

**ACUTE RESPIRATORY DISTRESS SYNDROME COMPLICATING INFLUENZA-
ASSOCIATED COMMUNITY-ACQUIRED PNEUMONIA IN A PATIENT WITH
RHEUMATOID ARTHRITIS AND TYPE 2 DIABETES MELLITUS: A CASE
REPORT**

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ABSTRACT

Objective: Acute Respiratory Distress Syndrome is a life threatening clinical syndrome characterized by diffuse inflammatory lung injury resulting in severe hypoxemia and respiratory failure. Community acquired pneumonia (CAP) is one of the common precipitating causes of ARDS. Early recognition and prompt multidisciplinary management are essential for improving patient outcomes.

Case Presentation: A 62-year old female with a history of rheumatoid arthritis and uncontrolled type 2 diabetes mellitus presented with shortness of breath for five days. On admission, she developed severe respiratory distress requiring non-invasive ventilation (NIV) and intensive care management. Laboratory investigations demonstrated leukocytosis, elevated inflammatory markers, raised brain natriuretic peptide (BNP), elevated inflammatory markers, raised rheumatoid markers, and electrolyte abnormalities. Computed tomography (CT) of the chest revealed bilateral diffuse ground-glass opacities with pleural effusion and features suggestive of pulmonary edema. The patient was treated with oxygen support, vasopressors, broad spectrum antimicrobial therapy, oseltamivir, corticosteroids, bronchodilators, diuretics, antiplatelet agents, anticoagulants, insulin therapy, and supportive care. Her clinical condition gradually improved, and she was discharged in a hemodynamically stable condition with appropriate medications and follow-up advice.

Conclusion: This case highlights the complexity of managing acute respiratory failure in a patient with multiple comorbidities. Early intensive care support, prompt antimicrobial therapy optimization of cardiovascular status, and multidisciplinary pharmaceutical care contributed to clinical improvement.

Keywords: Acute Respiratory Distress Syndrome, Community Acquired Pneumonia, Rheumatoid Arthritis, Type 2 Diabetes Mellitus, Non-invasive ventilation, Pharmaceutical care.

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INTRODUCTION

Acute Respiratory Distress Syndrome (ARDS) is a severe form of acute inflammatory lung injury characterised by diffuse alveolar damage, increased pulmonary vascular permeability, refractory hypoxemia, and bilateral pulmonary infiltrates. It remains one of the leading causes of respiratory failure requiring admission to intensive care (ICUs). The syndrome is associated with significant morbidity and mortality despite advances in critical care management.

Community-acquired pneumonia (CAP) is among the most common precipitating factors for ARDS. Other causes include sepsis, aspiration, trauma, pancreatitis, massive transfusion, inhalational injuries, and drug-induced lung injury. These conditions trigger a systemic inflammatory response that damages the alveolar-capillary membrane, leading to impaired gas exchange and respiratory failure.

The Berlin definition classifies ARDS based on the timing of onset, presence of bilateral pulmonary infiltrates, degree of hypoxemia assessed using the PaO₂ ratio, and exclusion of respiratory failure primarily caused by cardiac failure or fluid overload.

Patients with rheumatoid arthritis and diabetes mellitus are at increased risk of severe pulmonary infections because of

immune dysregulation, chronic inflammation, and frequent exposure to immunosuppressive therapy. The coexistence of cardiovascular dysfunction, pulmonary edema, and severe infection further complicates diagnosis and management, making careful clinical evaluation and multidisciplinary treatment essential.

This report describes the clinical presentation, investigations, pharmacological management, and outcome of a patient admitted with severe respiratory failure associated with community-acquired pneumonia and multiple comorbidities. It also emphasises the role of comprehensive pharmaceutical care in optimizing antimicrobial therapy, monitoring adverse drug reactions, managing drug interactions, improving medication safety, and enhancing patient outcomes.

CASE PRESENTATION

Patient Information

A 62-year-old female was presented to the emergency department with shortness of breath for five days. She had initially been admitted to a local hospital, where she received conservative management including broad spectrum antibiotics and non-invasive ventilatory support. She also reported recurrent episodes of similar respiratory symptoms over the preceding seven months.

