RESEARCH PAPER

Acute Exacerbation Of Copd Presenting With Atrial Flutter Progressing Into Atrial Fibrillation: A Case Report

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Abstract

Background: Acute exacerbation of chronic obstructive pulmonary disease (aecopd) is a common cause of acute respiratory failure in elderly patients, often complicated by infection, hypoxemia, and hypercapnia. Early recognition and appropriate ventilatory support are crucial for favourable outcomes.

Introduction: Chronic obstructive pulmonary disease (copd) is a common, preventable, and progressive respiratory disorder characterized by persistent airflow limitation and chronic airway inflammation. Acute exacerbations of copd (aecopd) are defined as episodes of worsening respiratory symptoms beyond normal day-to-day variation and are a major cause of hospitalization, morbidity, and mortality, particularly in elderly patients. Cardiovascular comorbidities are frequently encountered in patients with copd, among which atrial fibrillation (af) is one of the most prevalent arrhythmias. The coexistence of aecopd and atrial fibrillation represents a challenging clinical scenario due to shared risk factors such as advanced age, smoking, systemic inflammation, hypoxemia, and autonomic dysfunction. Acute hypoxia, hypercapnia, acidosis, and increased sympathetic activity during aecopd can precipitate new-onset atrial fibrillation or exacerbate pre-existing arrhythmias.

The presence of atrial fibrillation in aecopd is associated with increased risk of hemodynamic instability, prolonged hospital stay, higher rates of intensive care admission, and increased mortality. Moreover, management is complex as commonly used therapies for copd, including β-agonists and systemic corticosteroids, may contribute to arrhythmogenesis, while rate-control strategies must be carefully tailored to avoid respiratory compromise.

We present this case to highlight the clinical interplay between acute exacerbation of copd and atrial fibrillation, emphasizing diagnostic challenges, management considerations, and the importance of a multidisciplinary approach in optimizing outcomes in such high-risk patients.

Case Presentation: We report the case of an 84-year-old male, chronic smoker, presented with complaints of progressive shortness of breath, cough with expectoration, for 2–3 days. On admission, the patient was in extreme tachycardia with irregular rhythm of pulse and was tachypneic with use of accessory muscles and hypoxemia. Arterial blood gas analysis revealed type ii respiratory failure with respiratory acidosis. Upon examination engorged neck veins with raised jvp; barrel shaped chest with straightening of ribs was seen and upon auscultation bilateral wheeze and crepitations were heard, and chest imaging was suggestive of lower respiratory tract infection. Ecg showed atrial flutter with low voltage complexes, and laboratory investigations revealed mild anaemia and evidence of infection.

Keywords: Copd, Acute Exacerbation, Type Ii Respiratory Failure, Non-Invasive Ventilation, Elderly Patient, Atrial Fibrillation, Atrial Flutter.

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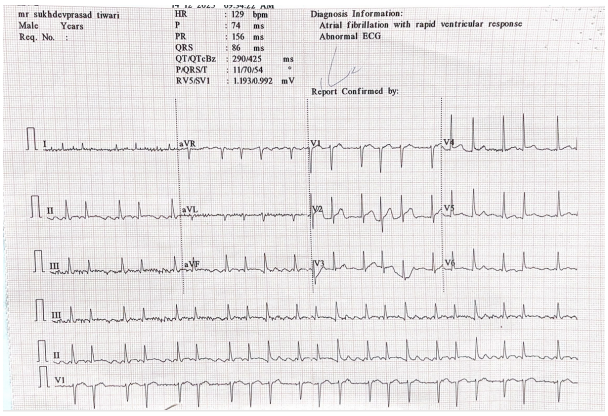
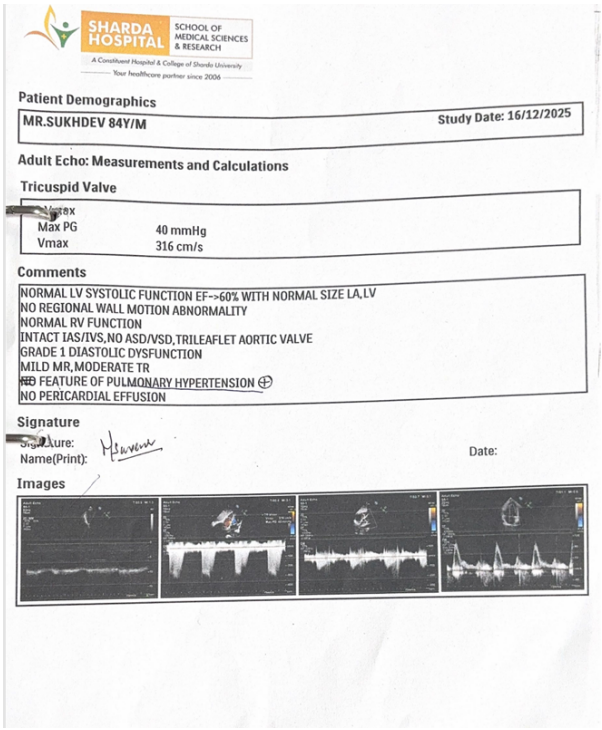
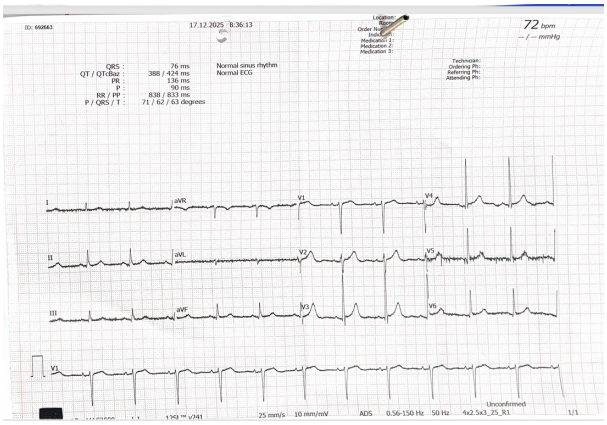
On Investigations - Trop – I was negative and NT-Pro BNP was raised and was 2659.43.

