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Case Series on Venovenous extracorporeal membrane oxygenation (VV-ECMO) as a bridge to complete recovery in influenza type A related refractory ARDS

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Case series on Veno - venous extracorporeal membrane oxygenation (VV-ECMO) as a bridge to complete recovery in influenza A induced ventilator refractory ARDS

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Introduction

Influenza A sequelae range from mild symptoms to acute respiratory distress syndrome (ARDS), which can be refractory to conventional ventilator therapy. We present a case series of three non-H1N1 Influenza patients with ARDS, who completely recovered after VV-ECMO.

Case Presentation

In January and February 2013, we experienced three cases of Influenza A induced ARDS that failed conventional ARDS ventilator therapy. All three patients presented with typical flu-like symptoms, which deteriorated over several days, requiring intubation. They were all treated with oseltamivir. They had bilateral chest infiltrates on chest x-rays. After a few days of failing conventional treatment these patients were placed on VV-ECMO using Avalon Dual Lumen catheters.

Case Presentation (2)

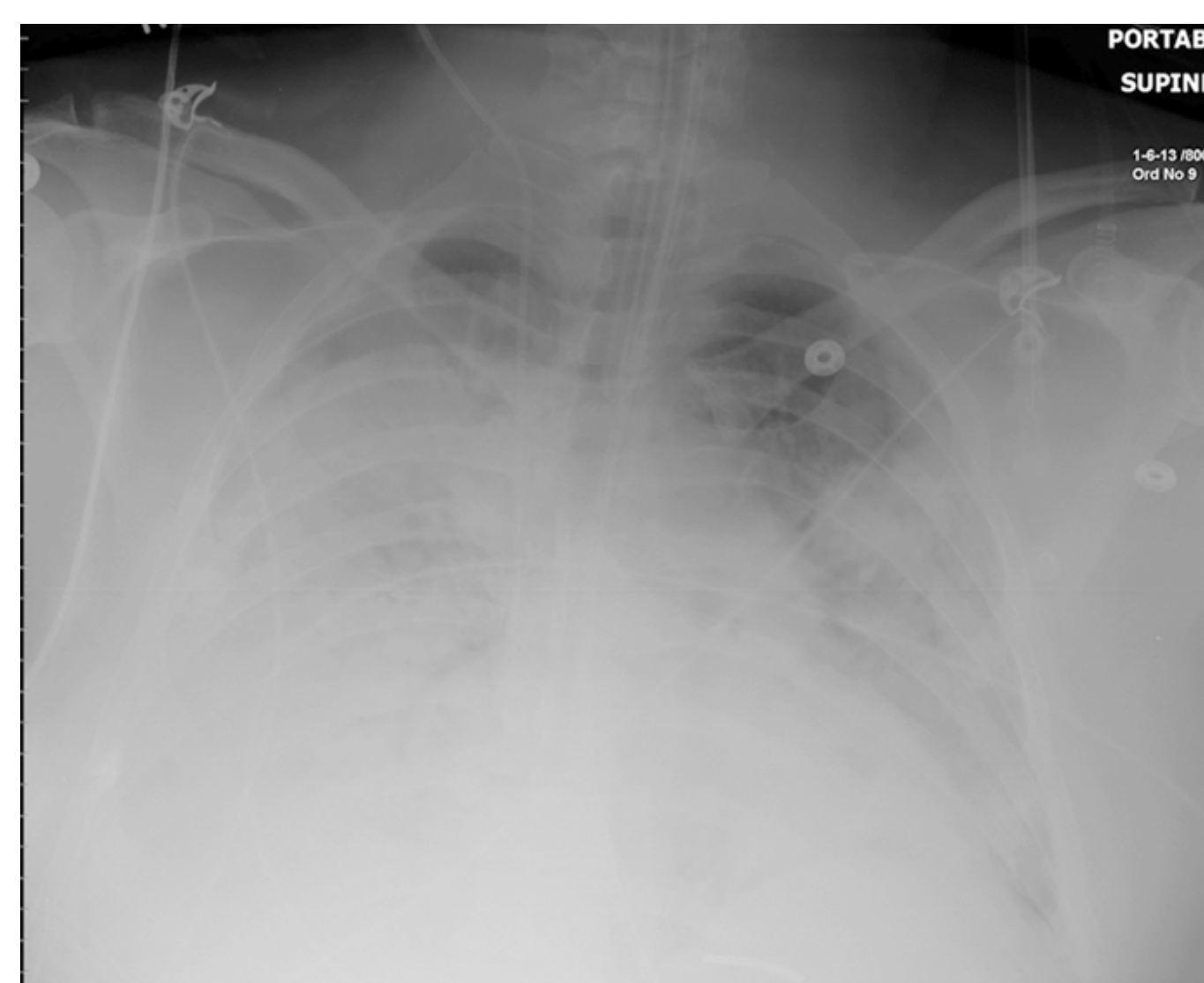
The patients' oxygenation improved dramatically at the instillation of adequate ECMO flow. ECMO was continued until improvement of chest x-ray findings, fluid status and end organ functions. All three patients were weaned off and decannulated from VV-ECMO within 10 days and achieved complete recovery of lung functions. The post ECMO decannulation chest x-rays show improvement of bilateral lung infiltrates in all three patients.

