

# Pneumopericardium following mechanical ventilation in COVID-19 pneumonia

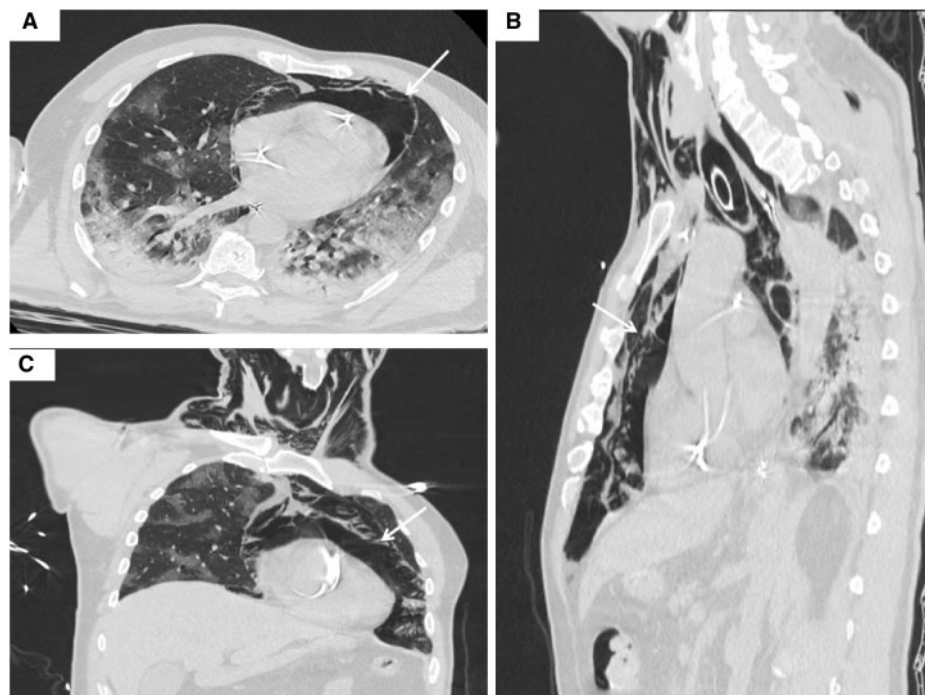
Roberto Scacciavillani <sup>1</sup>, Giulia Iannaccone <sup>1</sup>, Marco Giuseppe Del Buono<sup>1\*</sup>, and Giuseppe Bello<sup>2</sup>

<sup>1</sup>Department of Cardiovascular and Thoracic Sciences, Catholic University of the Sacred Heart, L.go A. Gemelli, 1, 00168 Rome, Italy; and <sup>2</sup>Department of Anesthesia and Intensive Care, Fondazione Policlinico Universitario Agostino Gemelli IRCCS, Università Cattolica del Sacro Cuore, L.go A. Gemelli, 1, 00168 Rome, Italy

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A 61-year-old man without comorbidities was admitted to a local hospital in Rome for fever and worsening dyspnoea. Two rhinopharyngeal swabs resulted positive for SARS-CoV2, chest X-ray demonstrated bilateral ground-glass opacities, and he was diagnosed with

COVID-19 pneumonia. After intubation for respiratory deterioration, he was transferred to the intensive care unit (ICU) of our university hospital. At ICU admission, blood tests showed lymphopenia ( $0.3 \times 10^9/L$ ), increased C-reactive protein (310 mg/L), normal



**Figure 1** Computed tomography scans showing diffuse bilateral ground-glass opacities and consolidations, extended subcutaneous emphysema, pneumomediastinum, and pneumopericardium (white arrows). (A) Axial computed tomography scan; (B) coronal computed tomography scan; (C) sagittal computed tomography scan.

\*Corresponding author. Tel: +39 06 30154187, Fax: +39 06 30154432, Email: [marcodelbuono@hotmail.it](mailto:marcodelbuono@hotmail.it)

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procalcitonin, and a  $\text{PaO}_2/\text{FiO}_2$  ratio of 143. Ventilator was set on volume-controlled ventilation with  $\text{FiO}_2$  of 70%, positive end-expiratory pressure (PEEP) of 15  $\text{cmH}_2\text{O}$ , tidal volume of 420 mL (6.0 mL/kg), and respiratory rate of 30 cycles/min. Resulting plateau pressure was 27  $\text{cmH}_2\text{O}$ . A few hours later, neck and chest subcutaneous emphysema was noted. Chest computed tomography scan showed ground-glass opacities and consolidations in both lungs, with pneumopericardium, pneumomediastinum, and left pneumothorax, without large-airway lesions. No invasive cardiac procedure was performed because of patient's stable haemodynamics, and chest X-rays showed progressive, spontaneous resolution of the pneumopericardium. After two prone-positioning sessions over the first 3 days of ICU admission, respiratory conditions progressively improved and patient was switched to spontaneous ventilation on Day 5 and, after tracheostomy on Day 14, was gradually taken off ventilatory support 1 month later.

We described the occurrence of a sizeable pneumopericardium following mechanical ventilation for COVID-19 pneumonia, although a lung-protective strategy was applied and no recruitment manoeuvre was performed. Mechanical ventilation can cause alveolar rupture, thus favouring gas passage first in pulmonary interstitium, peribronchial, and pulmonary perivascular sheaths, and then in lung hilum and mediastinum. In case of concomitant pericardial disruption, pneumopericardium may develop. Pneumopericardium due to barotrauma is a rare complication, and physicians should maintain the attention high when using high PEEP in patients with severe pneumonia even though protective ventilation is applied.

**Consent:** The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.