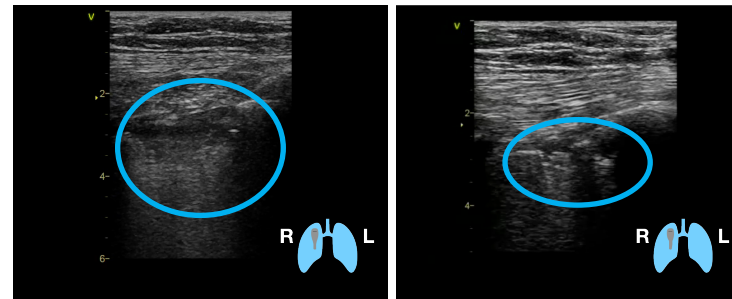
6 zones per hemithorax are differentiated in lung ultrasound (LUS)



- Zone 1, 2, 3 and 4 are located anterior
- Zone 5 and 6 are located posterior

AAL = anterior axillary line PAL = posterior axillary line
PVL = paravertebral line PSL = parasternal line

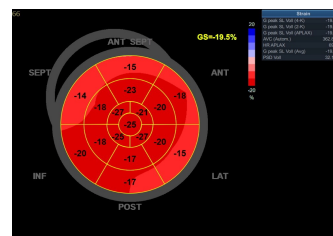
Comparison of LUS in zone 1



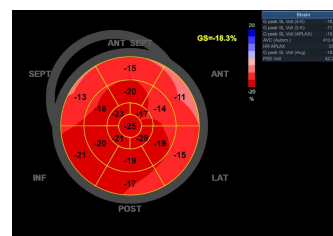
Moderate consolidation after the critical phase of COVID-19

4 months later - reduction in size of the consolidation

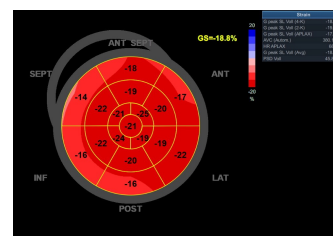
For strain imaging, there are 3 views to acquire :



Apical 4-chamber view

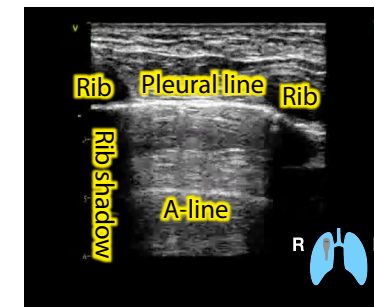


Apical 2-chamber view

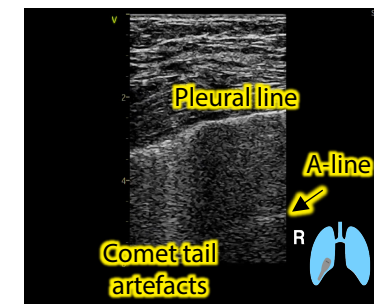


Apical long axis view

Three examples of strain imaging in post COVID-19 patients showing a normal global longitudinal peak systolic strain with reduction in the basal segments.

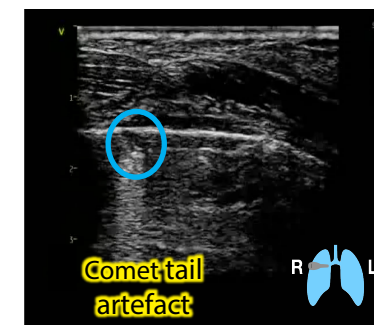


Normal longitudinal image of zone 1 of lung ultrasound with the pleural line and A-lines. The pleural line and the structures (A-line) in the far field are artifacts.

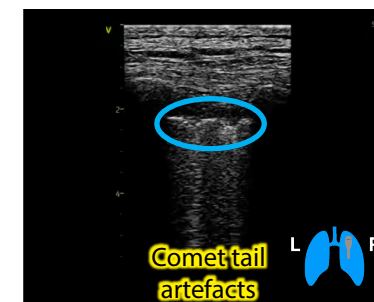


Zone 2 in a transverse view

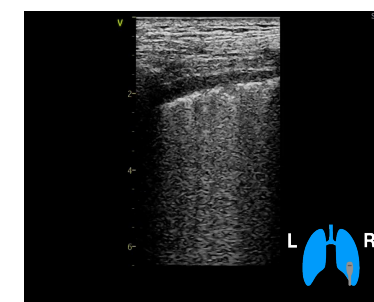
- Left: comet tail artefacts arising from a fragmented pleural line
- Right: normal area with smooth pleural line and no reverberation artefacts



Oblique view of zone 3 of the lung with a fragmented pleural line/borderline, small consolidation (circle) and concordant comet tail artefact (reverberation artefact originating from a fragmented pleural line).



Longitudinal plane of zone 5 with fragmented pleural line (circle) and comet tail artefacts



Zone 6 with multiple and confluent comet tail artefacts

Literature

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3. Altersberger et al., Point-of-care echocardiography and lung ultrasound in critically ill patients with COVID-19, under review Wien Klin Wochenschr 2021
4. Stöbe et al., Echocardiographic characteristics of patients with SARS-CoV-2 infection, Clin Res Cardiol, 2020
5. Mitchell et al., Guidelines for Performing a Comprehensive Transthoracic Echocardiographic Examination in Adults: Recommendations from the American Society of Echocardiography, J Am Soc Echocardiogr, 2019

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