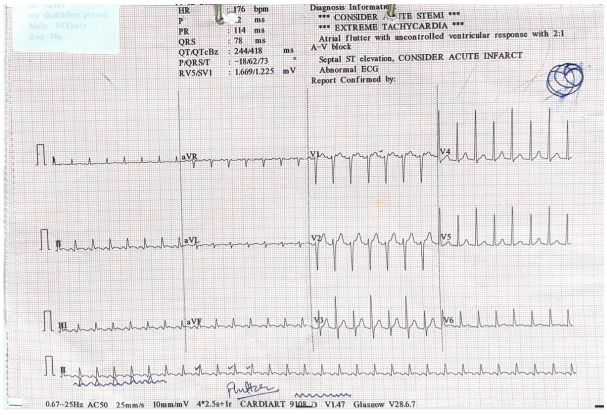


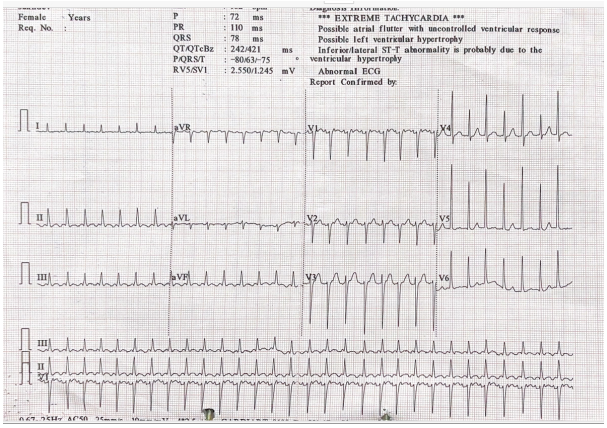
On 2D ECHO



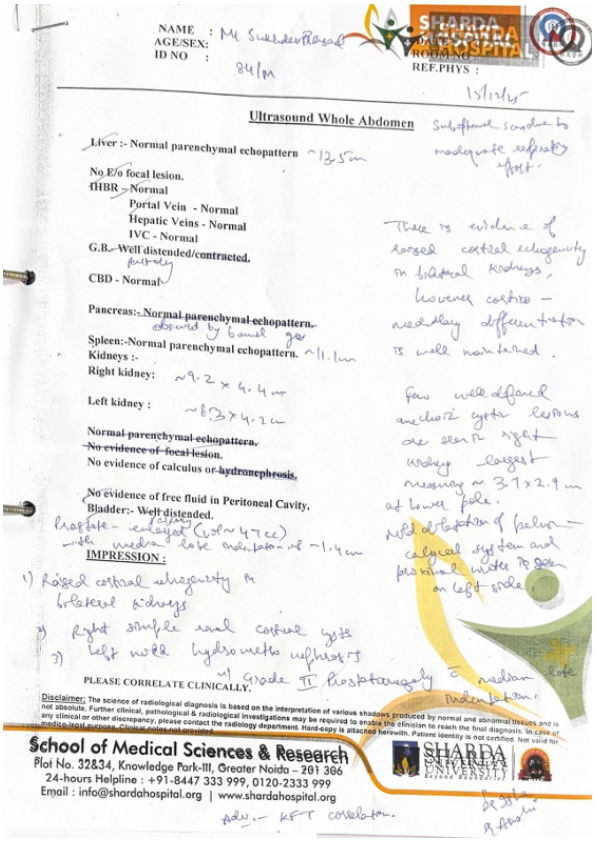


Serial ECG's Of Patient





ON USG W/A –



Hospital Course

84-year-old male, chronic smoker, presented with complaints of progressive shortness of breath, cough with expectoration, for 2–3 days. On admission, the patient was in extreme tachycardia with regular rhythm of pulse and was tachypneic with use of accessory muscles and hypoxemia. Arterial blood gas analysis revealed Type II respiratory failure with Respiratory Acidosis. Upon Examination engorged neck veins with raised JVP; barrel shaped chest with straightening of ribs was seen and upon auscultation bilateral wheeze and crepitations were heard, and chest imaging was suggestive of lower respiratory tract infection. ECG showed Atrial Flutter with low voltage complexes, hence in emergency he was administered diltiazem drug to control rate and it got controlled for some time but after some time rate again increased and became irregularly irregular and hence progressed from Atrial Flutter into Atrial Fibrillation with Apex Pulse Deficit of 18 and hence he was started on tab Diltiazem BD and finally rate was controlled and regular rhythm achieved.

