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# Overcoming the Challenges of Prolonged Ventilation and Critical Illness Polyneuropathy in Severe ARDS Patients Due to Extensive Viral Pneumonia: A Case Report

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## ABSTRACT

ARDS is a life-threatening condition requiring intensive care unit monitoring. We present a 46-year-old male patient with ARDS and its complications, ventilator-associated pneumonia (VAP) and critcal illness polyneuropathy after extensive bilateral viral pneumonia. The objective of this case report is to understand better and manage the complications of ARDS. This study addresses ARDS and its complications, providing a comprehensive clinical understanding. It details a 46-year-old male patient's case, treatment strategies, complications, weaning processes, and rehabilitation and emphasises the importance of physical therapy. This case report discusses the successful management and weaning of a patient with extensive viral pneumonia complicated with acute respiratory distress syndrome (ARDS), impending organ dysfunction, and critical illness polyneuropathy. The patient had a medical history of diabetes, hypertension, and dyslipidemia. Initial treatment involved oxygen therapy, nebulization, and empirical antiviral for seasonal flu. However, the patient required invasive ventilation with sedation and muscle relaxants following the ARDSNET protocol due to worsening respiratory status and extensive lung infiltrates. Secondary bacterial infections were also identified and treated accordingly. The weaning process was initiated but was complicated by re-intubation and the development of critical illness polyneuropathy. After successful weaning and recovery from ARDS and associated lung infections, physical therapy was provided for polyneuropathy regularly to overcome the manifest weakness all over the body muscles, including respiratory muscle weakness. The case report highlights the successful management of a patient with viral pneumonia, ARDS, and critical illness polyneuropathy, highlighting the importance of comprehensive treatment and physical therapy.

## INTRODUCTION

Viral pneumonia is a significant global health issue that can lead to serious complications such as ARDS and organ dysfunction, which usually necessitates invasive mechanical ventilation. Prolonged mechanical ventilation can also result in critical illness polyneuropathy, which causes muscle weakness and wasting along with the corticosteroids usually prescribed in such cases. This case report highlights a patient's successful management and weaning with these complex complications. The definition of ARDS was given in 2011 by The European Society of Intensive Care Medicine, supported by The American Thoracic Society and the Society of Critical Care Medicine, and it is known as the Berlin Definition. According to it, ARDS is characterised by the time frame of one week from worsening of the chronic condition, radiographic changes, lung oedema without left heart failure, and a PaO2 / FIO2 ratio of 5 cm2 H20 with continuous positive airway pressure (CPAP), with the presence of bilateral shadows and lung oedema (Huppert *et al.*, 2019). By definition, three ARDS categories have been identified. Subtypes are based on the degree of hypoxemia: mild (PaO2 / FIO2 < 300 mm Hg), moderate (PaO2 / FIO2 < 200 mm Hg), and severe (PaO2 / FIO2 <100 mm Hg) (Ferguson *et al.*, 2012; Milacic *et al.*, 2018). ARDS implies diffuse alveolar damage (DAD) and injury to the lung's capillary endothelium (Barbeta *et al.*, 2023). Injuries of the capillary endothelium and alveolar epithelium lead to impaired fluid transport through alveoli and fluid accumulation rich in proteins within the alveoli, eventually leading to diffuse alveolar injury, with the release of proinflammatory cytokines, such as Tumor Necrosis Factor (TNF), IL-1 and IL-6 (Rittayamai & Brochard, 2015). Neutrophils are activated, releasing toxic mediators, proteases and free radicals (Milacic *et al.*, 2018). Abnormalities of transcription factors, including NF-cap B, needed for gene transcription for many pro-inflammatory mediators, are present in ARDS (Forel *et al.*, 2012). Endothelin-1, angiotensin-2 and phospholipase A-2 also significantly increase vascular permeability (Montealegre-Gómez *et al.*, 2021).

ARDS impairs epithelial integrity, leading to alveolar leakage, altered fluid and ion balance, and alveolar oedema (Lucas *et al.*, 2022). Damage to type II epithelial cells reduces surfactant generation, causing known surfactant deficits(Agudelo *et al.*, 2020). Breaching the epithelial barrier can increase the risk of septic shock in individuals with bacterial pneumonia (Eisenhut & Shin, 2020). Excessive alveolar epithelial injury results in fibrosis, as the inability to regenerate leads to the etiology of fibrosis. Therefore, maintaining a physiological balance is crucial for preventing ARDS(Michalski *et al.*, 2022). The fibrosis process is stimulated by interleukin (IL) -1. Progression to fibrosis can be predicted by the increased

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**Table 1:** Pulmonary and Systemic Diseases Associated with ARDS

| S. No | Pulmonary diseases or conditions | Systemic Diseases |
|---|---|---|
| 1 | Pneumonia | Sepsis |
| 2 | Aspiration of Gastric Contents | Difficult Trauma |
| 3 | Lung Contusion | Multiple Fractures |
| 4 | Inhalation Lung Injury | Head Injuries |
| 5 | Drowning | Burns |
| 6 | Overdose of Narcotics | Multiple Transfusion |
| 7 | Bypass | Pancreatitis |
| 8 | | Post Cardiopulmonary |

values of procollagen peptide III (PCP-III) in the sample obtained by BAL. The diseases most commonly associated with ARDS can be both lung and systemic (Table 1). Mycobacteria pneumoniae, although associated with unilateral pneumonia, can also lead to changes that correspond to acute respiratory distress syndrome (6, 7).