Her past medical history was significant for:

- Rheumatoid arthritis
- Uncontrolled Type 2 Diabetes Mellitus

There was no documented history of smoking, alcohol consumption or known drug allergies in the available records.

The patients appetite, bowel, bladder habits were normal. Sleep was disturbed because of breathlessness.

Clinical Examination

On admission, the patient was in significant respiratory distress and required immediate oxygen supplementation.

Because of worsening hypoxemia, she was initiated on non-invasive ventilation (NIV/BiPAP) with:

- FiO₂:40%
- Positive End Expiratory Pressure (PEEP):6cm H₂O

She also developed hypotension requiring vasopressor support with noradrenaline and vasopressin.

Table I: Vital Signs and Systemic Examination on Admission

S.No	Vitals	Observed Value
1	Heart rate	100 beats/min
2	Blood pressure	107/52 mmHg
3	Respiratory rate	30 bpm
4	SpO ₂	98% on FiO ₂ 40%
5	Temperature	37°C
6	Cardiovascular system	S1 and S2 heard normally
7	Central Nervous system	No focal neurological deficit
8	Respiratory system	Bilateral air entry present

Clinical Findings and Diagnostic Assessment Laboratory Investigations

Initial laboratory investigations demonstrated evidence of systemic

inflammation, anemia, electrolyte abnormalities, autoimmune disease activity, and cardiac involvement.

Table II: Significant Laboratory Abnormalities

S.NO	PARAMETER	OBSERVED VALUE	REFERENCE VALUE
1	WBC	11300 cells/cu.mm (↑)	4400-11000 cells/cu.mm
2	RBC	3.78 million/cu.mm (↓)	3.80-5.50 million/cu.mm
3	Haemoglobin	10.5 g/dl (↓)	12.0-15.0 g/dl

S.NO	PARAMETER	OBSERVED VALUE	REFERENCE VALUE
4	Haematocrit	32.6 % (↓)	34.0-48.0 %
5//	RDW	16.9 % (↑)	11.6-14.0 %
6	Neutrophils	84.0 % (↑)	40.0-75.0 %
7	Lymphocytes	10.0 % (↓)	20.0-45.0 %
8	Serum Sodium	132.0 mmol/L (↓)	134.0-145.0 mmol/L
9	Brain Natriuretic Peptide	35,000pg/ml (↑)	<100.00 pg/ml
10	HbA1C	7.3 % (↑)	4.0-6.5 %
11	Total Protein	5.5 g/dl (↓)	6.4-8.3 g/dl
12	Serum Albumin	3.10 g/dl (↓)	3.50-5.00 g/dl
13	Blood Urea	52.20mg/dl(↑)	15.00-45.00mg/dl
14	Anti-Cyclic Citrullinated Peptide (Anti-CCP)	397 U/ml (↑)	<=17.0 U/ml
15	Rheumatoid factor	38.5 IU/ml (↑)	<14 U/ml
16	Troponin-I	119.00 ng/ml (↑)	<19.00 ng/ml
17	CRP	19.86 mg/dl (↑)	<5.00 mg/dl

Table III: Arterial Blood Gas Analysis

Parameter	Observed value	Reference range
BLOOD GAS VALUES		
pH	7.317(↓)	7.380-7.440
pCO ₂	485mmhg	35.0-48.0
pO ₂	14.6mmhg	80.0-100
OXIMETRY VALUES		
Hb	12.2 g/dl (↓)	12.00-17.00 g/dl
HCT	37.4% (↓)	36.00-54.00 %
sO ₂	98.8%	95.0-99.0
ELECTROLYTE AND METABOLITE VALUES		
K ⁺	3.6mmol/L	3.5-5.0mmol/L
Na ⁺	13.3 mmol/L (↓)	135.00-145.00 mmol/L
Ca ⁺	0.93 mmol/L (↓)	1.15-1.29 mmol/L
Cl ⁻	10.4mmol/L (↓)	98.00-106.00 mmol/L
CALCULATED VALUES (Others)		
ABE	3.6 mmol/L (↓)	2.4-2.3 mmol/L

From the above values, the calculated
PaO₂/FiO₂ (P/F) ratio was 180.