Discussion

Acute exacerbation of chronic obstructive pulmonary disease (AECOPD) remains a major cause of emergency admissions, especially in elderly patients with long-standing smoking history and multiple comorbidities. Our patient, an 84-year-old male with a significant smoking history, presented with classical symptoms of acute exacerbation including worsening dyspnea, cough with expectoration, and systemic features suggestive of lower respiratory tract infection. This case illustrates the complex interaction between respiratory failure, cardiac arrhythmia, and systemic illness in advanced COPD.

The most common triggers for AECOPD are respiratory tract infections and environmental pollutants. Acute hypoxemia, hypercapnia, and respiratory acidosis documented on serial arterial blood gas (ABG) analyses indicate type II respiratory failure. These physiological derangements play a crucial role in precipitating cardiac arrhythmias, particularly atrial fibrillation.

COPD itself predisposes patients to atrial fibrillation through multiple mechanisms including chronic hypoxia, pulmonary hypertension, right atrial enlargement, systemic inflammation, and autonomic imbalance. During acute exacerbations, these factors are further amplified due to worsening gas exchange, increased sympathetic drive, and electrolyte disturbances. In the present case, atrial fibrillation was noted during the acute phase, likely triggered by hypoxia and respiratory acidosis, a well-documented phenomenon in severe AECOPD.

The coexistence of AECOPD and atrial fibrillation significantly complicates management. Beta-agonist bronchodilators, although essential for relieving bronchospasm, may exacerbate tachyarrhythmias. Similarly, systemic corticosteroids, while improving airflow obstruction and reducing inflammation, may contribute to electrolyte imbalance and arrhythmogenesis. Therefore, a careful balance between respiratory and cardiac management was required.

Non-invasive ventilation (NIV) played a pivotal role in this patient's management. NIV is recommended as first-line ventilatory support in AECOPD with hypercapnic respiratory failure as it improves gas exchange, reduces work of breathing, decreases need for intubation, and improves survival. In this case, initiation of NIV led to gradual improvement in ABG parameters, respiratory rate, and mental status, highlighting its effectiveness even in elderly patients when applied early and appropriately.

Serial ABG analysis was instrumental in guiding therapy and monitoring response to treatment. Initial ABGs demonstrated respiratory acidosis with elevated $PaCO_2$ and hypoxemia. With NIV support, bronchodilators, antibiotics, subsequent ABGs showed correction of acidosis and improvement in oxygenation. Continuous monitoring of vitals, oxygen saturation, and cardiac rhythm was crucial, particularly in the context of atrial fibrillation.

ECG findings confirmed atrial fibrillation without acute ischemic changes. This distinction is important, as myocardial ischemia is another common trigger of arrhythmias in COPD patients. The absence of ischemic ECG changes and stable hemodynamics allowed for conservative rate control and supportive management rather than aggressive antiarrhythmic intervention.

AECOPD complicated by atrial fibrillation is associated with worse outcomes, including longer hospital stay, increased ICU admission, and higher mortality. Advanced age, recurrent exacerbations, and cardiovascular comorbidities further increase risk. However, timely recognition, early NIV initiation, and multidisciplinary management contributed to clinical stabilization in this patient, emphasizing that favourable outcomes are achievable even in high-risk individuals.

Learning Points from the Case

This case underscores several important clinical lessons.
Acute exacerbation of COPD can precipitate atrial fibrillation through hypoxia, hypercapnia, and systemic stress.
Non-invasive ventilation remains the cornerstone of management in hypercapnic respiratory failure and can be safely used in elderly patients.

Management of AECOPD with coexisting arrhythmia requires cautious use of bronchodilators and close cardiac monitoring.
Serial ABG and ECG monitoring are essential to guide therapy and detect complications early.
A multidisciplinary approach involving pulmonology, internal medicine, and cardiology optimizes patient outcomes.

Management and Outcome

The patient was managed in emergency with Diltiazem, controlled oxygen therapy, non-invasive ventilation (NIV), bronchodilators, and broad-spectrum intravenous antibiotics. Serial ABGs demonstrated gradual improvement in gas exchange parameters. Supportive care and close monitoring were continued in the medical unit, leading to clinical stabilization and improvement in respiratory status.

Conclusion of Discussion

This case highlights the complex interplay between pulmonary and cardiac pathophysiology in acute exacerbation of COPD. The occurrence of atrial fibrillation during AECOPD serves as both a marker of disease severity and a contributor to clinical deterioration. Early diagnosis, judicious use of NIV, prompt treatment of infection, and careful cardiovascular monitoring are key to successful management and improved prognosis in such patients.

Declarations

Conflict of Interest: None declared
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Patient Consent: Obtained