The main symptoms include breathing difficulties (dyspnoea), rapid breathing (tachypnoea), extremely deep breathing (hyperventilation) and reduced oxygen levels in the circulation (hypoxemia) (Kallet *et al.*, 2022). Typically, ARDS manifests within a timeframe of 24 to 48 hours following the onset of an underlying disease or the worsening of an existing condition (Henderson *et al.*, 2017). A distinctive hallmark of ARDS is the resistance of hypoxemia to conventional oxygen therapy, necessitating the implementation of mechanical ventilation (Henderson *et al.*, 2017). Importantly, one of the notable complications associated with mechanical ventilation is the heightened risk of bacterial pneumonia, often triggered by gram-negative bacteria such as Pseudomonas aeruginosa, Acinetobacter baumannii, and Stenotrophomonas maltophilia, which collectively account for 40% of cases. Enterobacteriaceae contribute to 29% of cases, while methicillin-resistant Staphylococcus aureus (MRSA) is implicated in 21% of instances (Trouillet *et al.*, 1998). White blood cell counts are frequently elevated in laboratory tests, which may indicate the presence of sepsis or pneumonia.

In contrast, an assessment of the acid-base balance may show a drop in pH, with values below 7.4 indicating respiratory acidosis and hypoxia (Berend & Duits, 2019). Pulmonary oedema is frequently detected in ARDS as well by radiographic examinations like chest X-rays (CXR) (Gosangi *et al.*, 2022). However, Computed tomography (CT) scans may be necessary in some circumstances for a more thorough analysis. An ultrasound of the heart is performed (echocardiography) to rule out any cardiac-related problems. Pulmonary hypertension can be ruled out with the help of arterial pulmonary catheter monitoring. Bronchoscopy may also be taken into account when it is clinically necessary for the assessment of lung conditions (Nowroozpoor *et al.*, 2019).

The management of ARDS includes dealing with underlying causes, enhancing oxygenation, offering supportive care, and avoiding complications. The management of fluid balance, positioning of patients, administration of medications, provision of nutrition, provision of supportive care, monitoring of hemodynamic parameters, management of pain control, prevention of complications, treatment of underlying conditions and consideration of Extracorporeal Membrane Oxygenation (ECMO) in severe cases are important components (Banavasi *et al.*, 2021; Peck & Hibbert, 2019).

This study aims to fill a research gap in the field of ARDS and its complications. It provides a comprehensive clinical understanding of ARDS, its complications, and the challenges of managing these conditions in patients. The case report presents a detailed case of a 46-year-old male patient with ARDS, discussing treatment strategies, identifying and managing complications, weaning processes, rehabilitation, patient profile, and overall management. The study also highlights the importance of physical therapy and rehabilitation in addressing complications and regaining muscle strength.

## Case Presentation

A 49-year-old male was admitted to Burjeel Farha Hospital due to several symptoms, including shortness of breath, dry cough, weakness, fatigue and an elevated body temperature. The symptoms had been worsening over two days, after which he was admitted to the general ward. The patient's medical history was taken primarily. The patient had a medical history of diabetes mellitus type 2, which was being managed with metformin intake, as well as hypertension and dyslipidemia, for which the patient was on medication. During treatment, a screening test for influenza A and B was performed in addition to various other routine lab tests, including CRP, abnormal liver function parameters and inflammatory markers. Chest X-ray was performed as well, and bilateral infiltrates and haziness were noticed.

On the first day of admission to the ward, the patient was conscious and mobile but presented with significant respiratory distress (Dyspnoea), tachycardia and a high fever (temperature >38.5 °C). The physical examination revealed auscultatory fine crackles at the basal parts of the lung.

## Laboratory and Radiological Findings

In the obtained laboratory tests, the increase in inflammatory parameters with elevated values of D

dimer and liver function parameters were verified (WBC >12.5, Hgb 12 gm, PLT 331, CRP 120, AST 142, ALT 180, GGT 227, LDH 751, CK 68, K 3.8, Na 137, D dimer >1.5). The performed ABG showed a global respiratory insufficiency, metabolic compensated (p H 7.43, p $CO_2$ 48, p $O_2$ 5.1, $HCO_3$ 28.4, BE 5.3, with $SO_2$ 84%).

In the chest x-ray (CXR) conducted at the urgent care (UC), the report noted bilateral shading in the lower and middle lung fields, as illustrated in Fig 1. Additionally, the lung computed tomography (CT) scan described consolidation of the lung tissue, originating from the lung's apex and extending through the middle and dorsal basal segments, accompanied by typical indications of pulmonary oedema, as depicted in Fig 2.