Conclusion.

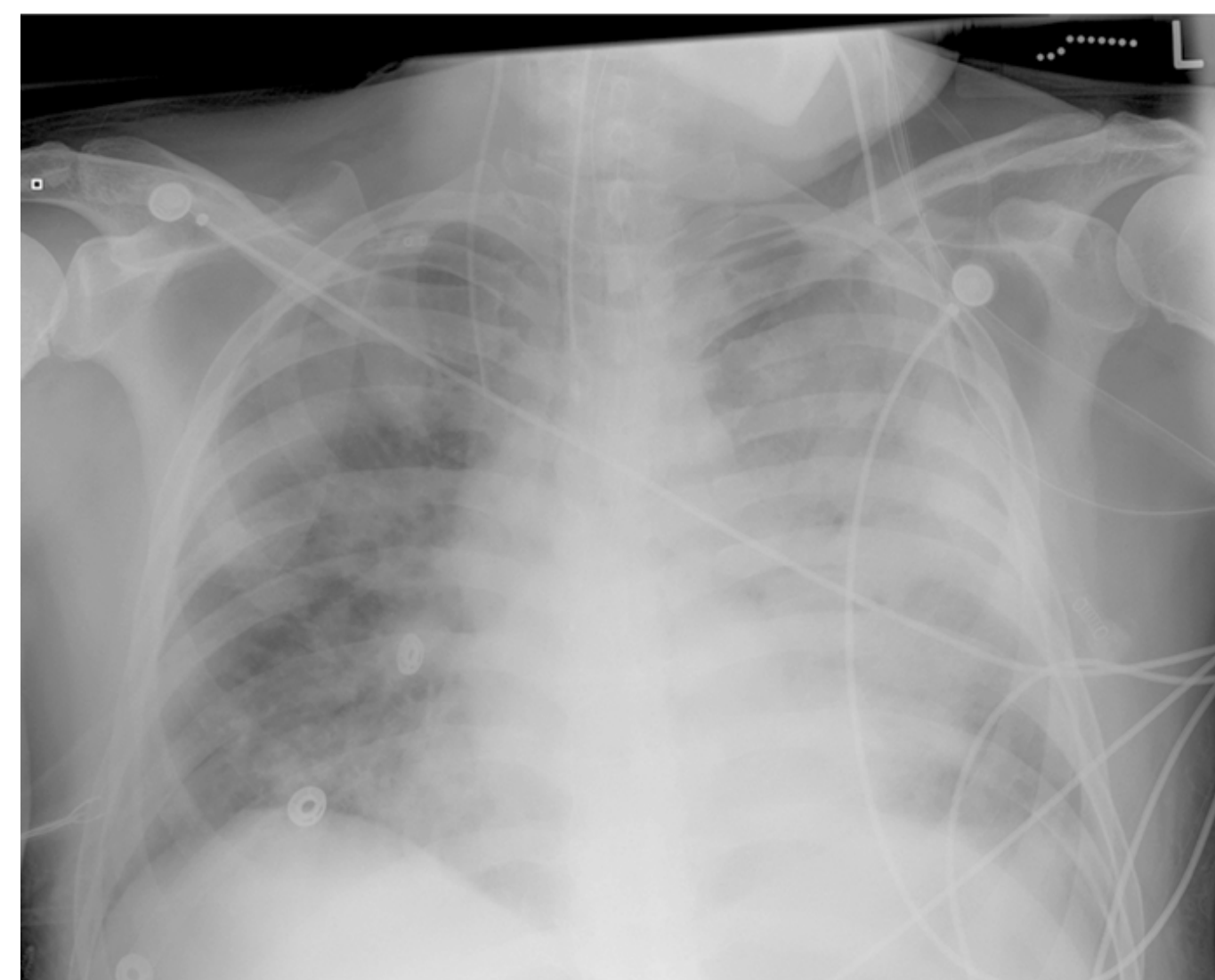
Although the survival benefit of the ECMO support for ARDS caused by H1N1 influenza was previously reported to be questionable, we were able to cure all ARDS directly related to non-H1N1 influenza with VV-ECMO support. We postulate that our difference in outcome compared to that published in the literature is due to the combination of the seasonal flu being treated appropriately and early intervention of VV-ECMO.