Diagnostic Tests

Plain CT Scan of Chest

Impression:

- Bilateral minimal pleural effusions right more than left
- Interlobular septal thickening with centrilobular ground glass lesions seen diffusely involving both lungs
- Features suggest ACUTE PULMONARY EDEMA
- Right proximal humerus fixation noted with plate and screws in situ



Fig. 1: Plain CT scan of the chest showing bilateral pleural effusions and diffuse centrilobular ground-glass opacities with interlobular septal thickening

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Doppler Study of Heart (Echocardiography)

Impression:

- CAD
- Dilated LA

- RWMA in LAD Territory
- (Mild & Distal IVS, LV Apex & Anterior wall Hypokinetic)
- Moderate LV systolic dysfunction
- Moderate MR

Table Iv: Treatment

S.NO	TRADE NAME	GENERIC NAME	DOSE	ROUTE OF ADMINISTRATION	FREQUENCY	DURATION
1	INJ. NORADRENALINE	Noradrenaline	8 mg	Intravenous	42 ml/NS - 10 ml/hr	D1-D3
2	INJ. HUMAN ACTRAPID INSULIN	Human Insulin	40 units	Intravenous	39 ml/NS - 8ml/hr	D1-D2
3	INJ.MEROPENEM	Meropenem	1 gm	Intravenous	1-1-1	D1-D9
4	INJ. DOXY	Doxycycline	100 mg	Intravenous	1-0-1	D1-D9
5	T. OSELTAMIVIR	Oseltamivir	75 mg	Per oral	1-0-1	D1-D9

S.NO	TRADE NAME	GENERIC NAME	DOSE	ROUTE OF ADMINISTRATION	FREQUENCY	DURATION
6	NEB. DUOLIN	Ipratropium bromide+levosalbutamol	500 mcg/1.25 mg	Per nose	1-1-1	D1-D9
7	NEB. FORACORT	Formoterol fumarate dihydrate+Budesonide	20 mcg/0.5 mg	Per nose	1-0-1	D1-D3
8	INJ. PAN	Pantoprazole	40 mg	Intra venous	1-0-0	D1-D9
9	INJ. FUROSEMIDE	Furosemide	20 mg	Intra venous	1-1-0	D1-D9
10	T. ATORV	Atorvastatin	40 mg	Per oral	0-0-1	D1-D9
11	INJ. SOLUMEDROL	Methylprednisolone sodium succinate	40 mg	Intra venous	1-0-0	D1-D9
12	T. CLOPITAB	Clopidogrel	75 mg	Per oral	0-1-0	D1-D3
13	INJ. HEPARIN	Heparin	5000 IU	Intra venous	1-1-1	D3-D9
14	T. HCQ	Hydroxychloroquine	200 mg	Per oral	0-0-1	D5-D9
15	T. ISTAMET DXR	Dapagliflozin+ Sitagliptin+ Metformin HCL	10/100/500 mg	Per oral	1-0-0	D6-D9
16	CANDID MOUTH PAINT	Clotrimazole	25 ml	Local application	1-0-1	D3-D9

DISCUSSION

The patient presented with acute respiratory distress syndrome, requiring immediate intensive care management. In the early stage of the therapy, the major aim was to correct hypoxemia and stabilize the respiratory system. On admission, the patient was critically ill and shifted to the intensive care unit for close monitoring and management. She was started on non-invasive ventilation [NIV/BiPAP] to improve oxygenation, decrease the work of breathing, and avoid the need for invasive mechanical ventilation.

As the patient was hypotensive, noradrenaline and vasopressin was administered to maintain adequate blood

pressure and ensure sufficient oxygen perfusion. Considering the possibility of severe bacterial superinfection, empirical broad spectrum intravenous meropenem and doxycycline was started. Since the influenza PCR confirmed viral pneumonia, antiviral treatment with oseltamivir was initiated. To reduce the intense pulmonary inflammation associated with viral pneumonia and ARDS, low dose intravenous Methylprednisolone was administered. Regular nebulization with Duolin and Foracort was also initiated to relieve bronchospasm, improve airway patency, and enhance ventilation. Clotrimazole mouth paint was also initiated to relieve the fungal infections inside the

mouth, primarily oral thrush (oropharyngeal candidiasis).