**Table 2:** Values of inflammatory parameters before treatment

| Parameter | Value | Normal Range |
|---|---|---|
| White Blood Cell Count | >12.5 | 4.5 - 11 x 10^9/L |
| Hemoglobin (Hgb) | 12 gm | 13.8 - 17.2 g/dL |
| Platelet Count (PLT) | 331 | 150 - 450 x 10^9/L |
| C-reactive protein (CRP) | 120 | < 10 mg/L |
| Aspartate Aminotransferase (AST) | 142 | 8 - 48 U/L |
| Alanine Aminotransferase (ALT) | 180 | 7 - 55 U/L |
| Gamma-glutamyl transferase (GGT) | 227 | 9 - 48 U/L |
| Lactate Dehydrogenase (LDH) | 751 | 140 - 280 U/L |
| Creatine Kinase (CK) | 68 | 55 - 170 U/L |
| Potassium (K) | 3.8 | 3.5 - 5.0 mmol/L |
| Sodium (Na) | 137 | 135 - 145 mmol/L |
| D-dimer | >1.5 | The reference range may vary |
| Arterial Blood Gas (ABG) | | |
| - pH | 7.43 | 7.35 - 7.45 |
| - $pCO_2$ | 48 | 35 - 45 mm Hg |
| - pO2 | 5.1 | 75 - 100 mm Hg |
| - $HCO_3$ | 28.4 | 22 - 28 mmol/L |
| - Base Excess (BE) | 5.3 | -2 to +2 mmol/L |
| - Oxygen Saturation ($SaO_2$) | 84% | 95 - 100% |
| - Lactates | 2.2 | 0.5 - 2.2 mmol/L |

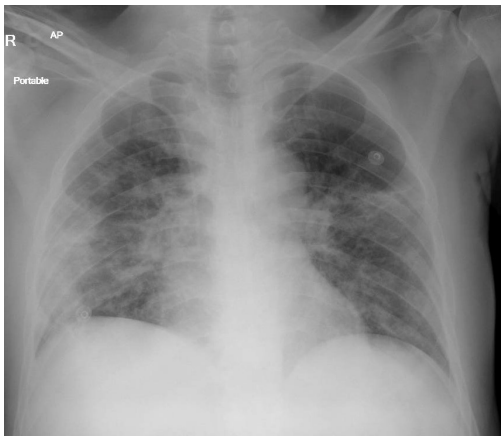


**Figure 1:** CXR showing patchy areas of consolidation noted in both lung fields in the mid and lower zones predominantly

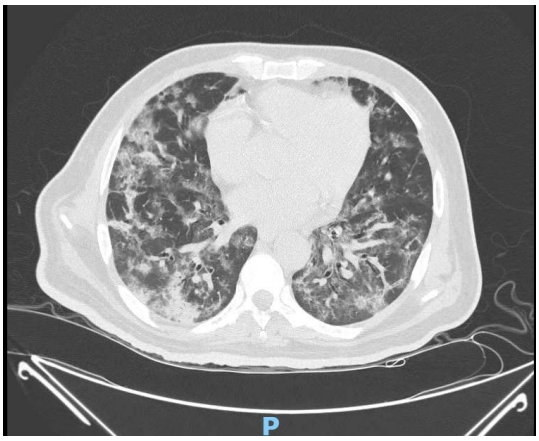


**Figure 2:** CT chest showing extensive areas of peripherally distributed foci of consolidation and ground glass opacities in both lungs.

**Treatment Administration**

Hospital treatment was initiated in the form of oxygen therapy, nebulisation, empirical antibiotics and antipyretics. Soon after the admission to the ward, the patient's condition worsened. Central cyanosis occurred, and repeated ABG showed: p H 7.51, p $CO_2$ 5.3, p $O_2$ 3.8, $HCO_3$ 30.4, BE 8.2, $SaO_2$ 63.5, lactates 2.2. Due to the need for monitoring of vital functions and the possibility of mechanical ventilation, the patient was transferred to the Intensive Care Unit.

Non-invasive ventilation (NIV) was initially used for the first two days after the patient was admitted to the intensive

**Table 3:** Repeated ABG results

| Parameter | Value | Normal Range |
|---|---|---|
| - pH | 7.51 | 7.35 - 7.45 |
| - pCO2 | 5.3 | 35 - 45 mm Hg |
| - pO2 | 3.8 | 75 - 100 mm Hg |
| - HCO3 | 30.4 | 22 - 28 mmol/L |
| - Base Excess (BE) | 8.2 | -2 to +2 mmol/L |
| - Oxygen Saturation ($SaO_2$) | 63.5 | 95 - 100% |
| - Lactates | 2.2 | 0.5 - 2.2 mmol/L |

care unit (ICU). The patient's oxygen saturation remained appropriate during this time, and the breathing effort was controllable. However, the patient's health appeared to deteriorate about 36 hours into the NIV treatment. The hypoxic index showed low blood oxygen levels, while $SAO_2$ pulse oximetry measurements fell below 85%. Recognising the patient's intolerance to NIV and taking into account the diagnostic criteria for ARDS, which were based on the patient's low hypoxia index and the presence of bilateral lung infiltrates, the decision was made to begin invasive mechanical ventilation. This procedure followed the ARDSNET protocol and included the administration of sedatives and muscle relaxants. The ARDSNET protocol builds a strong emphasis on using protective lung methods and modifying positive end-expiratory pressure (PEEP) levels according to the oxygenation level of the patient. This strategy aims to enhance ARDS patient outcomes and ventilator management efficiency.

