Pneumatocele in a COVID-19 patient treated with endobronchial valves – A case report

AS Bugge[1], A Sundset[1], LH Jørgensen[2], TM Aaløkken[3,4]
1) Department of Respiratory Medicine 2) Department of Cardio-thoracic Surgery
3) Department of Radiology Oslo University Hospital, Rikshospitalet 4) Institute of Clinical Medicine, University of Oslo

Patient history

- Caucasian male ~ 40's
- Spring of 2021
- 6 days of vague symptoms of COVID-19
- General condition deteriorated
- Admited to hospital
- Treated in the ICU-unit
- At no point mechanical ventilation

Medical history

- Hemithyroidectomy (benigne) (2016)
- Pneumonia, Mycoplasma pneumoniae (2016)
- Surgical resection of thymoma (2017)
- Visceral leishmaniasis (2017)

CT-scan prior to COVID-19

Follow-up after thymectomy (2020)
– Unremarkable except for dependent atelectasis

Investigations

- During recovery from COVID-19
- Experienced a cough bout
- Dyspnea worsened

CT-pulmonary angiogram showed a 10 x 18 cm, gradually expanding cavitary lesion with an air-fluid level (arrow) and surrounding atelectasis of the right lower lobe

Primary treatment

- Initially diagnosed as a right-sided pneumothorax
- Multiple chest drainage tubes were inserted into the pleural space
- Despite appropriate placement, no evacuation of air ensued

Secondary investigations

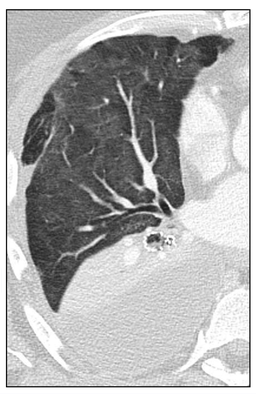
- CT scan revealed gradually expanding cavitary lesion
- A one-way valve mechanism
- A pneumatocele without communication to the pleural space had developed

Treatment – I

Occlusion of all bronchial segments of the right lower lobe with endobronchial valves (EBV)
(Zephyr®, Pulmonx Inc.)

Treatment – II

Three days later:
- Atelectasis of the lower lobe
- Valves in situ
- Pneumatocele remained unchanged in shape and size



Treatment – III

Pneumatocele completely evacuated with a CT-guided insertion of a pigtail drainage:
- 2.0–2.5 Liters of air
- 0.4 Liters of fluid
- Removed after 7 hours

Treatment – IV

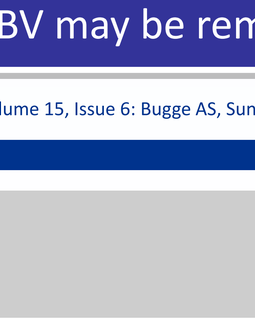
- Repeated X-rays confirmed that the cavity did not recur
- Dyspnoea and need of extra oxygen supply decreased
- Serosanguinous pleural fluid drained twice from the right thorax

Outcome - 4 weeks

- No pneumatocele identified
- No longer in need of oxygen supply
- EBV were removed during flexible bronchoscopy

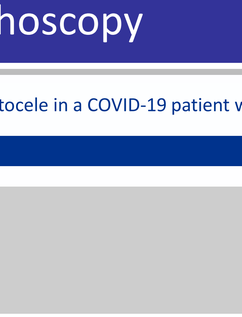
Outcome – 1 Month after EBV removal

- Almost complete re-expansion
- Organised pleural fluid with small air cavities (arrow)
- Still some opacifications related to COVID-19 pneumonia in all lobes



Outcome – 6 Month after EBV removal

- Almost complete absorption of the abnormalities
- Small parenchymal bands (arrows)
- Pneumatocele did not reappear



Outcome - Lung function

Lung function – prior to and after treatment

	Prior (2017)	1 month	2 months	6 months
FVC, liters (% exp.)	4.8 (92)	2.3 (45)	3.2 (61)	4.1 (80)
FEV1, liters (% exp.)	3.5 (83)	1.8 (43)	2.4 (59)	3.2 (80)
DLCO, SI-u. (% exp.)	8.3 (77)	4.0 (40)	5.7 (57)	7.1 (71)

CONCLUSION

- Most pneumatoceles disappear spontaneously
- When increasing pneumatocele causing cardiopulmonary instability – EBV may be considered
- Insertion of EBV and subsequent decompression by drainage may be efficient
- EBV may be removed by flexible bronchoscopy

Conflict of interest: None

Published 21th June 2022 – BMJ Case Reports, Volume 15, Issue 6: Bugge AS, Sundset A, Aaløkken TM, et al Treatment of a pneumatocele in a COVID-19 patient with endobronchial valves BMJ Case Reports CP 2022;15:e250409

Oslo University Hospital