Further evaluation with CT chest and Echocardiography revealed acute pulmonary edema with reduced left ventricular ejection fraction (36%). Hence intravenous Furosemide was administered to relieve pulmonary congestion. Fluid intake was restricted to 1.5L/day, and strict input output monitoring was maintained to achieve optimal fluid balance. Echocardiography also demonstrated regional wall motion abnormalities and severe pulmonary hypertension, antiplatelet therapy with aspirin and clopidogrel together with atorvastatin and anticoagulation, was initiated to reduce the risk of thrombotic and cardiovascular complications. The patient had diabetes mellitus and was receiving corticosteroids, blood glucose levels

monitored closely. Insulin (Basaglar) and Dapagliflozin were administered to maintain adequate glycemic control.

The patient had a history of Rheumatoid arthritis so the patient was treated with hydroxychloroquine. With the comprehensive supportive care, the patient's condition gradually improved over the following days. Her blood pressure stabilized, allowing vasopressors to be discontinued, and her oxygen requirement progressively decreased. She was changed from NIV to intermittent oxygen therapy without respiratory distress. Chest physiotherapy, incentive spirometry and early ambulation were recommend to enhance lung expansion and respiratory function. The patient was hemodynamically stable, and was discharged with her condition improved with appropriate medications.

Table V: Discharge medications

S.NO	TRADE NAME	GENERIC NAME	DOSE	ROUTE OF ADMINISTRATION	FREQUENCY	DAYS
1	T. CEPODEM	Cefpodoxime	200 mg	Per oral	1-0-1	5Days
2	T. SOMPAZ D	Esomeprazole magnesium and domperidone	40 mg	Per oral	1-0-0	10Days
3	T. QUICNAC AB	Aceclofenac and paracetamol	100/325mg	Per oral	1-0-1	10Days
4	T. DYTOR PLUS-LS	Torsemide and spironolactone	10/25 mg	Per oral	1-0-0	10Days
5	NEB. DUOLIN	Ipratropium bromide+levosalbutamol	500 mcg/1.25mg	Per nose	0-1-0	10Days
6	NEB. PULMOSMART	Formoterol fumarate and budesonide	20mcg/0.5mg	Per nose	1-0-1	10Days
7	T. ASPIRIN	Aspirin	75 mg	Per oral	0-1-0	Continue

S.NO	TRADE NAME	GENERIC NAME	DOSE	ROUTE OF ADMINISTRATION	FREQUENCY	DAYS
8	T. CLOPITAB	Clopidogrel	75 mg	Per oral	0-1-0	Continue
9	T. ATORVASTATIN	Atorvastatin	40 mg	Per oral	0-0-1	Continue
10	T. HCQ	Hydroxychloroquine	200 mg	Per oral	0-0-1	Continue
11	T. DAPEFY S	Dapagliflozin and Sitagliptin phosphate	10/100 mg	Per oral	0-1-0	Continue
12	T. RECLIDE XR	Gliclazide	120 mg	Per oral	1-0-0	Continue
13	T. OMNACORTIL	Prednisolone	30 mg	Per oral	1-0-1	Continue
14	INJ. BASAGLAR	Insulin Glargine	40 IU	Sub cutaneous	0-0-40	Continue

CONCLUSION

Acute respiratory distress syndrome continues to be a serious condition with high morbidity and mortality especially when it develops as a complication of severe community acquired pneumonia. Early recognition of the disease and timely admission to intensive care plays a crucial role in improving outcomes. Appropriate respiratory support, prompt antimicrobial therapy, careful fluid management, and treatment of associated comorbidities are key components of successful management.

ACKNOWLEDGEMENTS

We thank to the Department of Critical Care Medicine, Tertiary care hospitals, Tadepalli, for permission to access the clinical records and for their support in the preparation of this report.

ABBREVIATIONS

ABG, Arterial Blood Gas, ARDS, Acute Respiratory Distress Syndrome, RA, Rheumatoid Arthritis, ICU, Intensive Care Unit, NIV, Non Invasive Ventilator, PEEP, Positive End Expiratory Pressure, FiO₂, Fraction of inspired Oxygen.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

The consent was taken from the patient to participate in the study at Manipal Hospitals, Tadepalli.

FUNDING

There is no funding investment in this case report preparation.

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