The patient was intubated on the third day of their stay in the ICU, linked to mechanical ventilation in assist-control (A/C) mode, and their tidal volume (Vt) and a fraction of inspired oxygen ($FiO_2$) were set to 20 millilitres per kilogram (f20) and 0.7, respectively. The ICU staff attentively observed the patient's breathing pattern throughout the day. According to the patient's evolving state, the mechanical ventilation mode was changed several times, switching between the Assist-Control (A/C), BiLevel, and spontaneous modes as judged required.

To treat the patient's condition, a number of medications were started, including corticosteroids, bronchodilators, oseltamivir (an antiviral drug), a combination of intravenous antibiotics to treat potential infections, and prophylactic anticoagulants to prevent blood clots. The diagnosis was made as viral pneumonia brought on by an unidentified virus despite the fact that initial blood and sputum cultures did not indicate bacterial growth, and two COVID-19 reverse transcription polymerase chain reaction (RT-PCR) tests yielded negative results. This conclusion was reached because influenza A and B screening tests likewise produced negative findings.

Laboratory results revealed significantly raised levels of lipase, amylase, and liver enzymes, indicating potential impeding organ dysfunction. Inflammatory markers were also discovered to be increased, indicating a lively inflammatory response. The patient was completely sedated while on AC mode mechanical ventilation between the third and seventh days in the ICU, with help from the muscle relaxants cisatracurium and midazolam. Every 24 hours, a sedation vacation strategy was adopted, allowing patients brief intervals of reduced sedation. On day ten, on the tenth day, the patient developed a fever and coloured sputum during suction, indicating secondary bacterial infections after over a week of invasive ventilation. The condition was diagnosed as ventilator-associated pneumonia (VAP), requiring an increase in antibiotic therapy. The patient's weaning process began with a sedation vacation and reduced ventilatory support, transitioning to spontaneous pressure support ventilation.

Further evaluations showed that the patient had general weakness, which was characterised by wasting muscles, areflexia (lack of reflexes), and deteriorating muscle strength.

These results suggested critical illness polyneuropathy. This diagnosis was confirmed after a neurology referral using nerve conduction and electromyography studies. The results of the NCS are provided in Tables 4, 5 and 6, and the graphical representation can be seen in Figures 3, 4 and 5.

A Sensory Nerve Conduction Study (NCS) has revealed that the median nerve on the right wrist has a latency of 35.3 ms, while the ulnar nerve has a latency of 36.2 ms. The peroneal nerve on the left ankle has a latency of ***, while the tibial nerve on the left side of the ankle has a latency of 65.4 ms. These latency measurements are crucial for diagnosing and evaluating sensory nerve function, providing information about the speed at which sensory

**Table 4:** Nerve Conduction Study (NCS) Data

| Nerve and Location | Latency 1 (ms) | Latency 2 (ms) | Amplitude | Segment Distance (mm) | Interval (ms) | NCV (m/s) |
|---|---|---|---|---|---|---|
| Median Right Wrist | 3.5 | 4.0 | 25.7 uV | Wrist | 150 | 43.1 |
| Ulnar Left Wrist | Not specified | 2.7 | 9.6 uV | Wrist | 130 | 48.5 |
| Ulnar Right Wrist | Not specified | 2.7 | 48.9 uV | Wrist | 130 | 48.9 |