Pre ECMO Chest X-Rays

Case 1



Case 2



Case 3



Pre ECMO Data

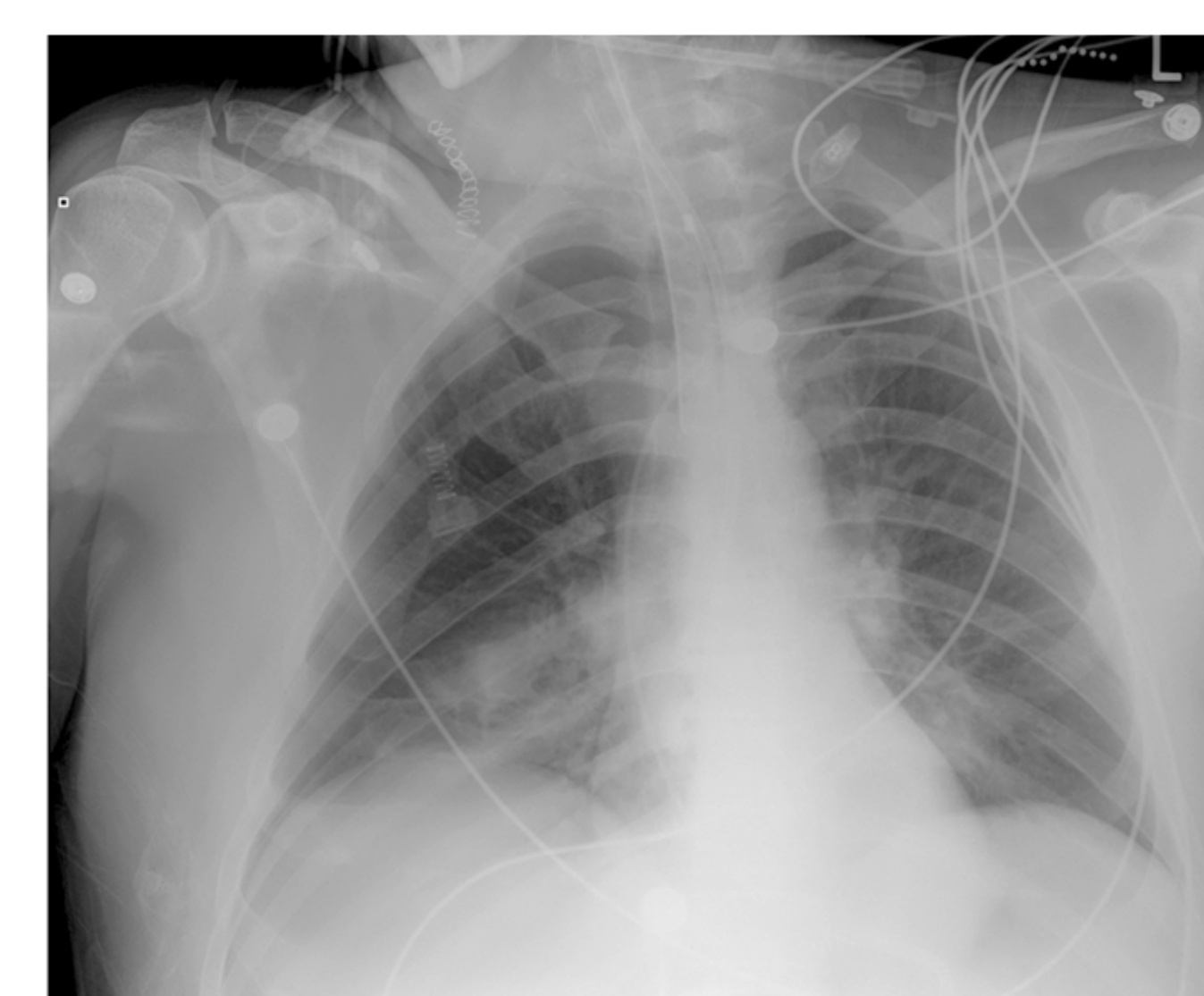
| | |
|---|-------------|
| Age, Sex | 47, m |
| Rapid influenza screening | Negative |
| PCR influenza assay | Positive |
| Days on vent (days) | 1 |
| Vent mode | Oscillator |
| Vent FiO ₂ | 100 |
| Peep | NA |
| PIP (mm H ₂ O) | 34 |
| Mean airway pressure (cm H ₂ O) | 22 |
| Arterial pH/PaCO ₂ /PaO ₂ | 7.49/32/144 |

