DYNAMIC CHANGES OF RENAL FUNCTIONAL PARAMETERS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE

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ABSTRACT

The study included 80 COPD patients (GOLD 2024 criteria). Patients were divided into GOLD I–IV groups. Assessed markers

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is associated with progressive airflow limitation and systemic effects including renal dysfunction. Persistent hypoxemia, hypercapnia, systemic inflammation, oxidative stress, and hemodynamic alterations impair renal perfusion and filtration. Early renal decline, including reduced eGFR and increased albuminuria, is now well documented [1, 2].Inflammatory cytokines such as IL-6 and TNF-α, along with endothelial dysfunction, accelerate renal impairment [3]. Chronic hypercapnia is similarly linked to faster progression of renal insufficiency [4].

Aim

To evaluate dynamic changes of renal markers (creatinine, eGFR, UACR) across different COPD severity stages.

Materials and Methods

The study included 80 COPD patients (GOLD 2024 criteria). Patients were divided into GOLD I–IV groups. Assessed markers:

- Serum creatinine
- eGFR (CKD-EPI 2021 equation)
- Urine albumin/creatinine ratio (UACR)
- Arterial blood gases (PaO_2, $PaCO_2$)
- C-reactive protein (CRP)

Results

1. eGFR decreased significantly with increasing COPD severity ($p < 0.05$).

2. Microalbuminuria was detected in 58% of GOLD III–IV patients and correlated with hypoxemia.

3. Hypoxemia demonstrated a negative correlation with eGFR ($r = -0.46$).

4. Renal decline over 6 months was more pronounced in hypercapnic patients ($p < 0.05$).

5. CRP levels positively correlated with UACR, indicating inflammatory contribution to renal injury.

Conclusion

Renal impairment progresses with COPD severity, driven by hypoxemia, systemic inflammation, and hypercapnia. Incorporating early renal screening in COPD management can prevent long-term complications.

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