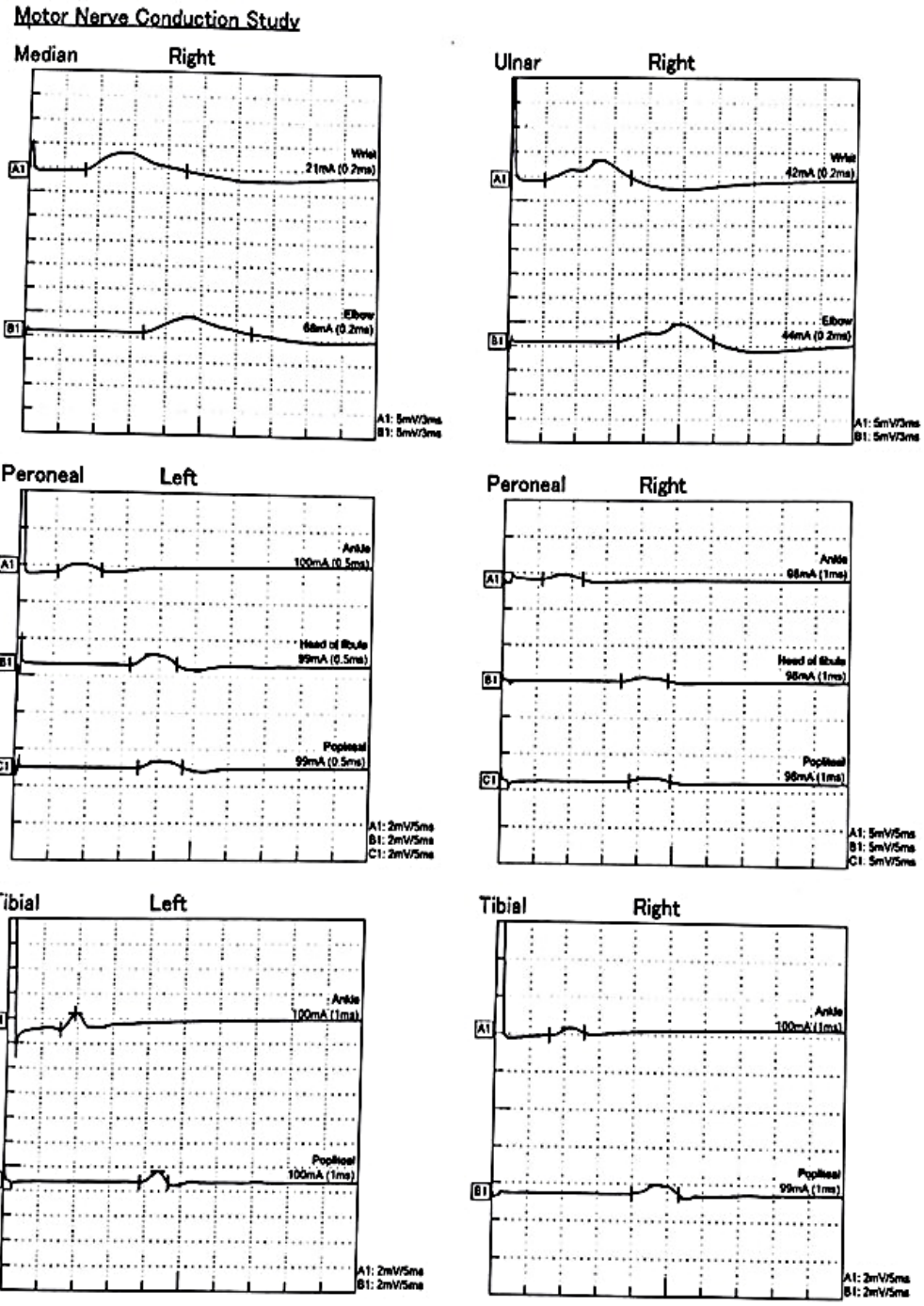


**Figure 3:** Motor nerve conduction Study graphical representation

**Table 5:** Sensory nerve conduction study results

| Site | Lat. 1 (ms) | Lat. 2 (ms) | Amplitude | Segment Dist (mm) | Interval (ms) | NCV (m/s) |
|---|---|---|---|---|---|---|
| Median Right Wrist | 3.5 | 4.0 | 25.7uV | Wrist | 150 | 43.1 |
| Ulnar Left Wrist | | 2.7 | 9.6uV | Wrist | 130 | 48.5 |
| Ulnar Right Wrist | | 2.7 | 48.9uV | Wrist | 130 | 48.9 |
| Sural Left | | | | | | |
| Sural Right | | | | | | |
| Superficial Peroneal Left (Mid. branch) | | | | | | |
| Superficial Peroneal Right (Mid. branch) | | | | | | |