| | |
|---|------------|
| Age, Sex | 46, M |
| Rapid influenza screening | Negative |
| PCR influenza assay | Positive |
| Days on vent (days) | 7 |
| Vent mode | Bi-Level |
| Vent FiO ₂ | 100 |
| Peep | 30/0 |
| PIP (mm H ₂ O) | 29 |
| Mean airway pressure (cm H ₂ O) | 16 |
| Arterial pH/PaCO ₂ /PaO ₂ | 7.25/54/93 |

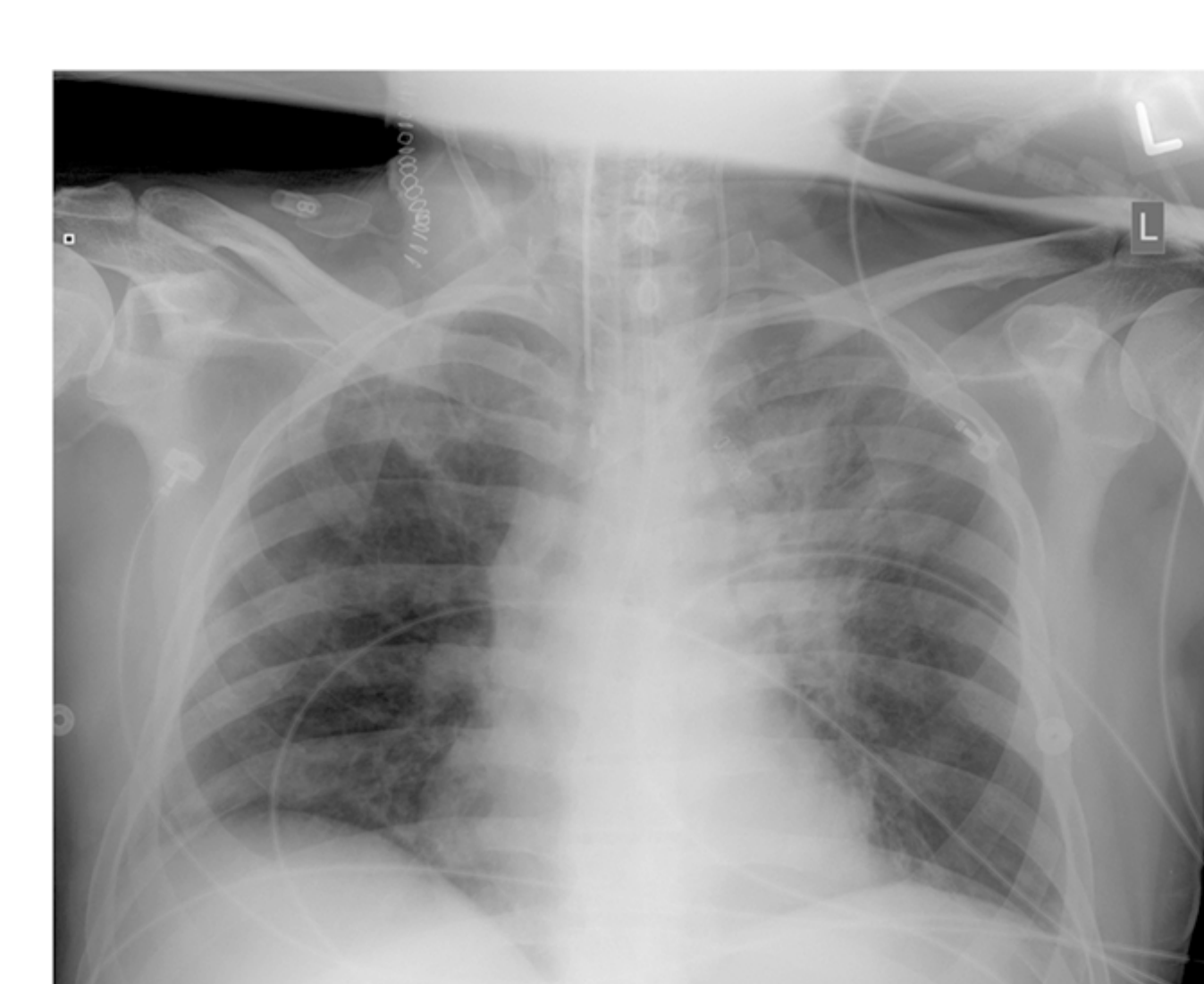
| | |
|---|------------|
| Age, Sex | 46, m |
| Rapid influenza screening | Positive |
| PCR influenza assay | NA |
| Days on vent (days) | 4 |
| Vent mode | Bi-Level |
| Vent FiO ₂ | 100 |
| Peep | 28/0 |
| PIP (mm H ₂ O) | 33 |
| Mean airway pressure (cm H ₂ O) | 28 |
| Arterial pH/PaCO ₂ /PaO ₂ | 7.36/44/76 |