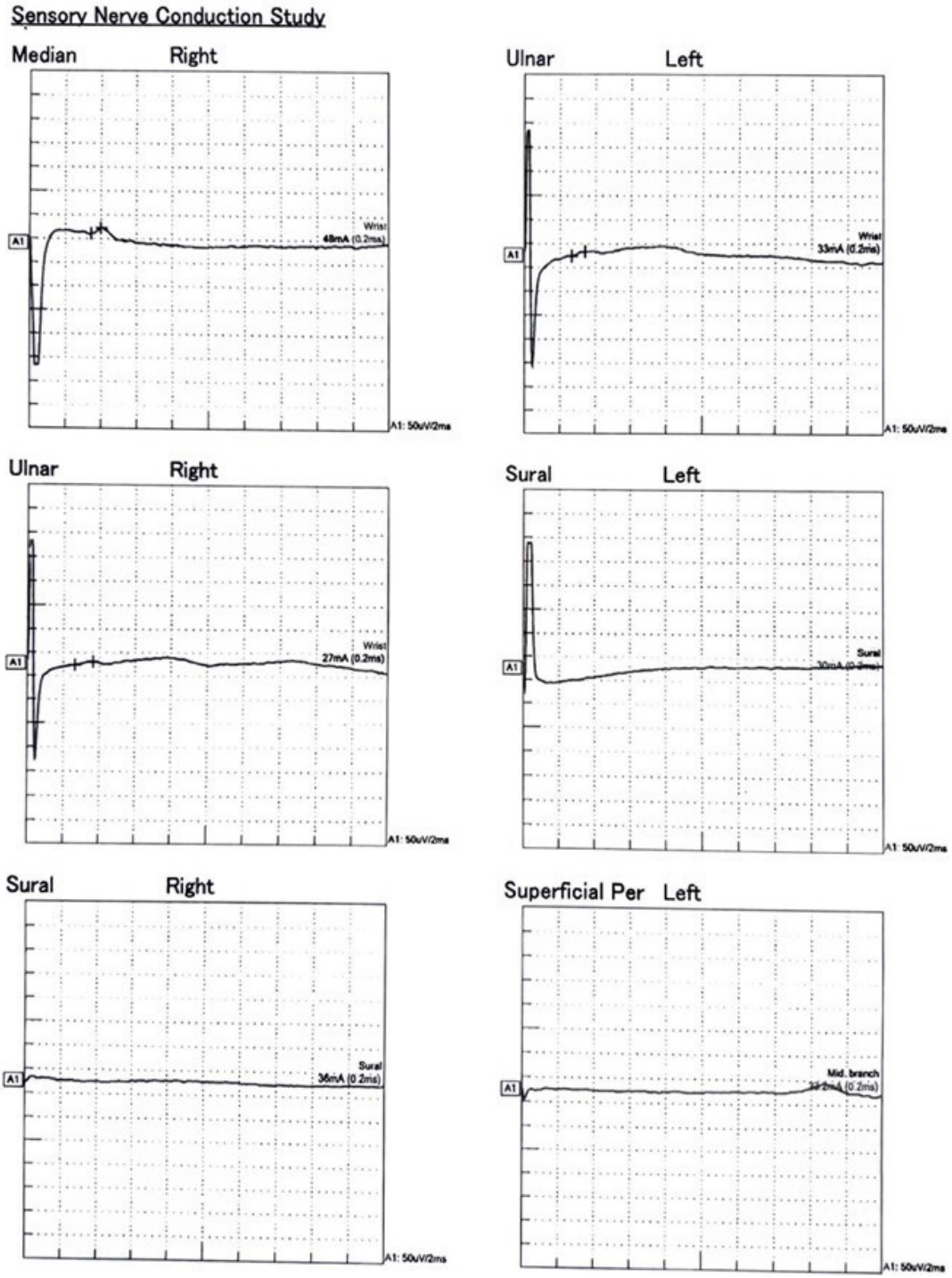


**Figure 4:** Sensory nerve conduction graphical representation

**Table 6:** Sensory Nerve Conduction Study Latency Measurements

| Nerve | Side | Site | F-Lat | F-M Lat |
|---|---|---|---|---|
| Median | Right | Wrist | 35.3ms | 35.3ms |
| Ulnar | Right | Wrist | 36.2ms | 36.2ms |
| Peroneal | Left | Ankle | *** | *** |
| Peroneal | Right | Ankle | **** | *** |
| Tibial | Left | Ankle | 65.4ms | 65.4ms |
| Tibial | Right | Ankle | 64.7ms | 64.7ms |

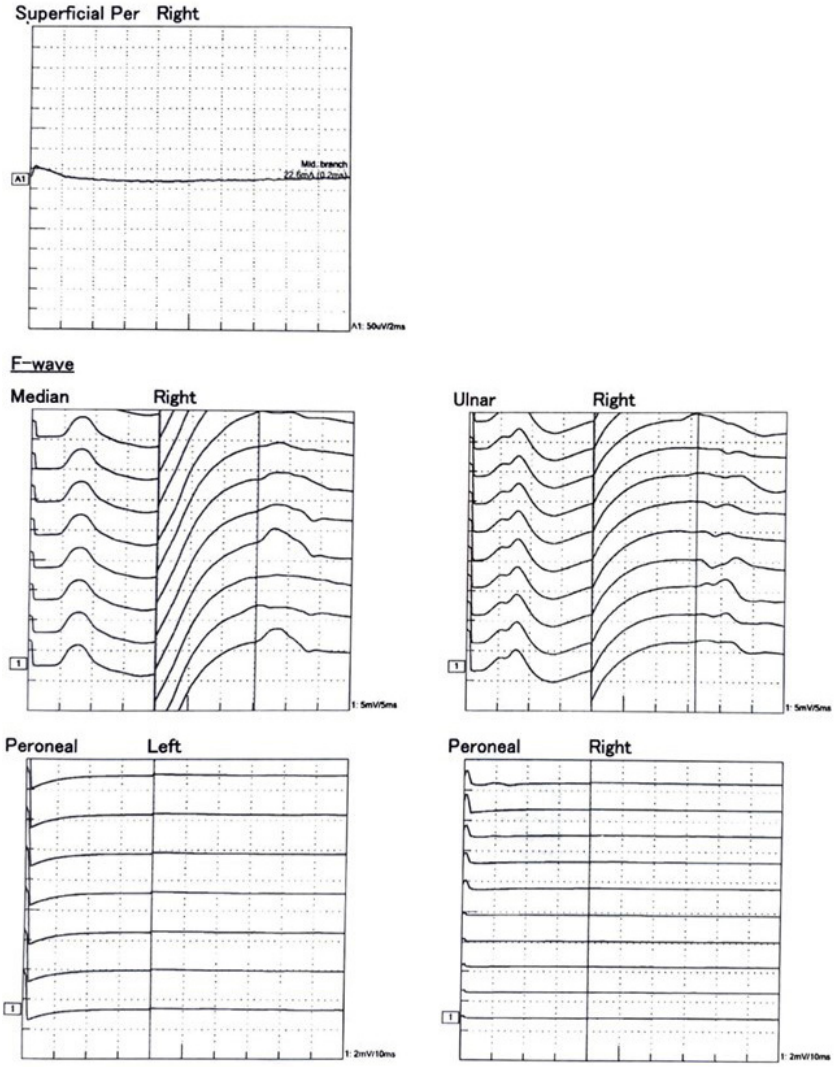


**Figure 5:** F-Wave representation

signals are conducted along these nerves.

After a failed weaning trial, the patient successfully weaned from mechanical ventilation after 22 days. Laboratory markers improved after recovery from ARDS and lung infections. Physical therapy continued to address polyneuropathy, guided by neurological assessments and nerve conduction and electromyography studies.

## RESULTS AND DISCUSSIONS

The case report describes the successful management and weaning of a ventilated patient with severe ARDS, viral pneumonia, VAP, and critical illness polyneuropathy.

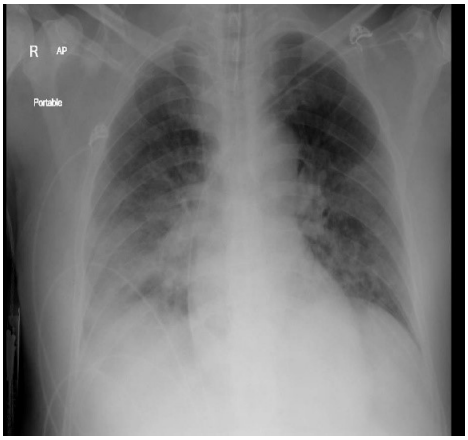


**Figure 6:** CXR showing bilateral airspace opacities noted, more on right side. Compared to previous image, some improvement noted.

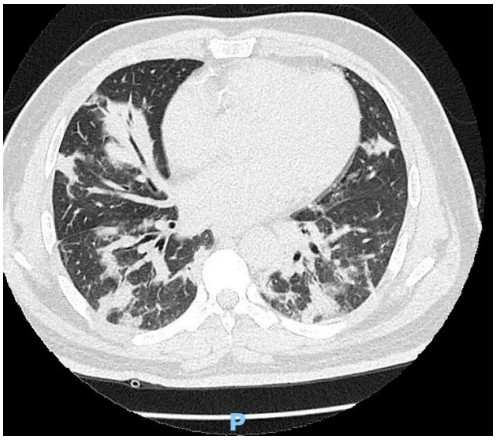

**Figure 7:** CT chest showing areas of consolidation bilaterally mainly rt lung lobes.

Despite a robust inflammatory response, the patient's oxygenation status improved over time, indicating better lung function and oxygenation. The patient's organ dysfunction parameters fluctuated throughout the treatment period, suggesting potential multi-organ involvement. The case highlights the importance of respiratory compensation and managing complex cases.

The patient was successfully weaned from mechanical ventilation due to improved lung function and oxygenation, effective complication management, and early physiotherapy, as seen in Figs 6 and 7. The case highlights the importance of ongoing rehabilitation and physiotherapy in critically ill patients, as polyneuropathy is a common complication, and ongoing rehabilitation is necessary to restore muscle strength and function.

This case report highlights the complexity of managing severe viral pneumonia caused by ARDS. The patient's success was achieved through evidence-based protocols, close monitoring of inflammatory markers, and organ dysfunction parameters. The patient had a combined infection with Corynebacterium amycolatum spp heavy growth and enterococcus spp, resulting in increased inflammatory parameters. The patient was treated with antibiotic linezolid plus gentamicin due to the bacterium's resistance to standard antibiograms. After completing antibiotics, the patient was transferred to the ward for further monitoring. Oral antibiotic therapy continued for a week, along with physical therapy sessions and supportive therapy. The patient was discharged in good condition and hemodynamically stable for further ambulatory monitoring.