Post ECMO Decannulation Chest X-Rays

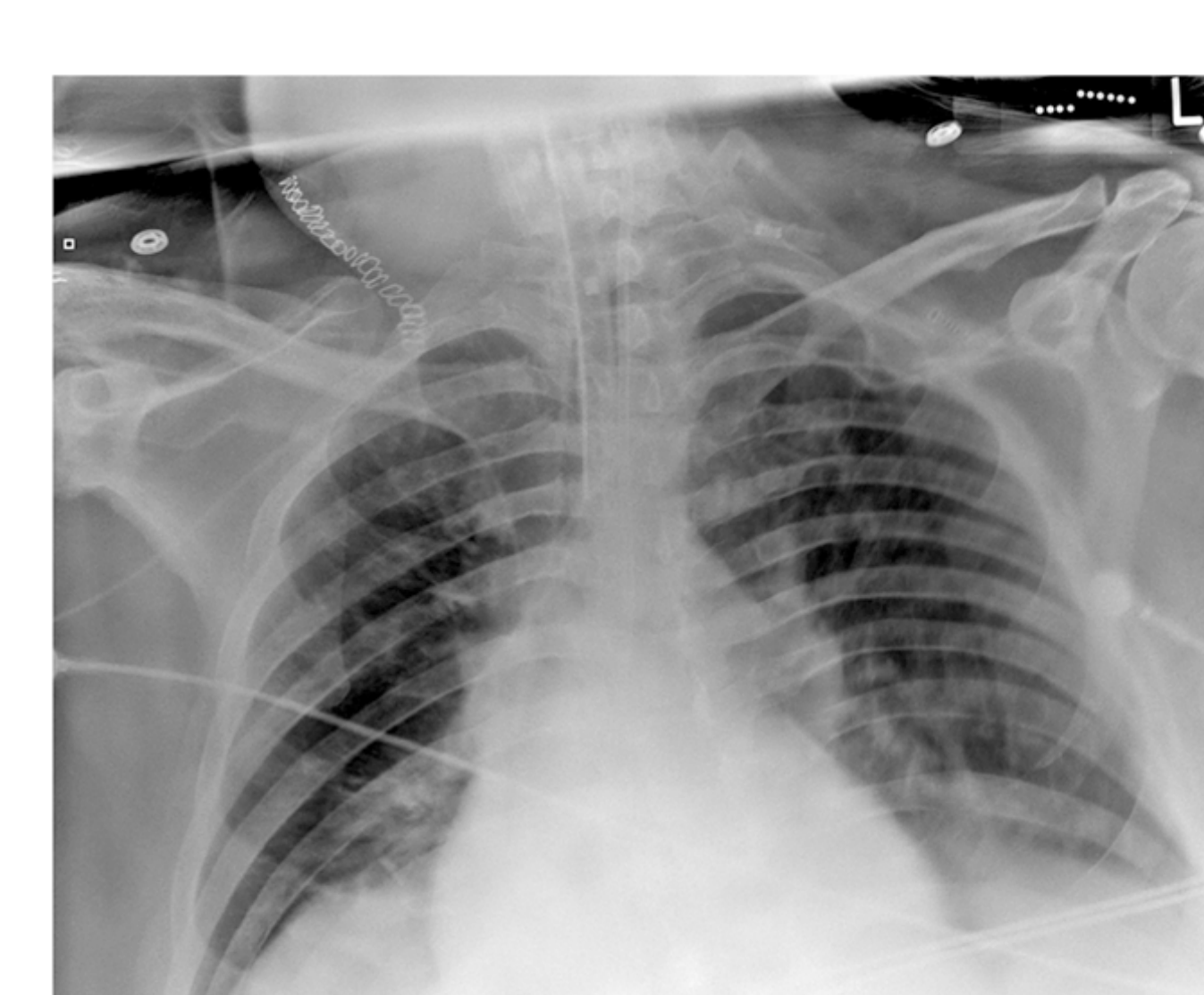
Case 1



Case 2



Case 3



Post ECMO Data

| | |
|--|-------------|
| Days on ECMO | 10 |
| Vent Mode | AC |
| Vent FiO ₂ (%), ECMO FiO ₂ | 50, 50 |
| Peep | 5 |
| PIP (mm H ₂ O) | 25 |
| Mean airway pressure (cm H ₂ O) | 15 |
| Arterial pH/PaCO ₂ /PaO ₂ | 7.39/41/144 |

| | |
|--|-------------|
| Days on ECMO | 7 |
| Vent Mode | AC |
| Vent FiO ₂ (%), ECMO FiO ₂ | 50, 50 |
| Peep | 8 |
| PIP (mm H ₂ O) | 22 |
| Mean airway pressure (cm H ₂ O) | 12 |
| Arterial pH/PaCO ₂ /PaO ₂ | 7.38/47/160 |

| | |
|--|------------|
| Days on ECMO | 10 |
| Vent Mode | AC |
| Vent FiO ₂ (%), ECMO FiO ₂ | 50, 50 |
| Peep | 8 |
| PIP (mm H ₂ O) | 21 |
| Mean airway pressure (cm H ₂ O) | 9 |
| Arterial pH/PaCO ₂ /PaO ₂ | 7.46/37/86 |