Patients with ARDS frequently need treatment in intensive care units. There is no particular treatment. The main focus of the treatment is support. A significant part is played by mechanical ventilation and the proper usage of oxygen (Bos *et al.*, 2018). Knowing that lung transduction with positive pressure can aggravate the current illness is a crucial development in therapy(Bos *et al.*, 2018). This mindset has helped to design a new approach to treating mechanical ventilation that combines positive end-expiratory pressure (PEEP) and small breathing volumes (6ml/kg) (Candan *et al.*, 2020). This case report details the medical history, diagnosis, treatment, and management of a 49-year-old male patient with diabetes mellitus type 2, hypertension, and dyslipidemia. The patient presented with respiratory distress, tachycardia, and high fever. However, his condition worsened rapidly, leading to central cyanosis and worsening respiratory parameters. The patient was diagnosed with viral pneumonia due to an unknown virus, and after over a week of invasive ventilation, he developed VAP. The patient underwent a weaning process from mechanical ventilation, with periods of sedation and a gradual reduction in ventilatory support. Physical therapy was initiated to address critical illness polyneuropathy. After 22 days of mechanical ventilation and successful management of complications, the patient was successfully weaned from the ventilator. The case highlights the importance of ongoing rehabilitation and physiotherapy in critically ill patients, as polyneuropathy is a common complication, and ongoing rehabilitation is necessary to restore muscle strength and function. The case report emphasises the complexity of managing severe viral pneumonia complicated by ARDS, emphasising the importance of evidence-based protocols, close monitoring of inflammatory markers, and the role of physiotherapy in achieving a successful outcome. Appropriate oxygen therapy in other medical conditions can also prevent the secondary development of ARDS. Determan and associates performed a controlled randomised study with 150 patients that compared the use of small breathing volumes versus standard patients with critical illness and pointed to reduced production of inflammatory cytokines in patients treated with low air volume (Determann *et al.*, 2010). Then, there are also adequate nutrition and hydration. Antibiotic therapy is mandatory if accompanied by secondary bacterial infections or ventilator-associated pneumonia (Papazian *et al.*, 2020). Corticosteroids are occasionally administered to resolve the primary condition; otherwise, their use is controversial. Correction of acid-base status and other therapies (diuretics, analgesics, anxiolytics, antihypertensives) is regulated as needed. Suppose the recovery does not occur in the first seven days. In that case, there is a greater likelihood that progressive lung injury will develop, followed by inflammation of the interstitium and later fibrosis. Applying early interventions, maintaining adherence to evidence-based protocols, and closely observing inflammatory markers and organ dysfunction parameters prove vital for achieving a positive outcome (Papazian *et al.*, 2020).

According to the International Nosocomial Infection Control Consortium (INICC), the frequency of VAP is 13.6 versus days spent on ventilation support. However, the incidence varies depending on the hospital groups and hospital conditions, so the frequency of VAP ranges between 13-51 and 1000 days spent on ventilation (Rosenthal, 2016). Patients who survive the ARDS episode usually have lasting effects that are reflected in reduced HRQOL (health-related quality of life) (Morgan, 2021). To enhance our overall comprehension of ideal treatment strategies as well as long-term outcomes in similar cases, further research endeavours are necessary. Ventilator-associated pneumonia (VAP) is a costly and prevalent infection in ICUs, causing significant morbidity and mortality. A study examined 36 cases over a year, and findings showed bacterial growth, with Staphylococcus aureus being the most common pathogen. Half of the isolated bacteria showed multi-drug resistance. Treatment options for VAP include Imipenem, amikacin, linezolid, vancomycin, and levofloxacin. The study highlights the need for up-to-date knowledge of bacterial causes and antibiotic susceptibility patterns when developing empirical treatment regimens (Abd-Elmonsef *et al.*, 2018). Extracorporeal Membrane Oxygenation (ECMO) can be a life-saving intervention when conventional treatments fail. A 50-year-old female with severe ARDS

developed ECMO therapy after 14 days, resolving her symptoms and successfully weaning from the ventilator. ECMO provides lung support, preserves hemodynamic stability, and is crucial for managing severe ARDS due to swine flu when combined with protective lung ventilation and timely weaning (Taneja *et al*., 2018). Another study presents two Chinese patients with pre-existing non-immune diseases who contracted severe H7N9 pneumonia and neurological complications. Both exhibited muscle weakness in their limbs, prolonging ventilator-weaning periods. Despite the clinical diagnosis, distinguishing between intensive care unit-acquired weakness and Guillain-Barré syndrome (GBS) was challenging due to a lack of lumbar punctures and muscle/nerve biopsies. Gradual improvement in neurological conditions was observed after extensive treatment (Jin & Tang, 2018).

Studies emphasise the importance of staying updated on bacterial profiles and antibiotic resistance patterns for effective VAP management. They also highlight the potential of ECMO as a life-saving intervention in severe respiratory distress cases. The case report demonstrates the successful management of a complex case involving polyneuropathy and VAP-related ARDS, underlining the need for a comprehensive approach, including infection control measures, reduction in mechanical ventilation and timely physical therapy.

## CONCLUSION

The excellent management of a 46-year-old male patient with viral pneumonia, ARDS, and critical illness polyneuropathy is discussed in this case report. It emphasises the value of comprehensive care that includes nebulisation, oxygen therapy, and antiviral therapy. It also emphasises the importance of promptly recognising and treating problems, like following bacterial infections. The report also emphasises the vital role that physical therapy plays in recovery, particularly when treating polyneuropathy associated with critical disease.

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